

PC
MAGAZINE



DIGITAL EDITION
AUGUST 2015



The Best
BACK TO
SCHOOL *gear*



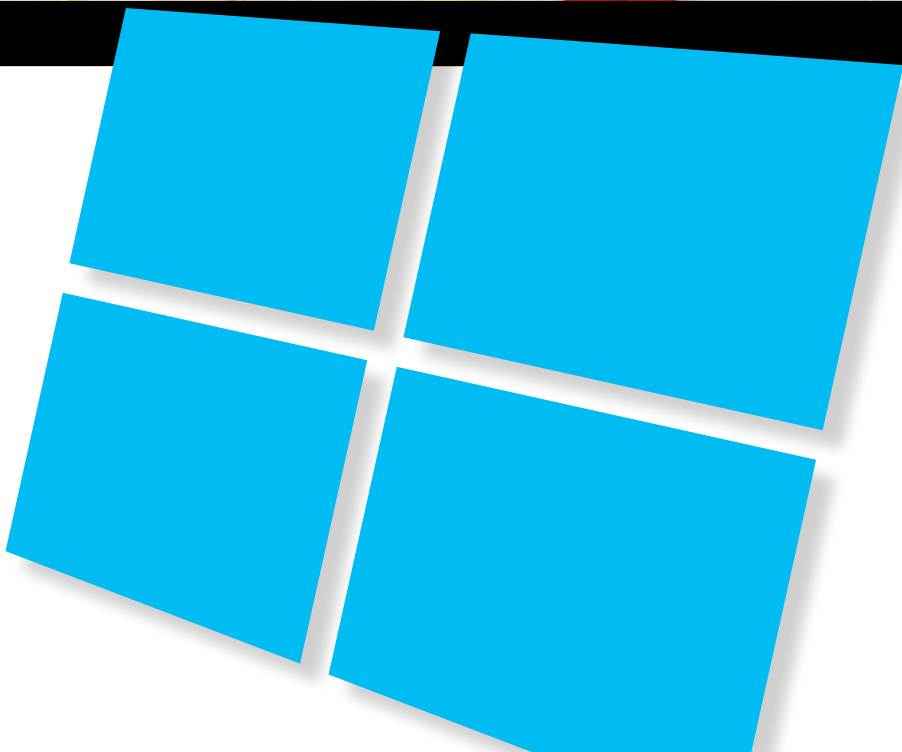
COVER STORY
THE BEST BACK-TO-SCHOOL GEAR

These outstanding—and affordable—tech products will help you make the most of your time both in and out of class.

FEATURES

10 FOR 10

Windows 10 puts a new spin on some classic Windows features. Make the most of them with these tips for the latest version of Microsoft's flagship operating system.



REVIEWS

CONSUMER ELECTRONICS

Apple iPod touch

Bose SoundLink Mini II

DJI Phantom 3 Professional

Pebble Time

Amazon Kindle Paperwhite (Wi-Fi, Special Offers)

HARDWARE

Alienware 15

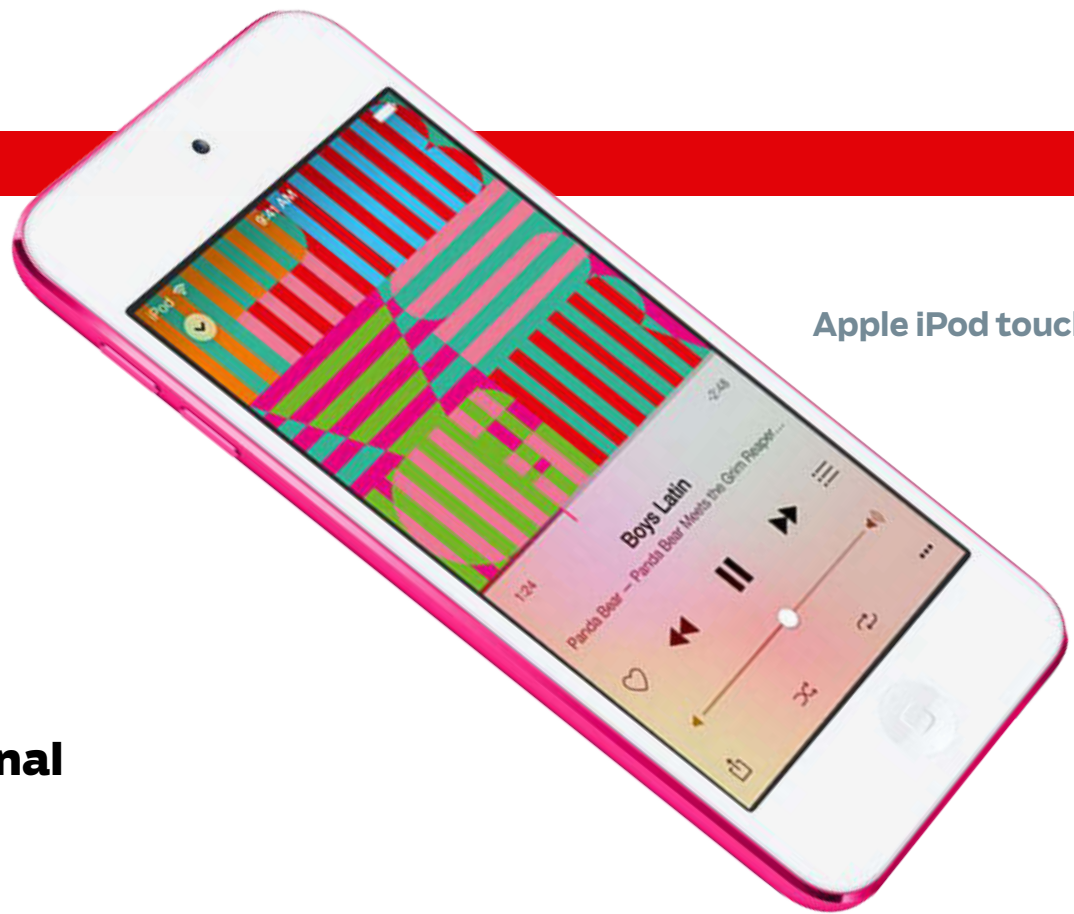
Cyberpower Trinity Xtreme

Zotac Zbox Pico PI320

ViewSonic VP2780-4K

SOFTWARE

SlimWare Utilities
SlimCleaner Free



Apple iPod touch



DJI Phantom 3 Professional



Alienware 15

WHAT'S NEW NOW



WHAT DOES INTEL'S 10NM DELAY MEAN FOR MOORE'S LAW?

Now that the 10nm Cannonlake chip is not coming until 2017, something has to fill the gap.

IMPROVING MOBILE DISPLAYS, MAYBE TOO MUCH

Samsung wants to create an 11K smartphone display. But are you—and your eyes—ready?

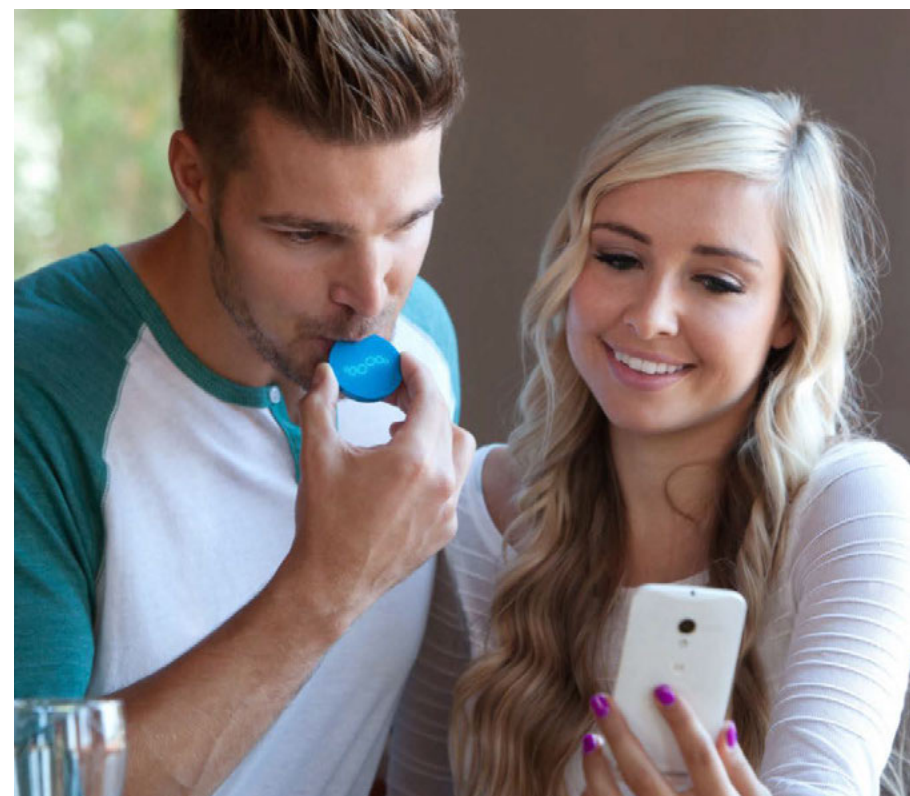
DARKODE SEIZURE PROVES THE FBI CAN GET ANYONE

No one, not even the cagiest hacker on the Internet, is completely safe today.

COMCAST GIGABIT PRO WON'T COME CHEAP

You'll have to pay a lot for Comcast's new, scorchingly fast 2Gbps Internet service.

TOP GEAR



OPINIONS

DAN COSTA

First Word

READER INPUT

MATTHEW MURRAY

Windows 10 Is What
Windows 8 Should Have
Been—3 Years Late

SASCHA SEGAN

Windows 10 Mobile
Gets More Incoherent

TIM BAJARIN

Is Negative PC Growth
the New Normal?



**Just wait until
your medical
records are
breached. What
happens then?**



JOHN C. DVORAK

Last Word

DIGITAL LIFE



GET ORGANIZED

Making the Move to the Cloud

TIPS

Smart Tricks for Polishing
Google Chrome

ENTERTAINMENT

The Ultimate Cord Cutter's
Guide

**CONNECTED
TRAVELER**

Free Travel Apps for Your Next
Road Trip



Educational Upgrades

In the fall of 1990, I went to Syracuse University to study journalism and political science. I did not own a computer. Given my current position, that’s hard for me to admit, especially considering that several guys in the Lab had not only built their own computers by that point, but were already getting into trouble on dial-up BBSes.

Truth be told, I could barely type. There was a “computer lab” on campus, of course—several of them. But schlepping to a lab across campus required a degree of preparation and planning that, as an 18-year-old, I completely lacked. As my editors over the years well know, I’m partial to just-in-time publishing. The fact that my illegible handwriting made my handwritten assignments completely inscrutable didn’t help, either.

I needed a tool. I got a word processor.

By “word processor,” I mean a Brother WP-1400D. Basically, it was an electric typewriter with some digital features. There was a ten-line LCD that let you preview your work before you printed it. The Brother could store documents on a 3.5-inch floppy disk, but the format it used was not PC-compatible. That means that whatever I wrote during those four years—letters, papers, short stories—could be read only on that machine. The Brother had a basic grammar checker, which was really just a spell-checker. It could even play games. When it came time to print, it would loudly bang out a page a minute. I used it all four years of college. It was state of the art.

Fortunately, the Newhouse School of Journalism was a little more sophisticated. The labs at school



were outfitted with the latest Macs (finally in color), although it's hard for me to remember the exact model—maybe LC II? That came with a blazing Motorola 68030 processor running at 16MHz (!), 4MB (!!) of RAM, and a 160MB (!!!) hard drive. It was in the lab I learned a relatively new desktop publishing program called QuarkXPress, my skill with which I credit with landing me my first job out of school as an editorial assistant at a little book called *Mobile Computing*. Suffice it to say, from then on I had much better hardware to both work and play with.

That was 25 years ago. Some things have changed. Although heading off to college may spur a laptop upgrade, that computer is unlikely to be the first any kid today has owned. And it's impossible to imagine a teenager without a smartphone that would put that old LC II to shame. There is no shortage of gear these days; the kids have all the tools they need.

And hardware upgrades are just upgrades to the education landscape. Colleges offer a lot of courses online, but sites like Khan Academy are putting up an entire *education*. Students operate in a world where every fact isn't just a search box away, but increasingly just a matter of making a simple verbal request to Siri, Cortana, Alexa, or the less-personably named Google Now. Today, a modern education is less about what you know and more about how you can find out. You need to know



When I got to college, *PC Magazine* had already been publishing for eight years. Obviously, I wasn't paying close attention to the PC market then—if I had been, I wouldn't have bought a Brother WP-1400D.



what questions to ask and how to interpret the never-ending deluge of data that surrounds us.

We're leading with back-to-school gear in this issue, but there's another big story out there: Windows 10. As this issue heads off to the online newsstands, the operating system is already in hardware makers' hands and current Windows 7 and Windows 8 customers are just days away from being able to download it and start using it themselves. Michael Muchmore and Matthew Murray show you how to make the most of the OS's most notable new features.

Finally, I wanted to share some feedback on the #ilovepcmag twitter campaign we launched last month. I asked you to use the hashtag and promised to share a link with a special \$1-per-issue subscription offer for *PC Magazine*. Hashtags campaigns can be risky, but this one worked out really well. It was supposed to be a limited-time offer, but we're going to keep it running. If you use the tag, I'll reply with our discount link. And if you want to add a few words saying what you like about the magazine or what you want to see more of, include that as well.

When I got to college, *PC Magazine* had already been publishing for eight years. Obviously, I wasn't paying very close attention to the PC market then—if I had been, I wouldn't have bought a Brother WP-1400D. Hopefully, this issue will help today's kids make better decisions than I did.

dan_costa@pcmag.com



Boot Camp

I know your magazine has featured an article on building a gaming PC. My son has purchased all the parts and has built his. Do you have any troubleshooting tips if, after it's all together, it doesn't work?
—Amy Billings

OUR ANSWER:

Please pass along my congratulations to your son, Amy. Building a computer is a wonderful experience, and the surest way I know of to get the best system for your money (as well as the simplest to upgrade or change around later).

The good news is that, in most cases, following a good set of building guidelines (like those in our June 2015 cover story), and paying close attention to the technical specifications while shopping and in the components' manuals afterward, everything will run fine. That said, any setbacks that occur are typically fairly minor and easily addressed.

First, the best diagnostic tool is the computer's monitor. Do you see anything on the screen? How far does the computer get in the boot process? Can you enter the BIOS or UEFI (system settings)? Is there a message about not recognizing your storage drive or not being able to find the operating system? Or are you informed about some other error? The messages on the screen will help you solve most problems.

Manufacturers of high-end or gaming motherboards recognize that their customers will probably tweak and tinker more than the average person, and often provide another tool for assessing issues: a built-in LED screen that displays two-character debug codes during boot-up and operation. If something goes wrong, see what the code is and then look it up in the manual. Then you'll almost certainly know where you should focus your attention.

Examine the other components, too. Are the fans on or off? Do you see all the lights you expect? Do you hear anything out of the ordinary, or does the sound change, and at what point in the boot process does this occur? Hopefully the answer to this one is no, but just in case: Do you see or smell smoke? (I have. It's not fun.) Admittedly, this requires extra technical knowledge, but you can answer a lot of these questions by keeping your eyes and ears (and occasionally your nose) open.

If your system still isn't working, then you may need to get your hands dirty. Start by reinstalling the RAM chips in their slots; even experienced builders can sometimes fail to push them in all the way. Check that all your wires and power connections are securely plugged in everywhere they should be. There's also a chance you may need to remove your CPU cooler and check the chip itself. It could be seated improperly or overheating, and just moving things around may get the system working.

Although the system may still not work once you've done all this, and you may have to take the entire thing apart and rebuild it or exchange some of the hardware, these steps will resolve most major problems. They may look intimidating, but remember that diagnosing and overcoming these kinds of obstacles comes with the territory—and is a big part of the fun. Little in the technology realm is more satisfying than building your own computer and booting it up for the first time. If you stumble a bit on the way there—and we all do from time to time—that only makes your final success that much more sweet.

—Matthew Murray, Managing Editor of Digital Editions

Ask us a question!

Have a question about a story in *PC Magazine*, one of the products we cover, or how to better use a tech product you own? Email us at letters@pcmag.com and we'll respond to your question here. Questions may be edited slightly for content and clarity.



What's New Now

**WHAT DOES INTEL'S 10NM DELAY
MEAN FOR MOORE'S LAW?**

**IMPROVING MOBILE DISPLAYS,
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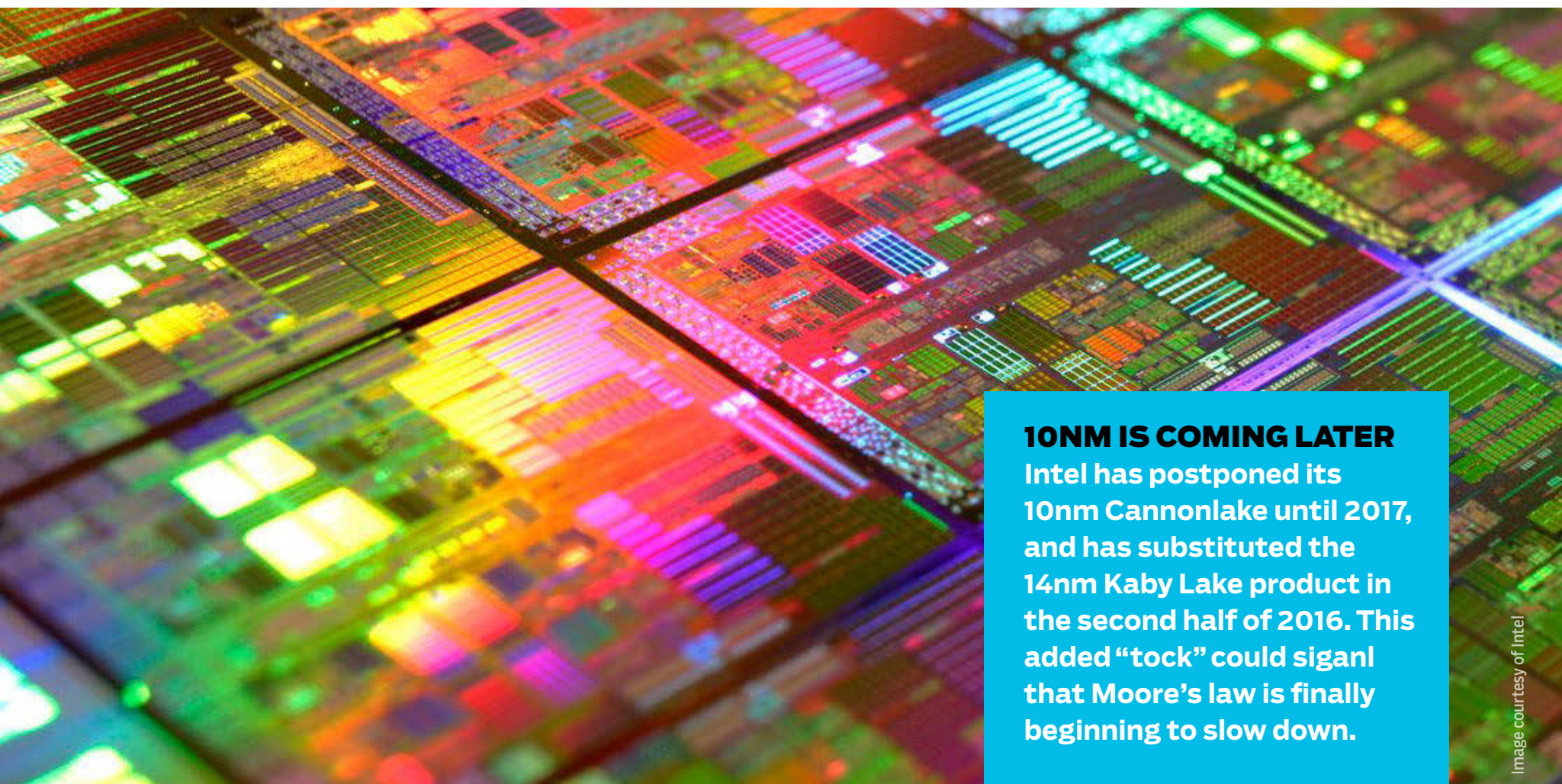
**DARKODE SEIZURE PROVES
THE FBI CAN GET ANYONE**

**COMCAST GIGABIT PRO
WON'T COME CHEAP**

TOP GEAR

What Does Intel's 10nm Delay Mean for Moore's Law?

BY JOEL HRUSKA



10NM IS COMING LATER

Intel has postponed its 10nm Cannonlake until 2017, and has substituted the 14nm Kaby Lake product in the second half of 2016. This added “tock” could signal that Moore’s law is finally beginning to slow down.

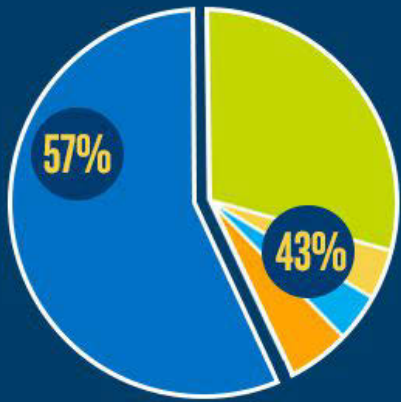
Image courtesy of Intel

Intel dropped a bombshell during its recent Q2 2015 conference call. The company’s sales were in line with reduced expectations, at \$13.2 billion revenue, down 5 percent year-over-year. Revenue rose 3 percent compared with Q1, with slightly better gross margins compared with previous expectations (62.5 percent, above the expected 56 percent). PC sales revenue fell 14 percent, but Intel’s tablet business shipped 9.9 million devices, up 11 percent year-over-year. Profits in the data center group also rose significantly, to \$3.9 billion (up 10 percent year-over-year).

What most are likely to notice, however, is the announcement that Intel’s 10nm hardware will be delayed. Intel CEO Brian Krzanich told investors, “The last two technology transitions have signaled that our cadence today is closer to 2.5 years than two. To address this cadence, in the second half of 2016 we plan to introduce a third 14nm product code named Kaby Lake, built on the

INTEL Q2 2015 EARNINGS

REVENUE BY SEGMENT



- Client Computing Group (\$7.5B)
- Data Center Group (\$3.9B)
- Internet of Things Group (\$559M)
- Software and Services (\$534M)
- All Other (\$715M)

REVENUE	GROSS MARGIN
\$13.2 BILLION up 3% versus Q1 '15; down 5% versus Q2 '14	62.5 PERCENT up 2 points versus Q1 '15; down 2 points versus Q2 '14
NET INCOME	EARNINGS PER SHARE
\$2.7 BILLION up 36% versus Q1 '15; down 3% versus Q2 '14	55 CENTS up 34% versus Q1 '15; flat versus Q2 '14

CHANGING TIMES
Intel's earnings show how the PC market is changing—it's down 5 percent compared with the same time last year—though the company is compensating in other areas.

“Second-quarter results demonstrate the transformation of our business as growth in data center, memory and IoT accounted for more than 70 percent of our operating profit and helped offset a challenging PC market.”

— Brian Krzanich, Intel CEO

Q2 2015 HIGHLIGHTS

- ✓ Datacenter Group expanded Xeon® portfolio, announced key design wins.
- ✓ Intel plans to acquire Altera for data center and IOT innovation.
- ✓ Intel® Atom™ x3 (“SoFIA”) based devices now shipping in US, Asia; more coming.
- ✓ Launched Intel® Compute Stick; unveiled Intel® Unite™ for smarter conference rooms.



foundations of the Skylake microarchitecture but with key performance enhancements. Then in the second half of 2017, we expect to launch our first 10nm product, code-named Cannonlake. We expect that this addition to the roadmap will deliver new features and improved performance and pave the way for a smooth transition to 10 nanometers.”

Investors obviously had a number of questions on this point, but Krzanich held his ground, noting that this 10nm delay was fundamentally similar to what Intel had done with 14nm. Krzanich put much of the blame on the intrinsic difficulty of the 14nm-to-10nm transition, particularly the lack of EUV or a new lithography technology. Krzanich doesn't want to label this a deviation from Intel's vaunted “tick tock” development model (one analyst referred to it as “tick tock tock”), but Intel continues to claim that it will deliver a 10nm process before any of its competition.

Krzanich, again: “We believe, even with this in 2017, our lead in Moore's Law will not change dramatically. We believe we'll continue to lead with roughly the same leadership position that we have today. We base that on, one, what really counts when I talk about 2017, that's not samples, that's not small volume. That's converting over Cannonlake and producing a large percentage of our

SMALL'S NOT ALL

Intel CEO Brian Krzanich is defending the company's change in strategy, and says that its "lead in Moore's Law will not change dramatically."



Image courtesy of Intel

“
Intel isn't lying when it says it leads on multiple metrics of semiconductor performance.
”

CPUs in volume in the second half of 2017. So there's a bit of definition. When we say second half of 2017 we're talking about millions of units and large volumes.

“And then, as you said, there's this definitional difference,” Krzanich continued. “This will be now our third generation of FinFETs by then. It will have several other transistor enhancements. And we believe if you take a look at the scaling, it will be quite strong relative to the normal scaling parameters that occur with the Moore's Law transition. I'm not going give you the exact numbers right now. But we think if you combine all those together, our leadership position doesn't change, even with this date.”

Obviously as Intel's CEO, Krzanich has good reason to spin the news this way, but chasing after which semiconductor firm has the “best” iteration of a process is prone to leave one stuck in the weeds. The fact is, Intel's 14nm process is different from Samsung's, which is different from TSMC's—and Intel isn't lying when it says it leads on multiple metrics of semiconductor performance. The flip side to that, of course, is that Intel's wafers and cost structure have traditionally been much higher than either of its foundry competitors. Whether its advantages are strengths or weaknesses depends on whether you think Intel will continue to derive the bulk of its revenue from the traditional PC business or will transition to a smartphone and tablet-centric business with a cost structure designed to compete with the likes of Samsung, TSMC, and GlobalFoundries.

Improving Mobile Displays, Maybe Too Much

BY JOEL HRUSKA



A recent report claims that Samsung is working with an industry consortium in a bid to create ultra-high-definition screens, with some additional investment from the South Korean government. The new project, dubbed EnDK, will focus on building an 11K display in partnership with 13 unnamed foreign companies and a total of \$26.5 million dollars of government funding. Apparently, Samsung is hoping to have a prototype display by the 2018 Olympics.

The Korea IT News claims that Samsung is targeting 2,250 pixels per square inch (ppi), which works out to a shade less than 11,520 by 6,480 pixels on a 5.1-inch screen. Put in pixel terms, that's a massive 74 megapixels. Modern 1080p screens are 2MP, 4K displays are 8MP, and even hypothetical 8K displays top out at 32MP. In short, Samsung wants to build ultra-dense displays and it



iPad 3

iPad 2

NIX PIXEL PICKS?

A comparison of pixels on the Retina display—equipped iPad and on the iPad 2. Samsung is proposing pixels about ten times smaller than those on the left. That may be going too far.

claims that doing so would create images so vivid that “there is an optical illusion where it is same as watching 3D screen. Because 11K is able to show screen colors in detail, it is able to show 3D-effect.”

This is a rather strange claim. There are already existing technologies for using glasses-free 3D—Sharp has previously marketed 3D LCD panels and Nintendo’s 3DS uses a parallax barrier already to create 3D imagery. An 11K display might have astonishing levels of clarity and detail, but such features aren’t enough to create what’s typically thought of as a 3D image.

According to Dr. Raymond Soneira of DisplayMate, there’s no known method for making a display look 3D just by pushing pixel density—and there’s even less reason to think that a massive 2,250ppi density would be particularly useful. “The highest human visual acuity is 20/10 vision, which is twice as sharp as normal 20/20 vision,” Soneira told *PC Magazine*. “At a typical smartphone 10-inch viewing distance, 20/10 vision corresponds to about 690ppi. At an obnoxiously close 5-inch viewing distance that is 1,380ppi... That’s still only about half of the proposed 2,250ppi.”

Soneira said that even the 20/10 claim could be inaccurate when applied to smartphones because the conditions used to test acuity typically assume sharp, high-contrast test images viewed in near-darkness. Smartphones aren’t used in anything like these conditions, so it would be even harder to see any benefit from the proposed resolution.

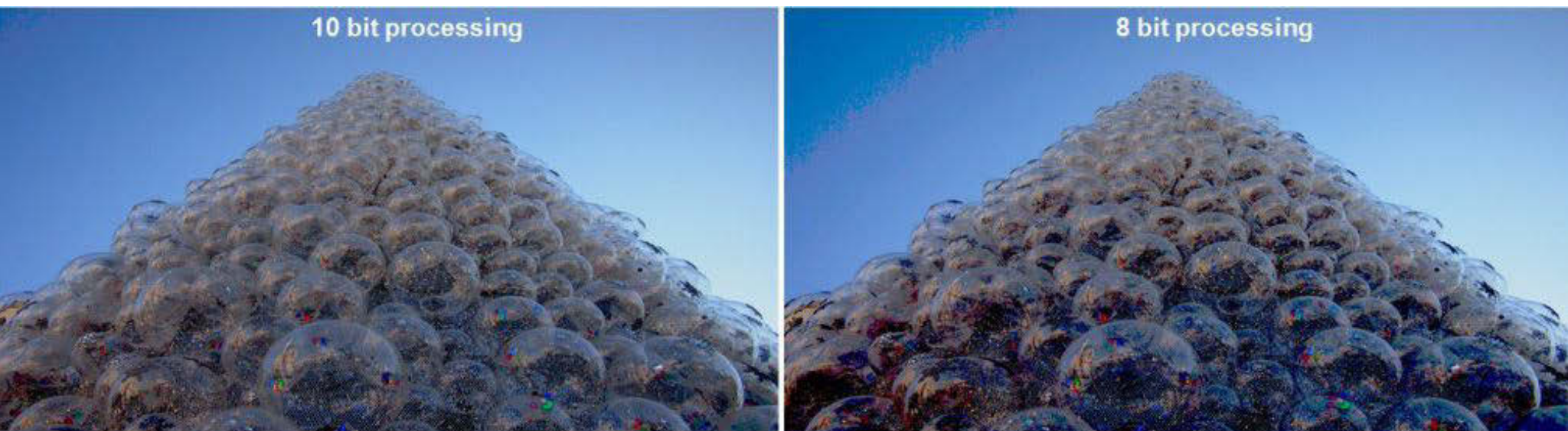
WHY HIGH-RESOLUTION DISPLAYS ARE THE WRONG IDEA

To my mind, high-resolution displays are fundamentally barking up the wrong tree. Every pixel in a mobile display requires power to operate. When you ramp up the pixel counts, you increase the amount of power required to operate the

panel, while simultaneously decreasing the amount of light that can pass through the tiny gaps in the display and actually reach the user.

Companies have continued to innovate around these problems, to be sure, but an 11K display would pack approximately 9.25 times as many pixels as a current 4K panel. In order to keep power draw constant compared with 4K, we'd have to reduce total panel power consumption by roughly 90 percent from present levels. That's going to be extremely difficult, particularly when you consider the need for GPU technology that can actually drive the panel.

Modern high-end GPUs from AMD and Nvidia can drive 4K above 30 frames per second with system power consumption of 280 to 350 watts and hundreds of gigabytes per second worth of memory bandwidth. Although Wide I/O should be available by the time Samsung hopes to debut its technology, keep in mind that 11K is more than nine times the pixels of 4K, and driving 4K successfully requires the most expensive GPUs you can buy today. A 74MP display on a 5-inch device would need far more GPU firepower than we can build into desktops or reasonably expect to build into desktops. And because the absolute best human visual acuity tops out around 690ppi, we're still talking about densities that no one can actually see.



There are other ways to enhance visual quality. Higher-quality color reproduction. Better wireless standards that allow for less image compression. Redesigned display standards that consume less power and allow for longer viewing or more even backlighting. All of these options would improve what people see when they reach for a smartphone or tablet. And they're all better ideas than shoving pixel density out the point where you literally need superhuman vision to see differences.

Darkode Seizure Proves the FBI Can Get Anyone

BY JOEL HRUSKA



A joint operation by the FBI and the law enforcement agencies of 19 other countries has led to the takedown of the notorious discussion forum for criminal hackers Darkode.me. It was the most central English-speaking hub for the sale of credit card numbers, criminal hacking hardware, and malware written for commercial sale. Originally called Darkode.com, the forum had shifted several times in response to pressure from authorities and the “white hat” hacking community, adding layers upon layers of security. It was a highly encrypted, invite-only forum hosted by true paranoiacs, and featuring a tiered access system designed to keep any unavoidable infiltrators away from the most sensitive discussions. With an air of true satisfaction, the FBI announcement makes the implication clear as day: If we can get Darkode, we can get anybody.



The arrest itself was massive in terms of geographical scale. That collaboration of 20 nations led to 70 arrests including, allegedly, Darkode's main administrator, which likely involved both funded infiltration (agents cleared to engage in some illegal activity to pass criminal vetting) and the classical approach of secretly turning criminal insiders. Whatever the means of the breach, Darkode's profile, and its well-known penchant for security measures, makes the FBI takedown notice on Darkode.me a powerful symbol. The site was a one-stop-shop for things like botnets and zero-day exploits in fundamentally important software. It was an approachable hub that made escalation of low-level criminal activity much easier.

Darkode has actually been beaten to some extent before—and not just by law enforcement. It's been taken down many times by DDoS attacks aimed at keeping it offline as long as possible. The security researcher and vigilante hacker Xylitol also released a huge cache of information about Darkode users and administrators in 2013. But the steps taken by Darkode members and administrators, from complicated encryption schemes to overt strategies like constantly changing forum usernames, meant that any damage did not spread far. You could compromise one of the members or administrators, but because the whole enterprise is premised on nobody trusting anybody, that really shouldn't matter.

The situation of Brian Krebs illustrates the level of security they exercised. Krebs, a security blogger, had worked his way into the beginner levels of the forum, and was using this insight to inform his articles on new hacks and exploits. Darkode administrators knew he was in there somewhere, but with the

krebs (Inbox)

From: [mafi](#)
 To: [sp3cial1st](#)
 Posted: Wed Jan 16, 2013 5:41 pm
 Subject: krebs [QUOTE](#)

looks like krebs swallowed the bait, and i got an idea how to catch him now for the next thread

[PROFILE](#) [EMAIL](#)

[Save Message](#) [Delete Message](#)

[Post Reply](#)

All times are GMT

Jump to: [Go](#)

DIRTY LITTLE SECRETS
 Administrators on Darkode discuss catching journalist infiltrators in their midst.

need to make money off a bustling marketplace, they couldn't just ban every user they were unsure about. The solution was a sting operation, which targeted Krebs by planting a fake story for him to report, then zeroing in on exactly which "lurker" forum account was his. Xylitol's breach exposed private messages like, "Looks like Krebs swallowed the bait, and i got an idea how to catch him now for the next thread."

In cases like this, one of the FBI's most powerful weapons is a lack of specificity. Tell the criminals precisely what technologies were used to attack the forum, and they'll quite quickly unite behind a newer, better standard. But with rumors running wild about just what law enforcement can and cannot do, it's in the best interests of investigators to play things close to the chest. A fractured criminal market, divided by differing opinions on how best to stay safe, could be much easier to take down.

For example, many hackers believe to this day that the Tor Network is a deliberately insecure government "honeypot" designed to lure dummies into using it for criminal activity—a belief that, if false, works decisively to law enforcement's advantage. Maybe Freenet is really the best thing to use; if that's the case, the FBI will go to great legal lengths to keep from confirming it publicly.

As always happens after a high-profile government takedown, the cybercrime community is atwitter with rumors and speculation. Did the administrators manage to kill or wipe the servers before seizure? Did the FBI really get the site's main administrators (they've been known to exaggerate in initial reports)? These are salient questions because, despite the fact that Darkode was supposedly structured to be safe for its users, criminal admins have been known to collect info on their users specifically for later use as a Get Out of Jail Free card. High-level users still at large will be watching out for such news—perhaps while packing for a one-way trip to Eastern Europe.

Comcast Gigabit Pro Won't Come Cheap

BY ANGELA MOSCARITOLO



COMCAST

Want multi-gigabit Internet service? You're going to have to pay for it. Comcast has finally revealed pricing for its Gigabit Pro service, which promises “next level” speeds of up to 2Gbps, and let's just say you had better have some deep pockets if you want in. According to the cable giant's new Gigabit Pro website (xfinity.com/multi-gig-offers), the service will set you back \$299.95 per month.

That's \$230 more than you'd pay for gigabit Internet service alone via Google Fiber, but at 2Gbps, it's also twice as fast. And considering that Comcast currently sells its top-tier Extreme 505 Internet—which clocks in at 505Mbps, or four times slower than Gigabit Pro—for \$400, the new 2Gbps service is somewhat of a bargain. Comcast has said that 505Mbps customers will get a bump to 2Gbps.

Those who want Gigabit Pro will need to sign a minimum two-year contract, and pay fees of up to \$1,000 for installation and activation, Comcast said. So you're basically committing to pay nearly \$7,200 over the next two years, plus the cost of installation and activation.

First unveiled in April, Comcast's fiber-to-the-home Gigabit Pro is expected to be available in about 18 million homes by the end of the year. Comcast has already committed to rolling out Gigabit Pro to portions of California, as well as Atlanta, Georgia; Chattanooga, Tennessee; and the Miami, Fort Lauderdale, and West Palm areas in Florida.

“Our approach is to offer the most comprehensive rollout of multi-gigabit service to the most homes as quickly as possible, not just to certain neighborhoods,” said Doug Guthrie, senior vice president of Comcast Cable's South Region, making a dig at Google's city-by-city rollout.

In January, Google said it will roll out its super-fast gigabit Internet service in 18 cities across four metro areas: Atlanta, Charlotte, Nashville, and Raleigh-Durham. Salt Lake City also joined that list in March.



What We Love Most This Month

BY MATTHEW MURRAY
AND STEPHANIE MLOT



AWAIR

Do you know what the quality of the air in your home is? If not, Awair may be able to help. It measures and analyzes the temperature, humidity, carbon dioxide, volatile organic compounds, and dust in your home's air, then gives you recommendations on how you can improve conditions to deal with allergies, be more productive, sleep better, and so on. Even if Awair can't solve every problem, it will give you the information you need to breathe easy.

\$149 getawair.com



What We Love Most This Month

BY MATTHEW MURRAY
AND STEPHANIE MLOT



BREATHOMETER BREEZE

Drunk driving killed more than 10,000 people in the United States in 2013. Don't become a statistic, and don't let inconvenience keep you from knowing whether it's safe to get behind the wheel. The Breeze is a portable, wireless breathalyzer that links with your smartphone to not only inform you of your current blood alcohol level, but also tell you when you'll be safe to drive again. (Note: The Breeze cannot replace common sense.)

\$79.99 store.breathometer.com



What We Love Most This Month

BY MATTHEW MURRAY
AND STEPHANIE MLOT



RANGE SMART COOKING THERMOMETER

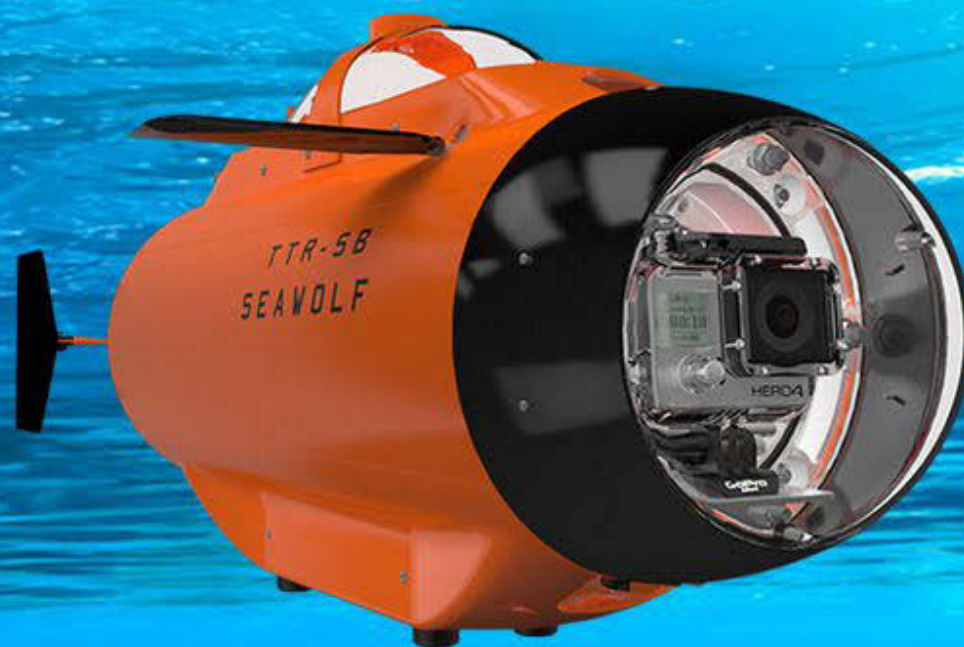
Simply trusting your eyes when you're cooking can lead to culinary catastrophe. Connect the Range Smart Cooking Thermometer to your iOS device and then insert its probe into your recipe. You'll be informed of your food's temperature so you can hit medium rare or the hard crack stage perfectly every time, and get the news instantly on your mobile device. Choose the Ember model for use with an oven or grill, or Aqua for making candy and brewing beer.

\$69.95 supermechanical.com



What We Love Most This Month

BY MATTHEW MURRAY
AND STEPHANIE MLOT



SEAWOLF

Action cams can be a huge amount of fun, but there are some places even they can't go. TTRobotix is scratching one off the list with its Seawolf, a submersible vehicle that lets you load up your GoPro or other sports camera and capture unique still photos and videos underwater. A heavy-duty carrying case and a miniature surface boat, for transmitting the signal between the Seawolf and your smartphone or a dedicated remote (depending on model), are included.

\$999 ttrobotix.com



What We Love Most This Month

BY MATTHEW MURRAY
AND STEPHANIE MLOT



WAKAWAKA POWER+

Don't get caught without power or light just when you most need them. Leave the WakaWaka Power+ in the sun for 12 hours and you'll store up enough juice to charge your phone, tablet, or other small electronic device when there may not be an outlet anywhere nearby. A built-in emergency beacon and flashlight (rated for up to 150 hours of sustainable illumination) will grant you further peace of mind, regardless of where you are.

\$79 us.waka-waka.com



Opinions

MATTHEW MURRAY

SASCHA SEGAN

TIM BAJARIN



**Windows 10
is more than
just an operating
system upgrade—
it's a godsend.**



MATTHEW MURRAY

WINDOWS 10 IS WHAT WINDOWS 8
SHOULD HAVE BEEN—3 YEARS TOO LATE

Windows 10 Is What Windows 8 Should Have Been—3 Years Too Late

I've been a Windows fanatic for nearly a quarter of a century. As a system builder and a (former) IT guy, it's what I used and came to understand and love, and I was willing to defend the operating system against the slings and arrows of sniffing, Apple-fueled outrage. From my perspective, Microsoft had made each release better than the one before, introducing new features and improving old ones in every area of the computing experience that mattered to me. And, until 2012, I never regretted my allegiance to Microsoft or its flagship product.

But installing Windows 8 on my freshly built home computer the week that OS was released still ranks as one of the worst technological mistakes I've ever made. I'd played with the early preview builds and knew what I was up against, but held out hope that the company had ultimately found a way to make it work. I lasted 5 hours. Forget prime time: Windows 8 wasn't ready to sub for Magic Bullet infomercials at 2:30 a.m. Short messages consuming my entire 1,920-by-1,200 display, being forced into the new Start environment regardless of how I tried to stay on the desktop—20 years supporting Microsoft, and it had put out an OS not designed for me. I wiped my system, reinstalled my beloved Windows 7, and resumed looking forward.



Matthew Murray, *PC Magazine's* managing editor, has edited its hardware, software, and consumer electronics content, and previously served as an editor at *Computer Shopper*.

So, for me, Windows 10 is more than just an operating system update—it's a godsend: a return to the path Microsoft never should have abandoned, of sensible rethinks and gentle nudges in new directions without discarding the past. Even so, I can't pretend that Windows 10 isn't, on a very real level, too little, too late. It is, in short, exactly what Microsoft should have done three years ago, but didn't. Now, in addition to looking like a colossal backtrack—which it is—it's also representing a stifling of further innovation that the tech industry, and particularly the moribund PC market, desperately needs.

It's been theorized that Microsoft slammed down the gas pedal on Windows 8 specifically to spur app development for the platform, guessing (perhaps correctly) that software makers wouldn't turn out the most varied, robust offerings possible if they didn't have to. That wouldn't surprise me, to be honest, and if Microsoft is ever to compete with iOS and Android in the mobile space, apps that aren't just up to snuff but make the most of their hardware are essential.

But in pursuing a market in which it's never had a solid toehold, Microsoft turned its back on the hundreds of millions who were already in its thrall. Those users (me included), many of whom had systems that weren't equipped with touch screens, wanted the faster speed and next-generation compatibility that Windows 8 provided. To get it, however, they had to learn a new usage model entirely from scratch, and Microsoft simply did not make it easy. Users without touch screens didn't like it because it was a pain to navigate, without the Start button that was their entry point to everything they did or even so much as the option to boot to the desktop. Companies didn't like it because it

would require spending time (and thus money) retraining their workforces. Microsoft felt the backlash and rapidly released updates to put back the things it had taken out, but the loss in goodwill was harder to salve: Whether you liked, tolerated, or hated Windows, you could at least trust it from one version to the next. No longer.

Unlike Windows 8, which was the OS equivalent of a mother bird pushing her wingless baby out of the nest, Windows 10 is the gentle, hand-holding guide into this strange new world that all of us need. If you use a phone or a tablet, you'll have full access to the Start environment. Users of more traditional PCs never have to see it if they don't have to—they can (and will, by default) boot directly into the Desktop. Of course, they have the choice of using the new-style apps by pinning them to the Start menu, or unpinning them and using the Menu the traditional way. There are the *de rigueur* speed increases, yes, but also changes to the Mail and Word apps that everyone can take advantage of on any device. And if you're invested in the Microsoft ecosystem in more than one way—say, by a desktop at work and a phone or a tablet that you carry around with you—the Continuum feature will make sure that the work you're doing follows you and behaves just as you need it to behave. Windows will work as it should on whatever device you're on, tailoring its capabilities to you, not forcing you to bend to its will.

This is all common sense, and it all should have been implemented in Windows 8 in exactly this way. Then the version that succeeded it—which probably wouldn't have been called Windows 10, because 8 wouldn't have been so bad that everyone (including those who made it) would be that desperate to get away from it—would then



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have been more like the 8 we got: the ultimate fusion of the new-style interface with contemporary hardware, the seamless blending of mobile and desktop that everyone in the industry has been striving to attain since it became clear the classic usage patterns were shifting irreversibly. But OS makers were tentative because of just how jarring a change this would be for many people. Since releasing iOS seven years ago, Apple has been slowly moving toward merging it with OS X, getting users of one acquainted with (and even reliant on) what the other has to offer, so eventually one OS will be all any Apple user needs it. But Cupertino saw that users weren't ready for that switch and held back. Microsoft pulled the trigger too early, and ended up shooting itself right in the face.

So as happy as I am that Windows 10 is finally here to deliver the experience I need, in the end it's nothing to celebrate. It's a temporary bandage for a wound that should never have been inflicted, a better-late-than-never Hail Mary. It's Microsoft making amends rather than making news. With any luck, Windows 10 will free Microsoft to bring us the new world of computing we've wanted to see for a decade—what's good in Windows 10 certainly suggests that's possible. But I fear that the company's previous mistakes will slow it down, making it more reluctant than it should be to innovate the next time around.

People need and want something new and different; they just don't want to lose what they have to get it. If this is a lesson that Microsoft takes to heart now and never forgets, maybe the Windows 8 fiasco will have been worth it.

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Windows 10 Mobile Gets More Incoherent

Microsoft needs to be a “mobile-first, cloud-first” organization; it’s CEO Satya Nadella’s mission statement. But although Microsoft is doing pretty well transitioning to the cloud, this past month brought another Microsoft disaster in mobile, and it’s one that could imperil the company’s overall Windows 10 strategy.

Microsoft is swerving all over the road so hard that it’s impossible to tell where it’s going.

Nadella laid off 7,800 people, took a huge write-down, and declared a new mobile strategy. Microsoft seems to have a new mobile strategy annually. It worked with big-name, first-world partners like Samsung and LG, and charged them license fees. Then it focused on Nokia, which it bought, so it became primarily a first-party phone maker. Then it tried to nurture lesser-known, developing-world partners and didn’t charge them. It kept its core experiences like Office to itself, and then it deployed them across all the competing major operating systems. It tried to appeal to less tech-savvy consumers and then, at MWC this year, said it was going big for business.

So now Nadella is saying that he no longer wants to “grow a standalone phone business” but instead “create a vibrant Windows ecosystem.” Okay, it sounds like he’s backing off from hardware. But wait! He is “committed



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to our first-party devices,” and will fill “three customer segments” with them. (In other words, he’s going to do a low-cost Lumia, a midrange business Lumia, and a high-end Lumia.)

This way and that. Whiplash. We’re going to make our own phones, but we’re not actually interested in selling them. We’ll have partners, but we’ll be best in the key customer segments. It’s a huge mess, and it’s a huge mess that looks like the mess Microsoft has been in since Windows Phone 7 launched in 2010, spinning and spinning in the widening gyre.

There’s one little light of hope: Windows 10 is going to be much more compellingly integrated across desktop and mobile than Windows 7 and 8 ever were. Continuum and universal apps are a new game. But nobody’s going to play that game if there’s nothing they really want to play it on.

WHAT HASN'T MICROSOFT TRIED?

The high-end Lumia 940 doesn’t look like a game changer. With a rumored 5.7-inch quad-HD screen and Qualcomm Snapdragon 810 processor, it will be a respectable phone, but Samsung will be coming out with a better Galaxy Note 5 and Apple will have a better-marketed and more app-friendly iPhone 6s Plus at roughly the same time.

Paul Thurrott has outlined a Surface-like approach for Windows Phone success: Make devices with unique capabilities that inspire third parties to do better. Yes, that would be a good strategy. Microsoft hasn’t said it’s doing that, and it hasn’t shown any ability to execute on that kind of strategy in mobile. It squandered the Lumia 1020’s camera

advantage, and the 940 is not going to set the world on fire, even if Windows 10 has great, unique features. Meanwhile, Microsoft seems to have either bored or alienated most of the hardware partners it's announced in the past.

For Windows 10 to succeed in a mobile-first, cloud-first context, Windows 10 Mobile either needs to be on compelling hardware people want to own (which the company doesn't seem to be capable of making), or Microsoft needs to break completely free of its own OS and become a provider of cloud services and apps, which Nadella has said it won't do.

I don't have any solutions here, just frustration. Microsoft doesn't seem ready to make good and highly differentiated Windows Phone hardware, to nurture the best Windows Phone partners, or to abandon the Windows Phone platform. And yet it wants to be "mobile-first, cloud-first." Can someone over there explain how this is supposed to happen?

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Is Negative PC Growth the New Normal?

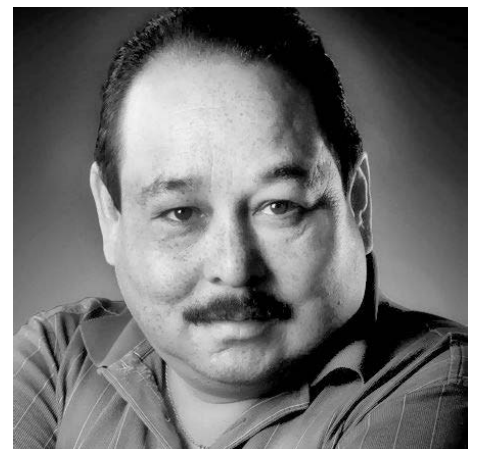
Recent PC shipment stats from IDC and Gartner surprised the tech world with much higher declines than most PC market trackers had expected.

Gartner saw PC shipments decline 9.5 percent in the second quarter, whereas IDC put that number at 11.8 percent. Overall, both companies believe that the PC sales will be off around 5 to 6 percent in 2015, with no real future growth.

I've been tracking PC sales as a professional industry analyst for 35 years, and this is one of the steepest declines in a single quarter I've ever seen. PC sales have been on the decline for several years, but never taken quite as steep a drop as Gartner and IDC reported.

Indeed, it appears that the days of any serious growth in PC sales are gone forever. To give you an idea of how much has changed in the PC market over the last ten years, if IDC and Gartner's numbers are right about 2015, PC sales will be only about 285-295 million this year at best. During the PC's heyday, sales peaked at around 400 million per year.

For most of the PC's glory years, it was the only digital device we had to connect to the Internet, data, and each other. But today we use smartphones, tablets, and even wearable devices for those purposes, and the PC has been relegated to a productivity tool more than



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ever before. PCs are only used sparingly for managing budgets, organizing video and music collections, and other tasks where mobile devices just won't do. Even in corporate settings, where the PC is still dominant, workers use smartphones and tablets more than ever to manage their productivity.

The ramifications for the PC market and the vendors who supply PCs will be significant if the decline continues. I spoke to one researcher who suggested that annual PC sales could hit 250 to 260 million in the next three years. If true, only three or four PC vendors are likely to survive, and fringe providers will be forced out of the market entirely. I'm not sure it will dip this low, but I do see more consolidation in the PC market regardless of where the yearly PC sales numbers finally bottom out.

So, if the PC market does consolidate, which firms will remain? I see Lenovo, Dell, and Apple doing well. In fact, although Windows-based PC sales declined in the last quarter, Apple's PC sales grew 16 percent. Yes, that's only about 10 percent of PCs sold, but Apple is also the most profitable of PC vendors, and it could grow its market share at the expense of fringe PC vendors.

HP also has a shot, but that's questionable, because HP is in the process of splitting into two groups: one focused on enterprise and the other on PCs and printers. HP hopes that the PC group can continue to stay viable and be an important vendor of PCs, but a lot of analysts are unsure if this will work.

At the same time, demand for tablets has declined as well. They will be off from their 2012-2013 peak by as much as 20 to 30

percent this year. Although tablets continue to be important mobile tools, they are getting pressure from large smartphones, or phablets, which have eaten into the market for 7-inch tablets and to some degree even affected sales of larger tablets.

That leaves smartphones as the only market experiencing significant growth. Even here, Apple only has 20 percent of the smartphone market but 90 percent of the smartphone revenue. The good news is that the smartphone market is still growing. Researchers believe that by 2020 we will be selling as many as 3.5 billion smartphones annually.

Although tech products, including the Internet of Things, servers, cloud, security, and IT, will continue to be in high demand, the PC and tablet growth era seems to be over, and will change the fortunes of many PC companies if they don't diversify. The good news is that Dell, HP, Apple, and Lenovo are branching out with offerings well beyond their core PC businesses. But they will have to place bets on profitable opportunities if they hope to thrive in this changing tech landscape. For their sake, and for that of the overall market, I hope they can remain strong.



The good news is that the smartphone market is still growing.



Reviews

CONSUMER ELECTRONICS

Apple iPod touch

Bose SoundLink Mini II

DJI Phantom 3 Professional

Pebble Time

Amazon Kindle Paperwhite

HARDWARE

Alienware 15

Cyberpower Trinity Xtreme

Zotac Zbox Pico PI320

ViewSonic VP2780-4K

SOFTWARE & APPS

SlimWare Utilities SlimCleaner Free

There's Still Nothing That Can Touch the touch



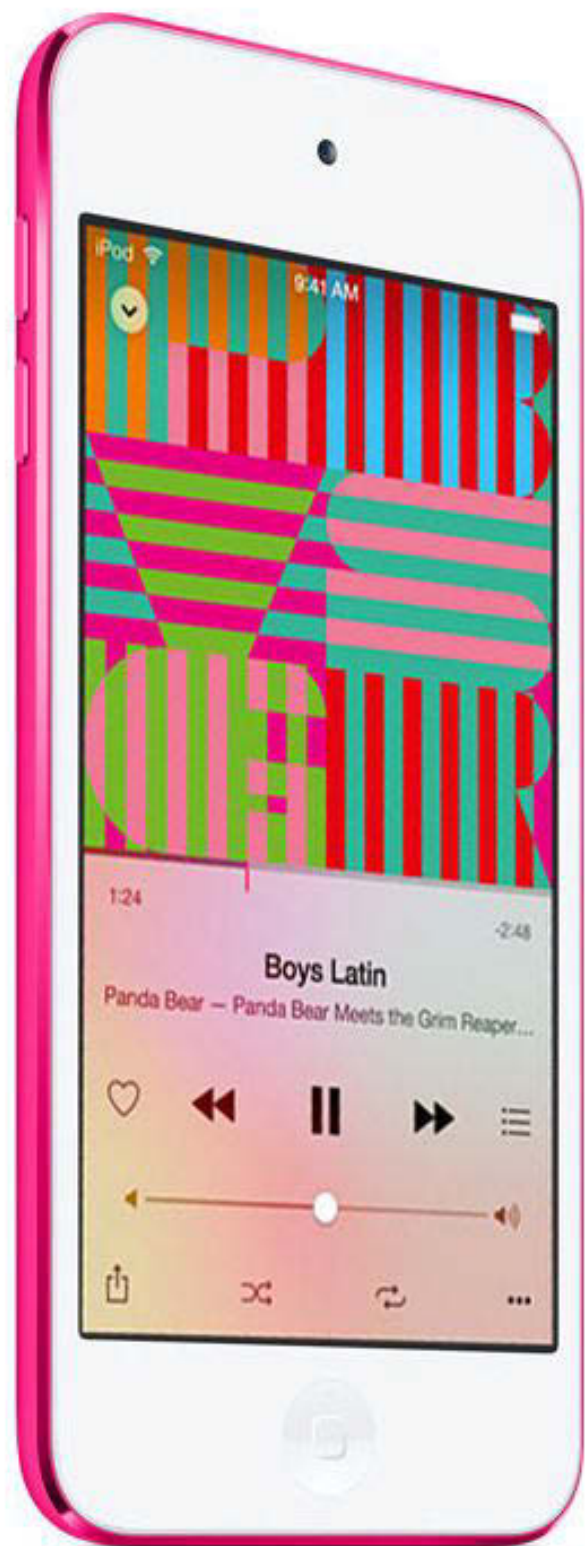
Apple's iPod touch is the last descendant of the proud race of PDAs that once roamed the wide-open ranges of America. It's for people who don't want to be tied to yet another cellular subscription, forced to pay by the minute or by the month. There is nothing else like it. Its closest competitors, really, are 7-inch tablets, although those aren't pocketable. The new 2015 model brings the line up to speed with a processor that can handle the latest apps from the hottest developers. The \$199 iPod touch is still the least expensive way to experience iOS, and, more important, it's the best value non-cellular media player on the market.

PHYSICAL FEATURES AND NETWORKING

The new iPod touch is the same size as the old one, with the antennas, buttons, and cameras in the same places, so it can use the previous version's cases, accessories, and docks. It measures 4.86 by 2.31 by 0.24 inches (HWD) and weighs a light 3.1 ounces. It comes in blue, gold, gray, pink, red, or silver. The 4-inch 1,136-by-640 screen is the same size and brightness as the last model's, too, and Apple's EarPods headphones still come in the box.

Apple iPod touch

\$199 (16GB), \$249 (32GB),
\$299 (64GB), \$399 (128GB)



The iPod touch has always felt like an iPhone, but cheaper. It's nicely built, with a smooth matte metal back that isn't slippery. The white front with its Cyclopean camera up top and its round, physical Home button says iPhone, as do the shiny, chamfered metal edges. But its extremely slim body and light weight remind you that there isn't as much here as there is in an iPhone.

There are a few other differences. On the back, the pop-up wrist strap loop is gone; that's not much of a loss. The bottom-ported internal speaker is significantly louder than on the previous unit, although sound through the headphones is not dramatically different.



Wi-Fi performance has improved considerably, especially at a distance or through walls. On a 2.4GHz Wi-Fi network over a Verizon FiOS router, both the new and old iPod touch models attained the same speeds of 25Mbps down close to the router. At 25 feet away, though, the older iPod dropped to 5Mbps down while the newer one maintained 12.7Mbps. When some walls were added in, the older model barely eked out 1Mbps down while the newer one maintained a healthy 9Mbps. That's going to make for a lot less Wi-Fi frustration, better streaming, and more reliable app downloads on the new model.

Apple iPod touch

PROS Fast processor. Excellent selection of apps. Well built.

CONS Not for audiophiles.

COLOR YOUR WORLD

The new Apple iPod touch comes in a variety of colors to match almost any personality.

The iPod touch has Bluetooth 4.1, but no NFC or a fingerprint sensor. There's also no GPS, but Apple uses a Wi-Fi hotspot database to determine location. The device does have Apple's mysterious M8 motion coprocessor, which is designed to improve battery life in health and fitness apps.

PROCESSOR, BATTERY, AND CAMERA

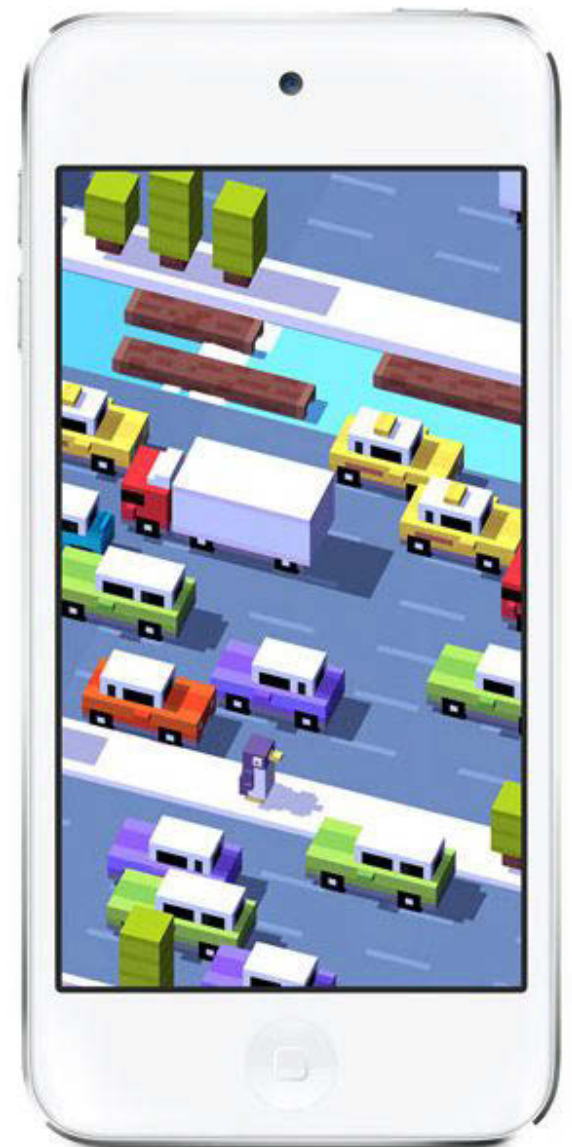
Let's get to the heart of why Apple needed to update this handheld: The old A5 processor is obsolete. It's just barely still on developers' radars because there are so many A5-powered iPad 2 units out there, but its days are numbered, and Apple is clearly no longer developing software with the A5 in mind. (Apple Music on the previous iPod touch is noticeably sluggish.)

Benchmarks show how huge the update to the A8 chip is here. The multicore Geekbench score, which deals with behind-the-scenes processing tasks, rose from 404 to 2,447. AnTuTu's "UX Multitasking" subtest, which focuses on user interface, went from 435 to 7,470. GFXBench's purely graphics-based T-Rex test shot from 5.3 frames per second (fps) to 51.2fps.

These results, by the way, are all quite similar to what we saw with the iPhone 6. The graphics benchmarks are identical, and the processor benchmarks are about 12 to 15 percent slower than the iPhone 6, reflecting a drop in processor clock speed from 1.3 to 1.12GHz.

The difference in application performance isn't as dramatic, because a lot of apps see the slower, older iPod touch and ratchet themselves back. Launching Need for Speed: Most Wanted took 17 seconds on the new iPod and 21 seconds on the old one. But anything involving photo or video processing gets a huge bump. Exporting a 1-minute iMovie took 110 seconds on the old device. On the new one? 15 seconds.

To be really picky, I'm a little concerned about the confluence of the new A8 processor and the old 4-inch screen on a low-volume product. The touch has to draft



behind the more popular iPhones, and developers might think of the A8 processor as going with the larger iPhone 6 screen. But the result may actually be that apps overperform on this device, as it will essentially act like an amped-up iPhone 5S.

Improving the processor while essentially maintaining battery size (1,043mAh versus the last generation's 1,030mAh) means a loss of battery life. On our full-brightness YouTube-streaming rundown test, the new iPod lasted about 4 hours, 15 minutes—the old iPod touch could hang on for 4:45. (Apple's claimed 8 hours of video playback assumes local content viewed at half brightness.)

Apple kicked up the touch's camera from 5 to 8 megapixels, but the increase in quality isn't uniform. The new iPod is much better at focusing flash photos and at eking out images in very low-light contexts, both with its 8MP main camera and its 1MP front camera. But in good light, the additional megapixels can appear compromised by noise or artifacting. Sure, you have more data, but the results aren't as gorgeous as, say, the iPhone 6's 8MP shots.

I've never loved Apple's one-size-fits-all video recording modes, but they always record nice 720p video at 30fps on the front camera and 1080p video at 30fps on the main camera, in all lighting contexts.

And because of the word "iPod," let's take a moment to think about music. The touch sounds fine through headphones and supports uncompressed ALC audio natively, along with FLAC through third-party apps. But the iPod touch line has never had, and was never intended to have, audiophile-quality components. You can get an external digital-to-analog converter that hooks up to the Lightning jack, but really, if you want a dedicated audiophile music player, these things exist. Get one.

COMPARISONS AND CONCLUSIONS

Apple seems to have very thought-through life cycles for its handheld products. Year one is premium; year two, midrange; year three, budget; year four, supported but not





sold; and year five, for God's sake will you buy a new one already? One of the reasons that many iPod touch owners currently feel burned is because Apple kept selling the A5-powered touch well into what would have been year four, giving it (at the end) the shortest real lifespan of any iPhone-like product. Powering the new touch with an A8 resets the clock to just before year two, and makes the handheld a solid buy again.

And as I said at the beginning, there's nothing like the touch if you want a handheld media player that doesn't require a phone subscription. At its price point, it's competing with unlocked phones like the Alcatel One Touch Idol 3, the Asus ZenFone 2, and the Huawei P8 Lite. In all those cases, you're trading the touch's flagship-level graphics and processor performance for a cellular modem you may not want. This is the most power-per-dollar you can get in a truly handheld form factor, and the touch runs gorgeous games, high-quality media apps, and even Microsoft Office. It's great for kids and for anyone else who wants iOS apps without investing in a \$600 iPhone.

I very rarely award products five stars, and the truth is that iPod touch could have been better. Should Apple have included GPS, Apple Pay, an iPhone 6-sized screen, high-res audio support, or whatever else your pet feature is? Maybe. But then, everything can be better. If you're looking for a handheld media player that doesn't force you into an intimate relationship with a cellular carrier, the new iPod touch is the best option out there by far.

SASCHA SEGAN

**Bose SoundLink
Mini II**

\$199.95



This Bluetooth Speaker Is Portable, Powerful



It's been a couple of years since Bose released the SoundLink Mini, a portable Bluetooth speaker that seriously impressed us with its smart design, features, and big sound. The updated SoundLink Mini II is priced the same (\$199.95), and looks quite similar in terms of size and design layout. New features include improved battery life and speakerphone functionality, but the main attraction remains an uncanny ability to produce convincing bass from its tiny frame. It may not sound like a subwoofer is involved, but this speaker can muster enough low end that, at times, you'll ponder its size in minor disbelief. Portable Bluetooth speakers have a long way to go before audiophiles and purists hop on board, but for those looking for a powerful, clean audio experience from a tiny speaker, the SoundLink Mini II is tops.

DESIGN

The SoundLink Mini II replaces the SoundLink Mini. Like the original, the speaker is easily portable in terms of its 2-by-7.1-by-2.3-inch (HWD) dimensions, but its weight can be a bit deceiving. At 1.5 pounds, it isn't exactly heavy, but it could weigh down a backpack or tote over time. The design itself is typical, sensible Bose, available in matte gray or off-white anodized aluminum. To add a flash of color, you can also buy (for \$24.95 each) soft covers in your choice of red, green, blue, black, or gray.

Power, Volume Up/Down, and Bluetooth buttons, along with a Multifunction button (Play/Pause, call management, track navigation, and selecting the language you receive alerts in), sit across the top panel. A port on the right panel houses the micro USB charging connection and a 3.5mm Aux input for wired listening. There's no included audio cable, however, which is disappointing at this price.

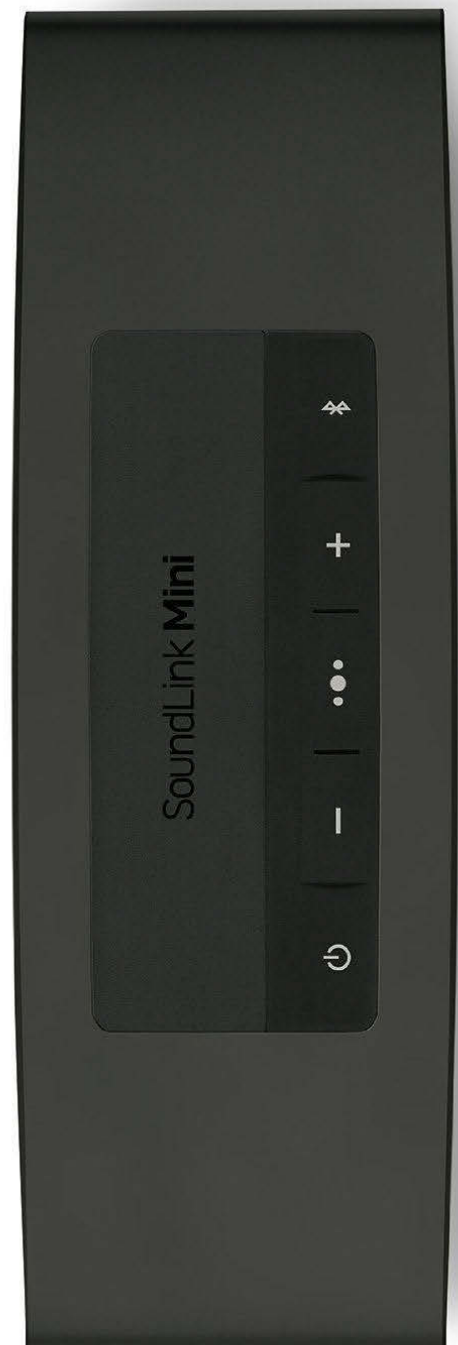
The pairing process begins as soon as you power up and choose a language for the speaker, after which a voice guides you through the quick steps to connect to a Bluetooth device. The SoundLink Mini II will automatically re-pair with the same device, provided it's on and within range, every time you turn it on. The system has a built-in speakerphone feature, which the previous iteration did not have. You can also connect two Bluetooth devices simultaneously—your tablet for music and your phone for calls, for example.

The SoundLink Mini II comes with a charging cradle, but it can also be charged directly; both the cradle and the speaker itself are fed power via a micro USB cable. A wall adapter that the cable plugs into is also included. The use of micro USB for charging instead of a proprietary power connector is a notable upgrade over the previous SoundLink Mini. Bose estimates the battery life to be roughly 10 hours, but your results will depend upon how loudly you play back your tunes.

Bose SoundLink Mini II

PROS Powerful audio performance with surprisingly robust bass response. Well designed. Built-in speakerphone. Can connect to two Bluetooth devices simultaneously.

CONS Digital signal processing changes bass response at different volume levels. Deceptively heavy. Aux audio cable not included.





PERFORMANCE

Bose uses digital signal processing (DSP) to prevent distortion through the SoundLink Mini II's drivers. On The Knife's "Silent Shout," which is a track with intense sub-bass content, the bass response seems to change depending on the speaker's volume level. At mid-level, the bass sounds rich and quite powerful for a speaker so small. At maximum volume, the speaker doesn't distort (thanks to the DSP), but the heavy thumping of the deep bass on this track turns into more of a tap. You'll still get a sense of strong low-end, but the DSP clearly alters the lows at high volumes to prevent distortion. Purists, therefore, won't appreciate the SoundLink Mini II, but anyone looking for clean, powerful audio from a portable speaker will enjoy its overall performance.

On Bill Callahan's "Drover," which has less intense deep bass, the SoundLink Mini II does an excellent job of conveying the singer's baritone vocals with richness, without ever letting things get muddy. The vocals also receive plenty of high-mid presence, along with the guitar strumming, so the mix retains a nice crispness. The drums on this track, which can often sound overworked on systems that boost the bass response too much, sound full and natural here, and are neither overly boosted nor meek.

The kick drum loop on Jay-Z and Kanye West's "No Church in the Wild" has an attack that gets enough treble edge to retain its sharpness, slicing through the multilayered mix. The sub-bass synth hits that punctuate the beat are more implied than delivered, especially at top volumes, when the DSP kicks in and the lows are somewhat restrained. At midlevel volume, a bass line that often gets lost in the mix seems to come more to the forefront through the SoundLink Mini II; its passive radiators really do bring out the low-mids and lows at



moderate listening levels. The vocals on this track float clearly over the entire mix, regardless of volume level.

On the opening scene in John Adams' *The Gospel According to the Other Mary*, a classical track, the SoundLink Mini II delivers the lower register instrumentation with some definite boosting, primarily in the low-mids. It adds quite a bit of body and richness to the mix, without sacrificing the crispness of the higher register instrumentation.

It's pretty clear that the SoundLink Mini boosts bass, but mostly in the low-mids and lows rather than the sub-bass realm. In fact, sub-bass can get limited by the speaker's DSP, depending on the volume level. All this considered, this is probably the best bass response you can find from a compact, portable Bluetooth speaker. If you're looking for booming lows with subwoofer-style bass, you simply need to buy a much bigger system, like the SoundCast Melody, which is quite large and certainly not portable in the pocket-able sense. If you like the SoundLink Mini II's dimensions and overall sound signature, but the price is a bit high, the Divoom Voombox Party, the Jabra Solemate Mini, and the Bose SoundLink Color Bluetooth Speaker are all solid options that cost a bit less, but they won't deliver bass with the same richness and power that the SoundLink Mini II musters. For its rich bass delivery matched with clarity in the highs, and its impressively small frame, the Bose SoundLink Mini II wins our Editors' Choice award.

TIM GIDEON



Shoot 4K Video With This Easy-to-Fly Drone



Like them or not, consumer drones are here to stay. Government regulations have eased, drones are selling like hotcakes, and models in DJI's Phantom series are the ones you're most likely to see represented in pop culture. The company's latest release aimed at consumers and enthusiasts is the Phantom 3 Professional, which flies through the air via an easy-to-use remote control and records stabilized 4K footage with a wide-angle lens. It offers numerous improvements and refinements over the previous-generation model, the Phantom 2 Vision.

DJI Phantom 3 Professional

\$1,259



DESIGN

The Phantom 3 Professional maintains the basic design of previous entries in the series. It's a white copter, with four pylons (each with a rotor), a bottom-mounted camera, and landing struts. The drone measures about 23 inches from wingtip to wingtip and weighs slightly less than 3 pounds. LED lights at the bottom of each wing help you track the drone in the air. It's easy enough to attach the propellers with your fingers—the motors and rotors are both color-coded to ensure proper installation.

The new remote control is also white and includes an integrated clip that can hold a phone or tablet to view aerial footage as you record it. A direct cable connection between your phone or tablet is required, and the remote has both a standard USB connector and a micro USB port for connectivity.

Dual joysticks for flight control, the Power button, and an emergency Return to Home button are on the front of the remote. Up top you'll find control dials to adjust camera exposure and the tilt of the gimbal, dedicated buttons to start video recording or capture a still image, a playback button, and a flight mode toggle switch. Two customizable control buttons are on the rear. The remote is powered by an internal rechargeable battery; it can be charged at the same time as the flight battery via a single adapter that includes electrical contacts for both.

TAKING FLIGHT

Both the remote battery and the flight battery should be fully charged before you take the Phantom for a flight. DJI states that you can fly for up to 23 minutes on a fully charged battery, but that's going to vary a bit based on how high and fast you fly it. The longest flight I was able to manage was 19 minutes. The Phantom will sound warnings and start to

DJI Phantom 3 Professional

PROS Easy to fly. Very stable in the air. Smooth video capture, even during motion. 20mm wide-angle lens. Captures 4K video, Raw, JPEG images. High-quality live streaming. Built-in GPS. Return to Home function. Automated takeoff, landing.

CONS Battery life limits flying time. Lens shows some edge distortion. Currently lacks automated flight.



FLIGHT FOCUS

The camera on the DJI Phantom 3 Professional shoots good 4K and HD video and still images in a variety of formats.



automatically land when the power drops below 10 percent. A mostly depleted battery requires about an hour to recharge, so if you want to work in the field for an extended period you'll have to invest in at least a couple of spares, which cost \$149 each.

With your phone or tablet plugged into the remote, launch the DJI Pilot app (available for iOS and Android), and move into the camera section. The Phantom takes a few seconds to acquire a GPS lock, which is required for autopilot along a preset flight path. The app asks you to roll the remote control around in your hands as part of the calibration process; you may also have to calibrate the compass (the app will guide you) and the gimbal (for best video quality). Once all that's done it's time to launch the DJI Pilot app again and take the Phantom up into the air.

You can set the app to launch the Phantom into the air automatically with a single tap on your phone's screen, or trigger the motors manually by pulling both joysticks into their bottom inside corner positions. Once the rotors are spinning, you can increase the drone's altitude by pushing the left joystick up; moving it down lowers the altitude; and pushing it left or right rotates the drone around its axis. The right stick moves the drone through the air forward, back, left, or right. The Phantom can also change its altitude while moving forward and spinning along its axis.

With practice, you'll be able to use the Phantom's maneuverability to capture compelling aerial video footage. While you're in the air the Phantom streams a Live View feed to the app at up to 720p resolution (though you can still record

4K footage to a microSD card). DJI calls the streaming technology LightBridge, and it can also be used to stream live video to a YouTube account—just enable live video feeds via your YouTube settings.

You are able to add audio commentary to your stream—it picks up sound from your smartphone’s microphone—making it practical for reportage and covering live events. During my test flights I was able to fly the Phantom up to 2,500 feet away before video choppiness set in and the app displayed a “Weak RC Signal” message. The app has an altitude limit setting that tops out at 500 meters (about 1,640 feet)—well above the 400-foot limit set by the FAA for recreational drone flying in the United States.

Without question, the Phantom 3 Professional is the steadiest drone I’ve flown, even at high altitudes. But flying is not only about going up high and zipping through the clouds. A new sensor (absent from previous models), called the Vision Positioning system, helps prevent you from crashing into the ground.

The Phantom 3 doesn’t support automated waypoint flying at this time; the hardware is capable, but the feature is not built into the app. DJI is trusting third-party developers to add this functionality via a software development kit, but it’s a curious omission. You can do some preplanning of flights via the app—it’s possible to draw lines on the map that display on the bottom-left corner—but you’ll need to fly along them manually.

The drone does have an automated Return to Home function in the event of an emergency. You can activate it via either the app or the large H button on the remote. The Phantom will ascend to a preset altitude (you can change it in the app, but it’s useful to make sure that it doesn’t hit a building or tree on its way back), return to the launch point on its own, and automatically land.



TAKE OFF
Connect your mobile device to the remote control, then use the two joysticks to control the Phantom as it flies through the Great Blue Yonder.



VIDEO AND IMAGE QUALITY

With the Phantom 3 Professional you can record 4K footage in two aspect ratios—a wide 1.9:1 (4,096 by 2,160 pixels) at 24p, and a more standard 16:9 (3,840 by 2,160) at 30p or 24p—or 720p and 1080p footage at various frame rates up to 60fps. You also have your choice of MPEG-4 or MOV file formats. For me, the sweet spot was shooting 4K footage at 30p; video was not perfect (I noticed some off compression artifacts when adjusting the gimbal), but it was crisp, detailed, and incredibly smooth even when my flying was erratic. The lens, a wide 20mm-equivalent f/2.8 prime, turns out some rectilinear distortion (at the edges of the frame), but it's minor. Still images are recorded at 12-megapixel resolution in JPEG or Raw DNG format—about the quality you'd get from a point-and-shoot.

You can edit video in the mobile app, though I recommend using real standalone software for the job.

CONCLUSIONS

The DJI Phantom 3 Professional is the best quadcopter we've seen yet, combining impressive ease of use with terrific video quality and live streaming, a better remote design, and rock-solid stability. I'd like to fly for longer on a battery charge and see waypoint flying implementation out of the box, but if you're willing to invest in a couple of spare batteries, and you don't need a drone that can fly autonomous routes, the Phantom 3 Professional is the drone to get—and the best you'll find anywhere near its price point.

JIM FISHER

Pebble Time

\$199



For an Affordable, Advanced Smartwatch, It's Time



The third time's the charm for Pebble. The company's latest Kickstarter-backed smartwatch, the Time, is easily its most accomplished effort to date. Like its siblings, the original Pebble Watch and the Pebble Steel, the Time lasts for several days on a single charge, whereas most smartwatches, including the Apple Watch, are really only good for about 24 hours. The Time also adds a cool color display and voice-to-text replies, so you can speak right into the timepiece to respond to text messages. Instantaneous notifications, a big app store, and all the pluses from previous Pebbles return as well. For \$199, a color upgrade and Dick Tracy-style communication may not be enough if you already own a previous Pebble. But if you don't, and you're looking to jump into the world of smart wrist wear, the Pebble Time is a solid place to start.

AVAILABILITY, DESIGN, AND FEATURES

From a design perspective, Pebble opts for a casual rubber strap that's soft, smooth to the touch, and comfortable to wear. It looks good, too, and quick-release pins let you swap out the strap for a standard 22mm band. My strap was red; the only other color options are black or white. You can also opt for the Pebble Time Steel (\$299), which retains the business class design of the original Pebble Steel. Its finish comes in silver, black, or gold, and that model promises longer battery life (up to ten days).

The watch face's slightly curved profile lets it fit perfectly over the wrist. In the center is an always-on, 1.25-inch, 144-by-168 color e-paper display with LED backlighting, framed by a stainless steel bezel and covered with scratch-proof Gorilla Glass. The Time's backlit display is always on, at all times of the day, which is a lot more than you can expect from many other 21st-century smartwatches, including the Apple Watch.

To control the Pebble Time, you use four plastic buttons—three on the right side, one on the left—along with a new microphone for voice replies. The magnetic charging port retains the two-point design of the Pebble Steel, so cables for the original Pebble won't work, but it now resides on the back instead of the side. The port can also grant the Time special functionality like GPS and a battery life boost, depending on the availability of third-party "smartstraps." Pebble is working with accessory manufacturers on said straps, but none are available as of yet.

The Time is water-resistant up to 98 feet, so you can shower and bathe with it, but don't go deep-sea diving. I wore it in the shower and in the rain while testing, and the only side effects were some watermarks, which are easy to wipe off with a cloth or your thumb.

Pebble Time

PROS Excellent battery life. Always-on color display. Voice-to-text functionality. Instantaneous notifications. Comfortable. Lots of apps. Syncs with Android, iOS.

CONS App store needs curation. Little reason to upgrade.



PAIRING AND PERFORMANCE

As with previous Pebbles, the Time boasts multiplatform capability, so it works with devices using iOS and Android, but not Windows Phone. I paired the Pebble Time via Bluetooth 4.0 with a Samsung Galaxy S6 by downloading the Pebble Time app and following the simple instructions. The two were connected quickly, the Time went through a software upgrade, and I was good to go.

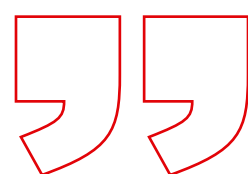
Pressing the buttons on either side of the watch activates a number of cheerful, colorfully animated screen transitions that give the Time a lot of personality. Screens quickly warp, wipe, and transform into star-shaped happy faces as you press your way from the weather forecast to Google Calendar appointments and back to the time of day. A fun and charming presentation goes a long way in my book, and the Time has that covered in spades.

As on previous Pebbles, notifications are instantaneous. The Time would buzz on my wrist at the exact same moment as the Galaxy S6 with which it was paired. I could easily read entire text messages on the display, as well as Google Hangouts messages, and, in some cases, whole emails, without pulling out my phone. Then, if I wanted, I could activate the microphone to dictate a response that I could then transmit in text form.

Voice replies really impressed me, as I was able to carry on entire conversations while walking outside. Even when strolling past loud, idling garbage trucks, the mic was still able to pick up my voice. Currently, Pebble is working to bring voice replies to Gmail, so I was mostly replying to basic texts. Also of note: The Time isn't advanced enough to pick up on intonation, so all of my correspondence lacked punctuation. That's a tiny nitpick for a cool and handy (or hands-free, really) feature.



A fun and charming presentation goes a long way in my book, and the Time has that covered in spades.



APPS

Pebble's app store looks basically the same as it did when the Pebble Steel came around, which is a good thing. The store is easy to navigate and search, and once you download an app, it's simple to add it to the Time. Thankfully, you aren't limited to just eight apps at a time here, as you are on Pebble's other watches.

Browsing through the app store, there are lots of watch faces, along with productivity, health, and fitness apps, and Tamagotchi-like minigames to download and play on your wrist. I was particularly fond of FitCat, a digital pet app that features a cat lazing, sleeping, and puttering about in a brick home that also displays the time of day, the number of steps you've taken, and, conveniently, the amount of battery power that's left on the Time.

You can also track activity and sleep patterns with a variety of fitness and health apps including Jawbone, LetsMuv, Misfit, and RunKeeper. Even FitCat does a decent job of counting and tracking step goals. The Time won't replace a dedicated fitness tracker, as it only has an accelerometer and lacks GPS and heart rate monitoring, but it does a solid job if you want a device that tracks basic fitness stats and keeps you up-to-date on notifications at the same time.

In addition to fitness tracking, there are plenty of other useful apps. You can use ESPN's app to deliver game times and scores, or Pandora to control the station playing on your connected mobile device. Other notable apps include Swarm, Yelp, and Uber. Once you've added apps to the watch, just press the buttons on the right side of the screen to scroll through them. If there's a dark side to the number of apps available (around 6,000 at the time of writing) it's that most of them appear unfinished and beta-like, or straight-up useless. It would be nice if Pebble more carefully curated its offerings, but it's not a problem specific to the company; Google should, too.





TALK TO ME
Voice-to-text replies
on the Pebble Time
make it easier than ever
to respond to your
incoming messages.

The built-in music player that controls tunes on your smart device and the alarm clock function also works well. The alarm's vibrations stirred me awake successfully each time, and you can set alarms right on the watch and have them repeat automatically.

CONCLUSIONS

The Pebble Time is the Game Boy Color to the Pebble's original Game Boy, and that's a good thing. It displays charming visuals in color, adds voice-to-text communication, and has all the things you expect a Pebble watch to have: instantaneous notifications, fun and useful apps, a comfortable strap, and a battery that lasts for days. Yes, the Apple Watch has a sharper, more colorful display and even bigger-name apps, but it costs nearly twice as much as the Pebble Time, and its battery doesn't last even half as long; Android Wear watches have also mostly failed to impress. That makes the Time hard to beat for first-time smartwatch buyers, and an Editors' Choice. Just keep in mind that you don't need to drop \$199 if you want a smartwatch; you can spend half that amount on the original Pebble (also an Editors' Choice), and still have access to most of the same apps.

TIMOTHY TORRES

Amazon's Paperwhite Is Now Sharper, Faster



The 2015 version of the Amazon Kindle

Paperwhite sends the Kindle Voyage packing.

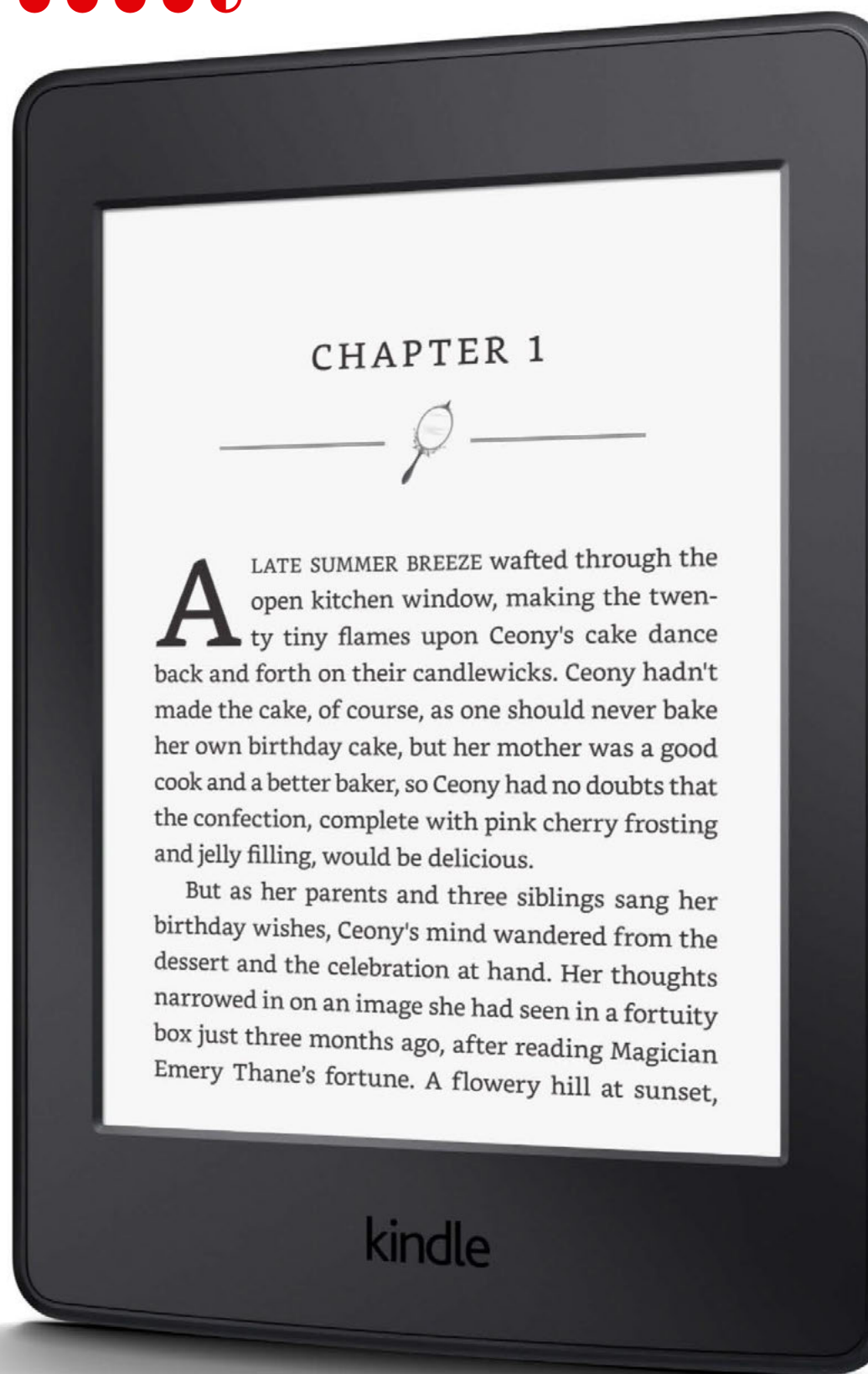
The Voyage already struggled to justify its high \$199 price tag beyond the strength of its screen, and now the new Paperwhite has the same sharp display—but the same original base price of \$119. This year's Paperwhite also has increased RAM for faster performance, along with access to Amazon's superlative ebook store. The Paperwhite is the best ebook reader you can get for the price.

PRICING, DESIGN, AND DISPLAY

First, it's worth mentioning that a couple of different versions of the Paperwhite are available. The standard Wi-Fi-only model costs \$119 with "Special Offers" (Amazon's term for advertising that appears onscreen when your Paperwhite is sleeping) or \$139 ad-free. A version with 3G wireless

Amazon Kindle Paperwhite (Wi-Fi, Special Offers)

\$119



connectivity—so you can download books any time, without the need for Wi-Fi—boosts the price to \$189 with ads and \$209 without. I tested the \$209 version, but we're basing our rating on the base model, as most users will be fine with Wi-Fi and ads.

Like the Voyage, the new Paperwhite uses a 6-inch Carta E Ink touch screen with a resolution of 1,448 by 1,072 and a screen density of 300ppi. Simply put, the display is terrific. Text is incredibly sharp and dark, and the screen is glare-free. I was able to read in direct sunlight, on the subway, on the bus, and everywhere else I carried it without issue. It's the best ebook reader screen you'll find, although it lacks the Voyage's adaptive backlight, which is basically an automatic brightness sensor. The Paperwhite is also missing the Voyage's bezel-mounted page-turn buttons. These are small nitpicks though; the Paperwhite's brightness is easy to adjust via the on-screen menu, and the touch screen is perfectly usable for turning pages and moving around the interface.

The 3G version of the new Paperwhite weighs 7.2 ounces and measures 6.7 by 4.6 by 0.4 inches (HWD). The Paperwhite never felt too heavy or uncomfortable to read. The power port is still on the bottom, alongside an LED charging indicator and the Power button. Once again, there is no headphone jack, because audiobook support isn't available.

Amazon Kindle Paperwhite (Wi-Fi, Special Offers)

PROS Affordable. Sharp, bright screen. Better performance than preceding model. Excellent interface. Cloud-based storage. Vast ebook store.

CONS No adaptive backlight, water-proofing, audiobook support.

THE SCREEN'S A SCREAM

The new Amazon Kindle Paperwhite's screen is sharper and darker than ever—ebooks have never been easier to read.

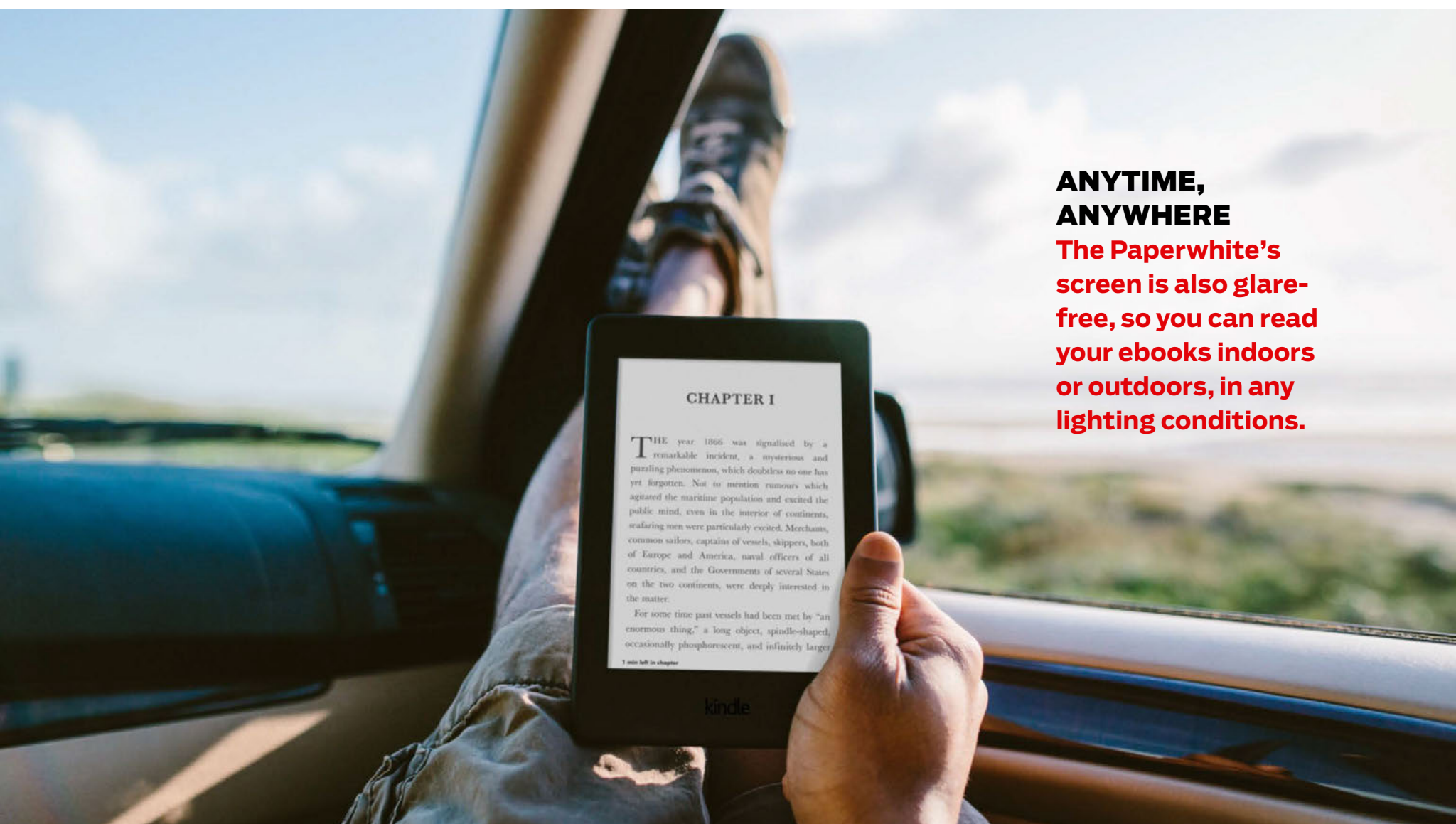


Unfortunately, Amazon has yet to make its Kindle lineup waterproof, something that the Kobo Glo HD and the Kobo Aura H2O can boast. It would be nice to be able to safely take the new Paperwhite in the tub or to the beach, but the lack of water resistance is by no means a deal breaker here.

FEATURES

The Paperwhite has a 1GHz processor and 512MB of RAM (an increase from the second-generation model's 256MB), for all-around faster performance. It uses 2.4GHz 802.11n Wi-Fi or 3G data on AT&T's network to download ebooks to its 4GB of internal storage. There is no external memory support, but there is free cloud storage, so you can carry your ebook library across any variety of devices that can download Amazon's Kindle app. You can even link Amazon accounts together using the Family Library feature, so you can easily share Kindle books with one another. A new About This Book feature reveals information about the title you're currently reading, its author, and its place in a series, too.

Also included is Amazon's Goodreads social network, which you can access by tapping on the "g" icon in the toolbar at the top of the screen. From there, you can follow friends, view your shelved books, share passages while reading, see what friends are reading, and rate books in a manner similar to the way you can on the Amazon.com storefront. You can also update lists, such as what you're currently reading, what you have read, and what you want to read.



ANYTIME, ANYWHERE

The Paperwhite's screen is also glare-free, so you can read your ebooks indoors or outdoors, in any lighting conditions.



FreeTime also returns here, a feature that lets you create profiles for kids so you can set reading goals for them. It tracks accomplishments, awards achievements, and generally encourages better reading habits. It makes the Paperwhite childproof too, locking out the Kindle Store, Goodreads, Wikipedia, and the (beta, rudimentary) Web browser, so as to not distract kids or let them go shopping.

The Paperwhite features a new typesetting engine and a new font, Bookerly. As far as fonts go, Bookerly is pretty nice, resembling the typography you'd find in an actual book. But don't upgrade from your old Kindle just for the font: Both the typesetting engine and the font will be available on Kindle Fire tablets, Kindle ebook readers, and Kindle iOS and Android apps through a forthcoming software update.

The Paperwhite lasts a long time on a single charge. I received my review unit at half-charge and used it for a couple of days before it needed juice. Amazon promises "weeks" of battery life, but that's only if you read for 30 minutes per day. In any case, you can read for hours on end without worrying about finding a power outlet. When you need to charge, just plug the included standard micro USB cable into an outlet adapter (not included) or a computer and you're good to go.

INTERFACE AND READING EXPERIENCE

If you're familiar with Amazon's previous Paperwhite models or the Voyage, you'll feel right at home with the new Paperwhite. When you turn it on, you'll

see a row of icons at the top of the screen for Home, Back, Brightness, Cart, Search, Goodreads, and Menu, along with six covers of books you currently have in the cloud or on your device below. You can easily switch between the cloud and local storage by tapping Cloud or On Device below the toolbar.

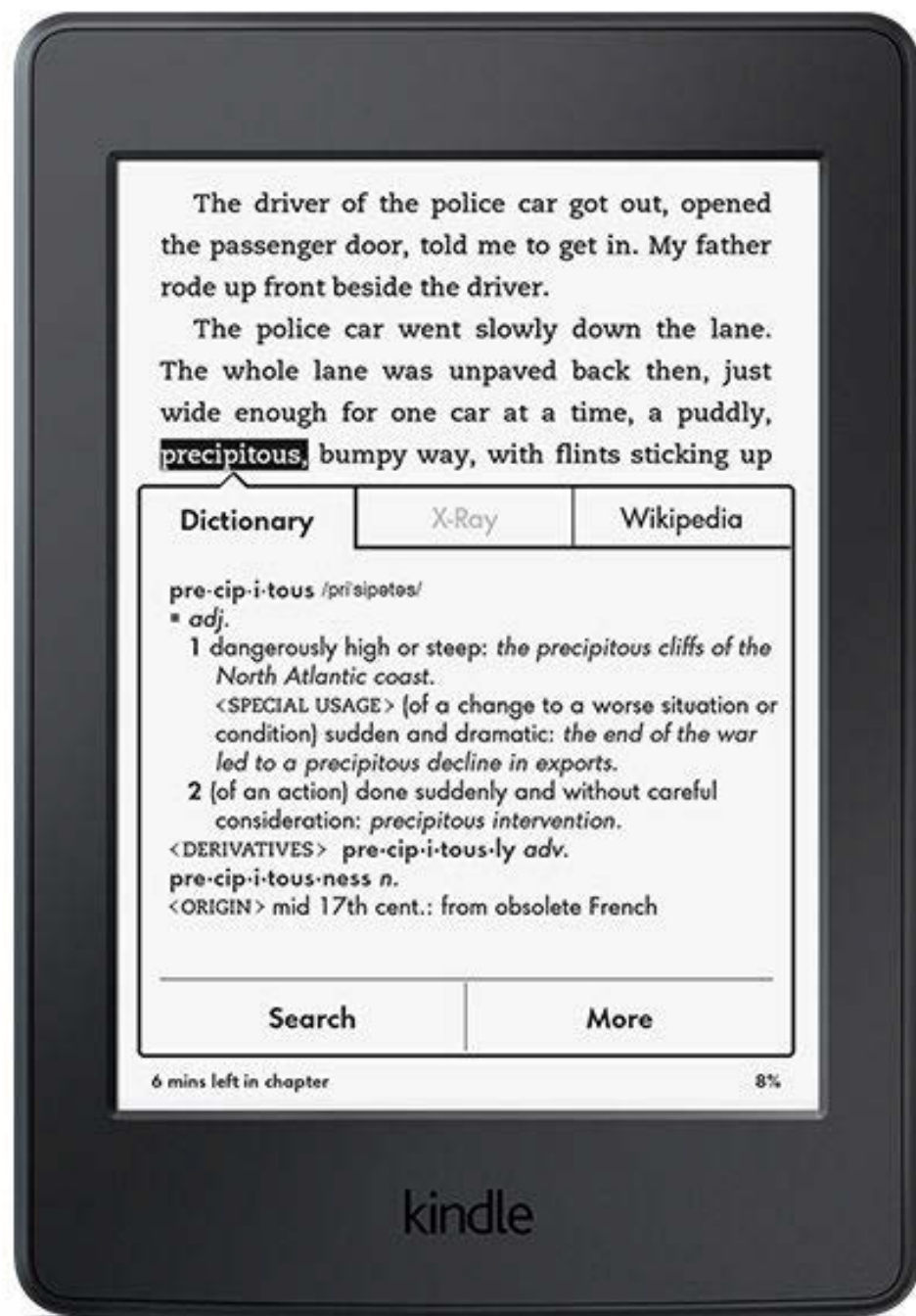
If you open a book and tap near the top of the screen, you'll bring up a similar row of icons like Home, Back, Brightness, and so on, along with options to adjust the font, navigate to a specific page or location in the book, share to Facebook or Twitter, or bookmark pages. The bottom of the screen displays how much reading time you have left based on your reading pace.

Reading a book is quite simple. You merely have to tap the right or far-left side of the screen to progress forward or backward. I flipped through several chapters of Haruki Murakami's *The Wind-Up Bird Chronicle* and Mike Davis' *Planet of Slums* with no problem. Reading the Paperwhite felt just like reading a physical book, the screen barely refreshed (turned to black), and my eyes never experienced any discomfort.

AMAZON STORE AND CONCLUSIONS

The Kindle Store is still the ruler of the roost in the ebook space, and that seems unlikely to change anytime soon. If you want the best ebook selection available at the best prices, you will probably want to go with an Amazon device. You can also subscribe to magazines and newspapers, and Amazon Prime users can borrow books for free from a list of more than 350,000 titles. Then there's the Amazon's Kindle Unlimited service, which is like a Netflix for books that gives you access to over 700,000 titles for \$9.99 per month.

In addition to the native Kindle protected formats AZW and AZW3, the Paperwhite supports TXT, PDF, unprotected MOBI, PRC, HTML, DOC, DOCX,





JPEG, GIF, PNG, and BMP files. Notably absent, as usual, is EPUB, which limits your public library and Internet sharing options; this is still where Barnes and Noble and Kobo have an edge over Amazon. But you can connect the Kindle Paperwhite as a USB mass storage device with a PC or Mac, so it's not as if you're only stuck with Amazon's store downloads.

All in all, the 2015 version of the Kindle Paperwhite is the right ebook reader for most people. That said, although the upgrade in resolution is easy to see, it's probably not enough of a reason to upgrade from your second-generation Paperwhite. But if you're upgrading from an older ebook reader, or buying one for the first time, the new Paperwhite is a no-brainer.

As for other E Ink–based ebook alternatives, the Kobo Glo HD offers similarly sharp fonts with a screen that matches the resolution you get on the new Paperwhite and the Voyage—plus it's waterproof—but it's slightly more expensive than the Paperwhite and lacks Amazon's winning ebook ecosystem. And although the Voyage remains Amazon's high-end ebook reader, you simply can't beat the Paperwhite for sheer value. That makes it our top pick.

TIMOTHY TORRES

**Alienware 15**

\$1,499.99 (as tested)



As Good as Entry-Level Gaming Laptops Get



The Alienware 15 is an imposing system that just sneaks under the wire to meet our pricing qualification as an entry-level gaming laptop. But boy, do you get a lot for your money. It not only delivers top-notch gaming performance, it also comes with all sorts of choice features, including customizable accent lighting, dedicated programmable macro keys, and the option to upgrade desktop-style with an external graphics card.

DESIGN AND FEATURES

Every inch a gaming rig, the Alienware 15 has a chunky design; it measures 1.34 by 15.2 by 10.65 inches (HWD), and is accented with glowing lights on the logo, lid, and chassis. (You can assign almost any color you want to these lights in the

settings.) Given its thickness and weight (7.1 pounds), the system stands in stark contrast to other gaming laptops that emphasize portability, such as the Razer Blade (0.7 inch thick, 4.47 pounds). Instead, Alienware focused on performance, which means building the chassis around powerful hardware and cooling fans.

The 15.6-inch display offers full HD (1,920-by-1,080) resolution, which is lower than what you might see on other systems (like the Razer Blade), but 1080p still seems to be the best resolution for the form factor. We've seen that several of these higher-than-HD systems can't provide the sort of gaming performance buyers want at 3K and 4K resolutions. There's also no touch capability on the Alienware 15, though the feature is becoming increasingly common on gaming systems. The laptop is outfitted with Klipsch speakers that deliver excellent sound quality.

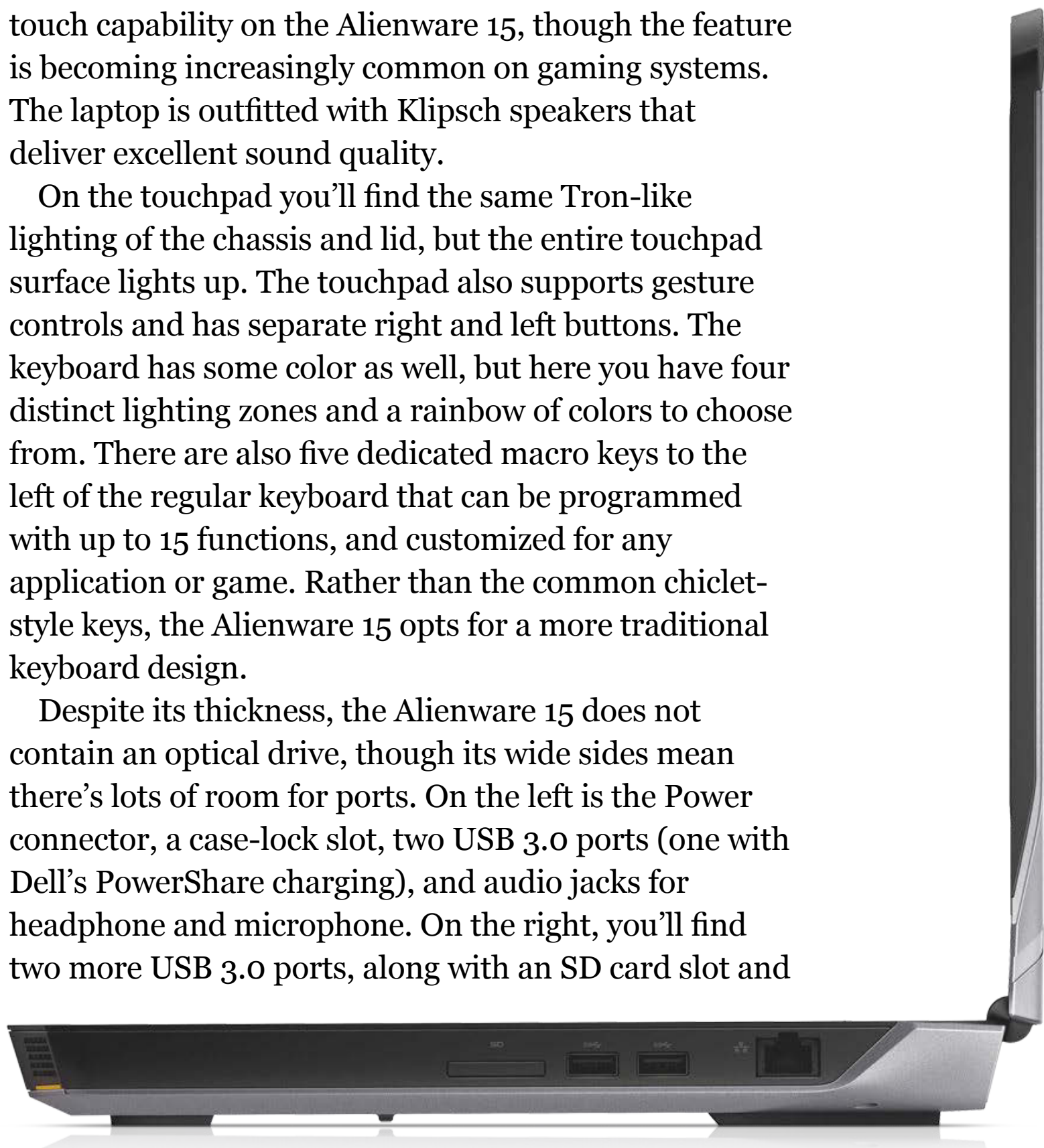
On the touchpad you'll find the same Tron-like lighting of the chassis and lid, but the entire touchpad surface lights up. The touchpad also supports gesture controls and has separate right and left buttons. The keyboard has some color as well, but here you have four distinct lighting zones and a rainbow of colors to choose from. There are also five dedicated macro keys to the left of the regular keyboard that can be programmed with up to 15 functions, and customized for any application or game. Rather than the common chiclet-style keys, the Alienware 15 opts for a more traditional keyboard design.

Despite its thickness, the Alienware 15 does not contain an optical drive, though its wide sides mean there's lots of room for ports. On the left is the Power connector, a case-lock slot, two USB 3.0 ports (one with Dell's PowerShare charging), and audio jacks for headphone and microphone. On the right, you'll find two more USB 3.0 ports, along with an SD card slot and

Alienware 15

PROS Solid design. Excellent gaming performance. Full HD display is well suited to gaming. Customizable lighting, macro keys. Good sound quality. Sizable storage. Graphics upgradable with external video chassis.

CONS Heavy. No touch capability.





a Gigabit Ethernet port. The back of the laptop has still more ports, including an HDMI output, a Mini DisplayPort jack, and a proprietary connector for Alienware's Graphics Amplifier (a proprietary \$299 external enclosure that lets you use a desktop video card). For wireless networking, the system has a Killer Wireless 1525 adapter that provides 802.11ac Wi-Fi and Bluetooth 4.0.

Storage comes by way of both a 128GB solid-state drive (SSD), which houses the operating system and ensures speedy boot times, and a 1TB 7,200rpm hard drive that handles bulk storage for your game and media libraries. There's not much preinstalled software, either: There are a few utility programs, for things like customizing the lighting, programming keyboard macros, and the like, plus Steam, Flipboard (a news reader), Stagelight (for music creation), and a free 30-day trial of Microsoft Office. Dell covers the Alienware 15 with a one-year warranty, with on-site service after remote diagnosis.

PERFORMANCE

Most gaming systems boast high-end processors, but the Alienware 15 sticks with a basic 2.9GHz Intel Core i5-4210H. Although it's not the fastest CPU around, it does just fine for gaming, and it's a less expensive choice that, as paired with 16GB of RAM, still gives solid performance, even in productivity and multimedia tasks. In PCMark 8 Work Conventional, the Alienware 15 scored 3,206, outperforming the MSI GE62 Apache (3,099) and even the Acer Aspire V 15 Nitro (3,160), but the HP Omen 15 edged ahead with 3,400. It also



did quite well in Photoshop CS6, completing the test in 3 minutes, 36 seconds. That's faster than both the GE62 Apache (4:05) and the V 15 Nitro (4:11), but again behind the Omen 15 (3:24).

More important than the processor in gaming performance is the video card, and the laptop's 3GB Nvidia GeForce GTX 970M is a good one. At baseline settings (1,366-by-768 resolution, medium details), the Alienware 15 completed our Heaven test with 112 frames per second (fps) and Valley with 84fps. By comparison, the GE62 Apache produced 85fps in both tests, and the V 15 Nitro managed only 66fps in Heaven and 76fps in Valley at the same settings. When the resolution and detail settings are dialed up, the wisdom of the 1080p display becomes evident. The Alienware 15's frame rates were the best of the bunch in our tests: 38fps in Heaven and 44fps in Valley, both at 1080p—other systems struggled to produce playable frame rates at their full resolutions.

Finally, although the Alienware 15 isn't the most portable laptop, it does have very good battery life. It lasted 5 hours, 29 minutes, on our battery rundown test, with its closest competitor being the built-for-portability Razer Blade, which still lagged behind by more than half an hour at 4:52. Other systems trailed still further, like the Omen 15 (4:17), the V 15 Nitro (4:10), and the GE62 Apache (3:15).

CONCLUSION

The Alienware 15 is about as pricey as an entry-level gaming laptop can get before you enter midrange, but it delivers what you want: superior gaming performance, best-in-class battery life, and customizations galore. It's well worth the extra \$300 over the Acer Aspire V 15 Nitro, and that's before you add the option to upgrade it with a desktop-class graphics card.

BRIAN WESTOVER

**Cyberpower
Trinity Xtreme**

\$2,139.45 (as tested)



Unique Design Takes This Gaming Desktop Only So Far

The Cyberpower Trinity Xtreme is one of the more striking gaming desktops to come out of CES this year. It has a distinctive, three-chamber chassis and all the power needed to run today's games at up to 4K resolutions, but constructs some barriers to future expandability. It's a good midrange rig, but ultimately you'll find better values in traditional tower gaming desktops.

DESIGN AND FEATURES

Each of the Trinity Xtreme's chassis' three compartments or chambers is a separate thermal unit, so the individual components don't heat each other up as they would in a large, traditional tower. But the overall volume of this uniquely designed case is actually the same as or greater than what you'll find in a typical desktop. The black metal chassis measures 15.25 by 17.25 by 15.5 inches (HWD), so you'll need a lot of room on your desk. We don't recommend putting the system on the floor, because you'll have a hard time reaching the Power button that's located in a recessed area smack dab in the middle of the case.

The top compartment houses the Nvidia GeForce GTX Titan X video card. Because the Titan X is situated apart from the processor, you won't have to worry about the GPU causing it to overheat, or vice versa. There are also three 2.5-inch drive bays in the top lobe, one of which is filled with a 250GB solid-state drive (SSD).

The bottom-right compartment is where the Mini-ITX motherboard is located. The motherboard is very compact, with the only two DIMM slots, which are filled with 16GB of memory, and only one PCIe x16 slot (containing the video card). A cable connects the motherboard to the video card, so there isn't any upgrade space left on the motherboard.

In the bottom-left compartment you'll find the system's 850-watt power supply and two 3.5-inch drive bays. One of those bays contains a 2TB 7,200rpm hard drive.

Cyberpower Trinity Xtreme

PROS Unique design. Compartmentalized cooling. High-powered components.

CONS DIY upgrades are tricky. No internal expansion room. Takes up more space than a traditional gaming tower. Can only accommodate one dual-width graphics card.





THE FUTURE IN THREES?

Despite its dynamic look, Cyberpower's Trinity Xtreme has some limitations that will irk gamers.

Upgrading the system is a chore, because each compartment has its own set of screws and metal cover that you have to slide off in order to access the components within. Because the motherboard is full, you can't install multiple video cards, but that's somewhat moot as there isn't any space for two dual-width cards in the top chamber anyway. Space is also tight around the motherboard, so extra hard drives and SSDs are really all you can install without removing something.

There's a pair of USB 3.0 ports on the front of the top compartment, along with the usual headphone and microphone jacks. In the back, on the rear of the video card, are the display output ports: three DisplayPort, one DVI, and one HDMI. The motherboard also has a set of surround-sound audio ports, a Toslink digital audio port, two Ethernet ports, an eSATA port, a PS/2 port, eight USB ports (two 2.0; four 3.0; and two 3.1, which use the traditional, rectangular plugs, not the newer and more compact USB-C plugs), and a pair of leads for the included 802.11ac Wi-Fi antenna. So even though there's limited internal expansion space, the external connectivity is excellent. The warranty is also top-notch, lasting three years.

PERFORMANCE

The system is equipped with a six-core Intel Core i5-5820K CPU, running at a stock 3.3GHz. Because it has two more cores than most midrange gaming desktops, it turned out a class-leading score of 1,017 on the CineBench R15 test—much higher than the 699 we saw from the Maingear Vybe, our current Editors' Choice midrange gaming desktop, or the 608 attained by the Digital Storm Eclipse.

Unfortunately, that was the Trinity Xtreme's only decisive victory. It delivered a butter-smooth 104 frames per second (fps) on the Heaven test and 102fps on the Valley test, both at Ultra-quality settings. But it was eclipsed by the Origin Chronos (132fps in Heaven, 133fps in Valley) and the Maingear Epiq Torq (114fps in Heaven, 125fps in Valley). When we pumped the resolution on both tests up to 2,560 by 1,600, the system still performed smoothly, at 48fps on the Heaven test and 50fps on the Valley test. The Trinity Xtreme is ready for 3K and 4K gaming, which is good news if you've already bought a 4K display.

The six-core processor helped the Trinity Xtreme to fine results on our Handbrake (54 seconds) and Adobe Photoshop CS6 tests (3 minutes, 10 seconds), although those still weren't the top scores. The Digital Storm Bolt II



**UPGRADE
DOWNGRADE**
Forget about replacing or upgrading components in the Trinity Xtreme—its tight design makes that difficult.

was faster on both tests (50 seconds on Handbrake, 2:18 on CS6), as was the Maingear Drift on the Photoshop test (1:43). The Trinity Xtreme scored 3,693 points on the PCMark 8 Work Conventional test, and did well on the 3DMark Cloud Gate (30,703) and 3DMark Fire Strike Extreme (8,021) tests, but again, neither was the top score. The Bolt II, Drift, and Maingear Epic Torq, respectively, were the winners on these tests.

CONCLUSION

The Cyberpower Trinity Xtreme is a uniquely designed gaming PC that will certainly turn heads and start conversations, but its price is at the high end for a midrange model. The extra expense may pay off if you're starting to get into 4K gaming or if you're going to render, say, a CGI-based cartoon as a project, but when gaming at 1080p HD resolutions, the Maingear Vybe, our Editors' Choice, is just as smooth, and costs about \$500 less. The Vybe also has a lot more room for future upgrades without requiring you to remove existing components.

JOEL SANTO DOMINGO



**Zotac Zbox Pico
PI320**

\$199.99 (as tested)



A Windows PC That Will Fit Into Your Pocket

The Zotac Zbox Pico PI320 is really, really tiny. It's one of the many so-called mini PCs, like Apple's Mac mini and Intel's pocketable Compute Stick, that are redefining how small a small-form-factor (SFF) desktop can be. This category has grown rapidly in the last year as PC manufacturers have leveraged the energy-efficient components found in tablets and inexpensive laptops to make PCs increasingly compact, but the Zbox Pico proves there are still some significant limitations to overcome.

DESIGN AND FEATURES

The Zbox Pico PI320 measures just 0.75 by 2.6 by 4.55 inches (HWD), roughly the same size as a deck of cards. With glossy black plastic on the top and bottom, and a band of aluminum around the edges, it's an unassuming little box. As mini PCs go, it's tinier than the Mac mini or the HP Pavilion Mini, but

not quite as small as the Compute Stick. It can, however, still slip into a shirt pocket.

On the front of the system is a simple Power button. On the left side is an Ethernet jack, two USB 2.0 ports, and a headset jack. On the back are another USB 2.0 port, an HDMI-out port, and a Power connector. On the right is a lone microSD card slot. Compared with the port selection on the Intel Compute Stick, this is a wealth of connectivity options. But other mini PCs, such as the Pavilion Mini or Zotac's Zbox CI320 nano Plus, pack more features: a full-size SD card slot, for example, or any HDMI alternatives (say, DisplayPort).

You'll also feel the difference in storage capacity, as the Zbox Pico PI320 is equipped with just 32GB of eMMC storage. That's the same amount found in the Compute Stick, but that doesn't necessarily make it competitive. The Zbox CI320 nano Plus offers a solid-state drive (SSD) with twice the capacity for only \$50 more. The Maingear Spark is almost as small as the Pico PI320, but boasts 128GB of solid-state storage. Everything else—the Mac mini, the HP Pavilion Mini, the Zotac Zbox Sphere OI520 Plus—is in the 500GB-to-1TB range.

Included in the box is a power adapter—an external wall-wart plug with swappable, international connectors—and a tiny, mountable clip for attaching the Pico PI320 to the back of a TV or monitor. Finally,

Zotac Zbox Pico PI320

PROS Small enough to fit in your pocket. Affordable. Comes with Windows 8.1 With Bing preinstalled. Includes mounting bracket, power supply with plug adapters.

CONS Only 32GB of onboard storage. OS is 32-bit. Low-powered processor.

PORTS OF SMALL
The tiny Zotac Zbox Pico PI320 is about the size of a deck of cards, which means it doesn't have a lot of spare room for ports.





there's a recovery disc for the operating system. The compact Zbox Pico PI320 comes with Windows 8.1 With Bing, a free version of 32-bit Windows that Microsoft offers to manufacturers of inexpensive systems. It comes preset to use Microsoft services like Bing search and OneDrive cloud storage, and isn't allowed to ship with another browser or storage service installed (that's the condition for manufacturers to get the free license and keep retail prices low). But there's nothing keeping you from installing whatever programs and apps you want once you have the system. Zotac also covers the computer with a one-year warranty.

PERFORMANCE

The Zbox Pico PI320 is outfitted with a 32-bit 1.33GHz Intel Atom Z3735F processor and 2GB of memory, the same setup used in the Intel Compute Stick. The low-powered processor is cooled passively, which keeps the PC small and silent but means you'll sacrifice some of the capability you'd get with even an inexpensive Celeron chip.

We couldn't run all of our usual tests (CineBench is 64-bit, and Photoshop and PCMark 8 Work Conventional conked out too early to give us usable results), and one we could run, HandBrake, ran incredibly slowly. The system's time on that test, 8 minutes, 14 seconds, was well behind what we saw from both the HP Pavilion Mini (7:19) and the Mac mini (3 minutes, 13 seconds), though it was a bit better than the Compute Stick's 8:20. In other words, the Pico PI320 may be adequate for Web browsing and streaming media, but it won't replace a regular desktop for more demanding tasks.



ON THE MOUNT
Included with the Zbox Pico is a clip you can use to attach the PC to the back of a monitor or TV.

CONCLUSION

Like the Intel Compute Stick, the Zotac Zbox Pico PI320 is more about stretching the boundaries of what can be considered a PC, and less about providing performance. These extra-small mini PCs are perfect for streaming media or putting simple Web-browsing capabilities on an otherwise unused monitor. For the most low-price flexibility, the Editors' Choice Compute Stick manages to be both smaller and less expensive than the Zbox, and its innovative stick design means you can plug into and power the system directly from the HDMI port of a TV or monitor. Still, I could see this sort of computer being ideal for either the living room or a customer service kiosk. The biggest benefit of the Pico PI320 isn't even its small size, but its similarly small price. When \$200 can get you a basic Windows PC, you can afford to be creative with it—so why not try it?

BRIAN WESTOVER



ViewSonic
VP2780-4K

\$889.99



Watch Full 4K Video on This Strong Midrange Monitor



The ViewSonic VP2780-4K is a moderately priced 27-inch monitor with an impressive feature set including 10-bit color technology, multiple input connections, and an In-Plane Switching (IPS) panel with a 3,840-by-2,160 ultra-high-definition (UHD) resolution. Its out-of-the-box color accuracy is top-notch, and it delivers good grayscale performance and viewing angles. It does lack advanced color settings, and its erratic function button behavior can be frustrating, but neither of these minor gripes prevents it from being our top pick for midrange UHD monitors.

DESIGN AND FEATURES

The VP2780-4K maintains the same basic design as earlier ViewSonic VP models. The 11.8-pound cabinet has a matte-black finish, relatively thin (0.75-inch) bezels, and a three-legged stand assembly that gives the monitor solid footing. The fully adjustable stand offers 5.9 inches of height, 120 degrees of swivel, 28 degrees of tilt (5 forward, 23 backward), and 90 degrees of pivot maneuverability.

Connectivity ports are abundant. At the rear of the cabinet, facing downward, are two DisplayPort inputs (one full size, one Mini); three HDMI ports (one 2.0, two 1.4) that can also connect to, and charge, compatible Mobile High Definition (MHL) devices; three USB 3.0 ports (one upstream, two downstream); and a headphone jack. Two additional USB 3.0 ports are mounted on the right side of the cabinet.

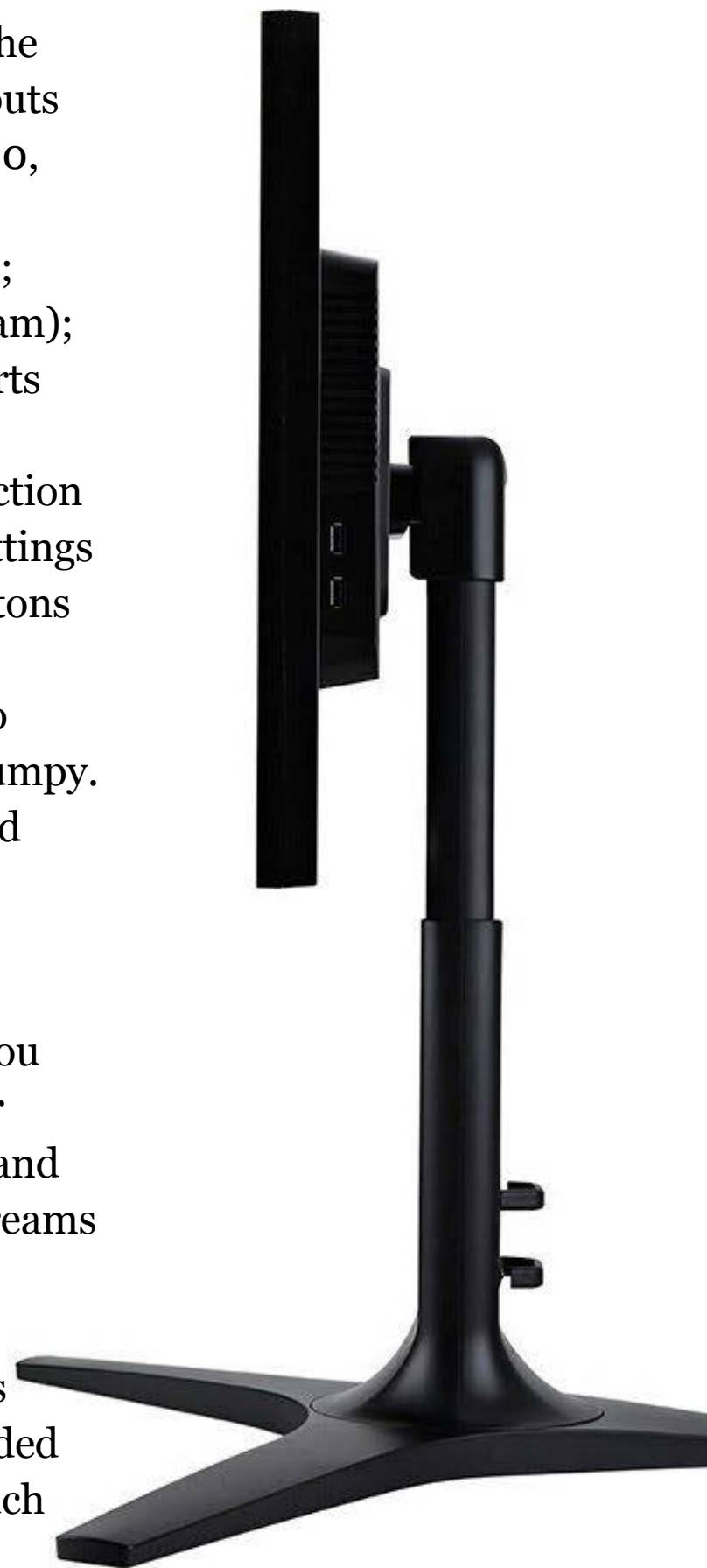
On the bottom bezel are five touch-sensitive function buttons used to access and select options in the settings menus and power the monitor on and off. The buttons can be finicky. For the most part they worked fine during testing, but every so often they would fail to respond and then become too sensitive and a bit jumpy.

Picture settings include Brightness, Contrast, and seven picture presets: sRGB, Bluish, Cool, Native, Warm, User, and EBU. The EBU (European Broadcasting Union) setting is used for video production and editing, and the User setting lets you adjust red, green, and blue saturation levels. Other settings include Multi-Picture (Picture-in-Picture and Picture-by-Picture modes) for viewing multiple streams simultaneously, three Eco power-saving modes (Standard, Optimize, Conserve), and five Gamma presets. Missing are advanced adjustments such as the 6-Axis Hue and 6-Axis Saturation settings needed for precise calibration, as you get with monitors such as the NEC MultiSync PA322UHD, and the Acer H257HU and S277HK models. There is a Blue Light

ViewSonic VP2780-4K

PROS Strong color, grayscale, 4K imagery. Numerous features, ports.

CONS Finicky controls. No advanced color settings.



Filter setting that can help reduce eyestrain, however.

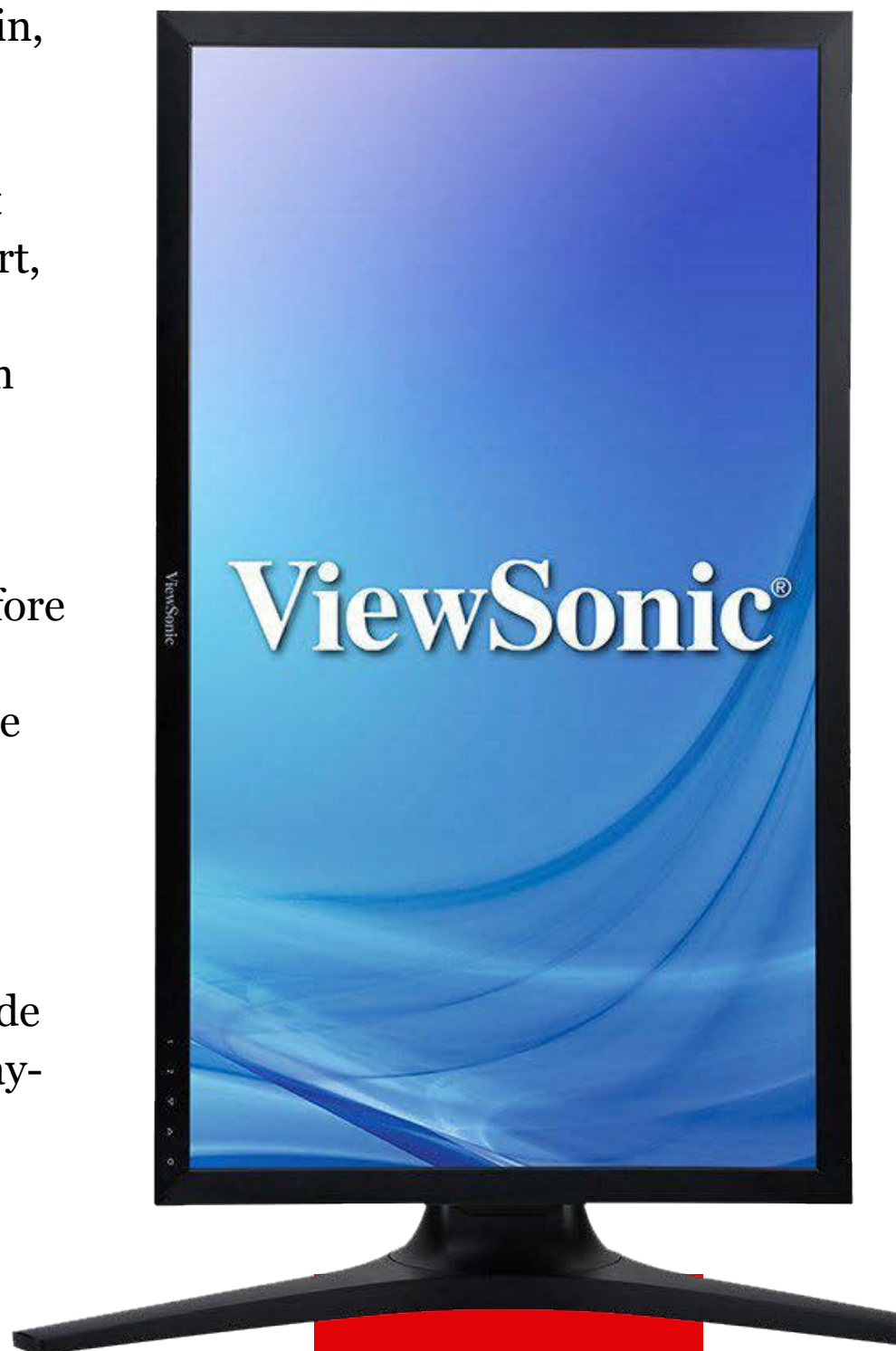
The monitor comes with a three-year warranty on parts, labor, and backlight. It also bundles in four cables (for DisplayPort, HDMI, MHL, and USB), a resource CD, a Quick Start Guide, and a Color Calibration report (see below).

PERFORMANCE

ViewSonic calibrates each VP2780-4K before it leaves the factory, and according to my testing, it's done well. Red, green, and blue were rich and evenly saturated. The IPS panel's ability to deliver dark blacks helps punch up color quality while providing exquisite shadow and highlight detail. It cleanly and accurately displayed each shade of gray from the DisplayMate 64-Step Gray-Scale test without any trace of clipping (whitewashed whites) or crushed blacks (when two or more shades of gray appear black). As a result, UHD image quality in my tests was outstanding, and small text appeared sharp and well defined.

The VP2780-4K's 5ms (gray-to-gray) pixel response keeps motion artifacts to a minimum, but it was unable to squash them completely in testing; I observed slight blurring during my *Crysis 3* (PC) and *Call of Duty: Black Ops* (Xbox 360) gaming tests. Input lag, as measured by the Leo Bodnar Video Signal Lag Tester, came to a relatively low 10.9ms, which means you won't notice any delay while trying to take out your opponents. The best input lag result we've measured to date, 9.5ms, was achieved by a dedicated gaming monitor, the BenQ XL2430T.

In testing, the ViewSonic monitor consumed 41 watts of power while operating in Standard mode.



ONE GOOD TURN
You can orient the excellent-quality ViewSonic VP2780-4K display to best match how you use your computer.



When set to the Optimize Eco mode, it used 31 watts, and in the Conserve Eco mode, it used 21 watts (Conserve mode is a bit dim, but not terribly so). These numbers are similar to what we saw from the Acer S277HK (48 watts Standard, 33 watts Eco mode), but more efficient than those from the AOC U2868PQU, which used 57 watts and has no Eco mode.

CONCLUSION

The ViewSonic VP2780-4K is a good choice if you want high-end UHD performance without spending a fortune. Its 27-inch IPS panel delivers exceptional color quality, wide viewing angles, and a crisp, highly detailed UHD image, and it aced our grayscale tests. You get lots of features with this monitor, including multiple high-speed video inputs, a USB hub, and a fully adjustable ergonomic stand. It may not be as stylish or affordable as the Acer S277HK, but it delivers equivalent performance and you get a lot more features. As such, the VP2780-4K is our Editors' Choice midrange UHD monitor.

JOHN R. DELANEY



SlimWare Utilities SlimCleaner Free

Free



The Best Free System Tune-Up Utility



Traditionally, PC tune-up utilities have performed a basic, straightforward function: improve your computer's overall performance via a number of behind-the-scenes tweaks that ditch unused files. You ran it and moved on—it was a solitary experience. That has changed with SlimWare Utilities SlimCleaner Free, which uses aggregated data collected from its user base to recommend the optimal settings for your PC. It even rewards you with badges for contributing accurate information back to the community. In short, SlimCleaner is a mashup of social network and utility that does a fine job of cleaning gunked-up PCs.

SYSTEM REQUIREMENTS AND INTERFACE

Compatible with PCs running Windows XP or later, SlimCleaner requires an Internet connection for downloading the software and performing any updates

that may be required during installation. As with Iolo System Mechanic 14, our Editors' Choice for paid tune-up utilities, you can install SlimCleaner Free on an unlimited number of systems. (The industry standard is three licenses.)

SlimCleaner's attractive interface features a pleasant color scheme that deftly balances blacks and grays with a bright blue gradient. Clicking one of the categories located in the column to the left of the main content area—Cleaner, Optimize, Software, Browsers, Disk Tools, Windows Tools, Hijack Log—brings up that individual interface to the right. SlimCleaner also displays your PC's operating system, CPU, and GPU information just south of that. A gripe: I don't like that SlimCleaner sometimes opens secondary windows when you click on an option. For example, clicking Disk Tools opens another window that lets you run disk utilities. I prefer a tighter interface that keeps everything in one place.

CLEANER, OPTIMIZER, AND SOCIAL FEATURES

The Cleaner area, which contains tabs for Windows, Applications, Browsers, Advanced, and Registry, is what you'll encounter upon firing up the application.

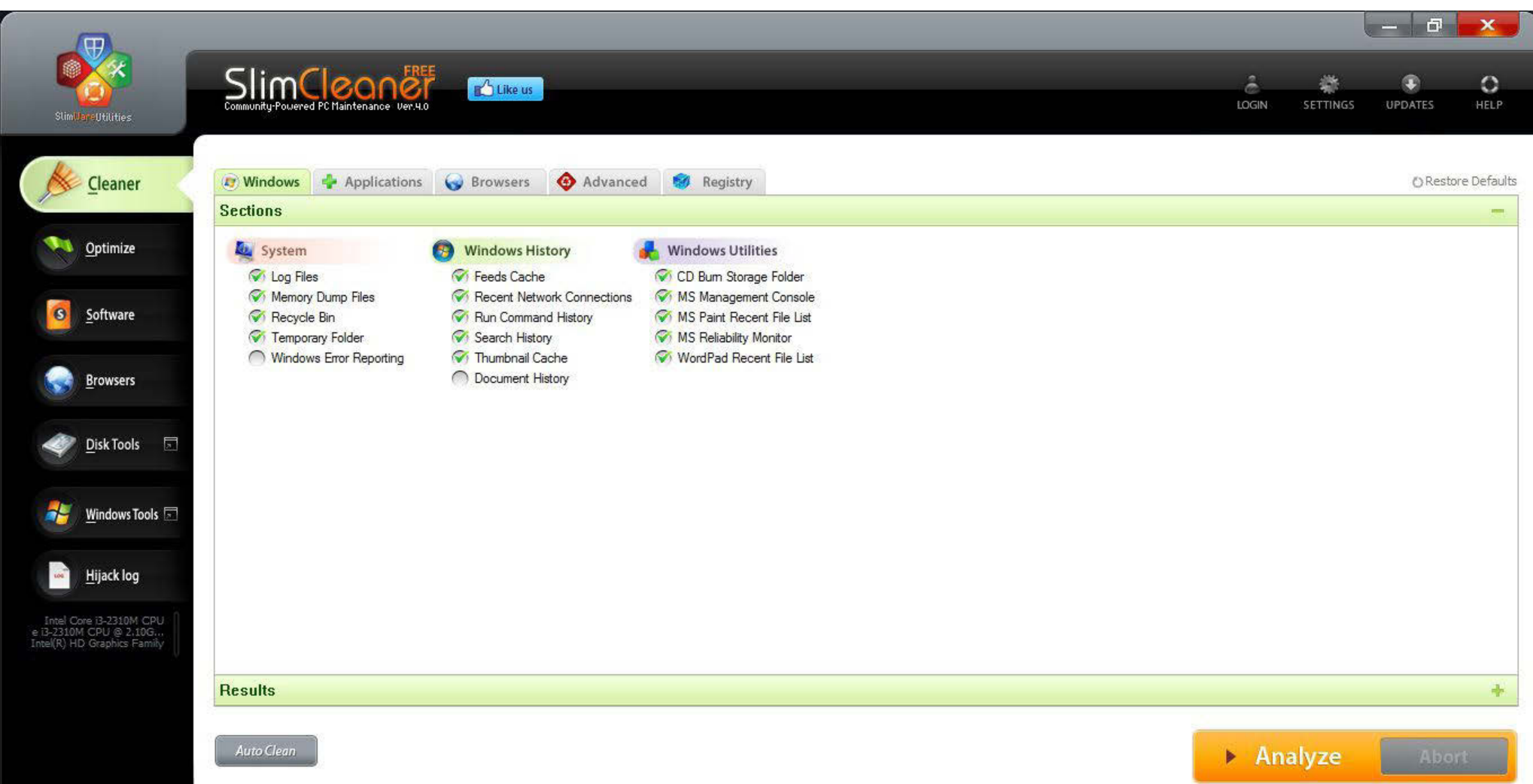
SlimWare Utilities SlimCleaner Free

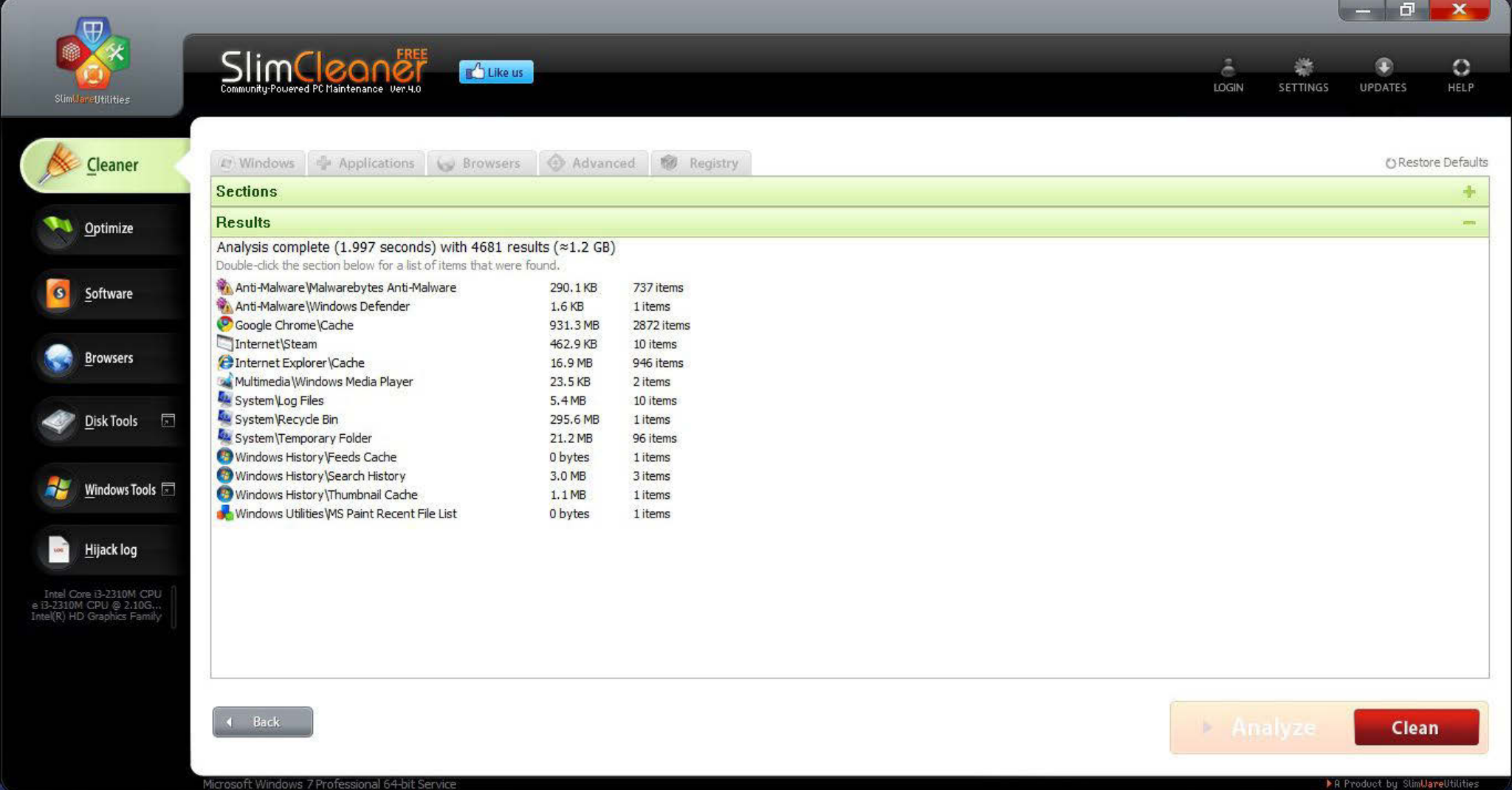
PROS Powerful tune-up capabilities. Free. No license restrictions. Allows scheduling of tune-up sessions. Includes browser cleanup, search engine selection tools.

CONS Software rating system requires Web connection. Can't simultaneously uninstall multiple applications, delete multiple duplicate files.

NOT SO SLIM

SlimWare Utilities SlimCleaner Free is loaded with different methods of cleaning troublemaking files on your computer.





Clicking the Analyze button runs SlimCleaner so it can spit back a list of problems; my initial scan uncovered dozens upon dozens on my test computer. The Clean button removed all the problem files and Web cookies, but gave me the option of preserving the login cookies of Facebook and other sites I frequent using the IntelliCookie Filter—a nice touch.

That's far from the only tool at your disposal. Optimize lets you alter which programs boot at launch—handy for those who may not realize that resource hogs are slowing the boot process and hindering the system's overall performance. The option provides detailed information so you know exactly what each file does before you take action; you can also sort software (based on user feedback) using an adjustable, color-coded slider, and rate programs yourself using drop-down menu selections and mini-reviews. I especially like that SlimCleaner gives you a warning if you elect to remove software that's been well received by other users. Unfortunately, because the feature is community-based, your PC has to be connected to the Web to get the crowdsourced software ratings.

Taking a cue from popular social networking sites, SlimCleaner gives users a wall to display personal information and view badges, awards that are given for those with helpful useful reviews. In order to save badges to your wall, you need to create an account from scratch or log in via Facebook. Personally, I could do without the badges, but I suppose they're carrots that will entice some users to contribute ratings and thus improve everyone's experience.

UNINSTALLER, BROWSERS, SHREDDER, AND HIJACK LOG

Running UnInstaller causes SlimCleaner to scan your computer and display the total number of software installs, so you may install any applications you no longer need. I don't like that you have to uninstall applications one at a time, which quickly became a chore.

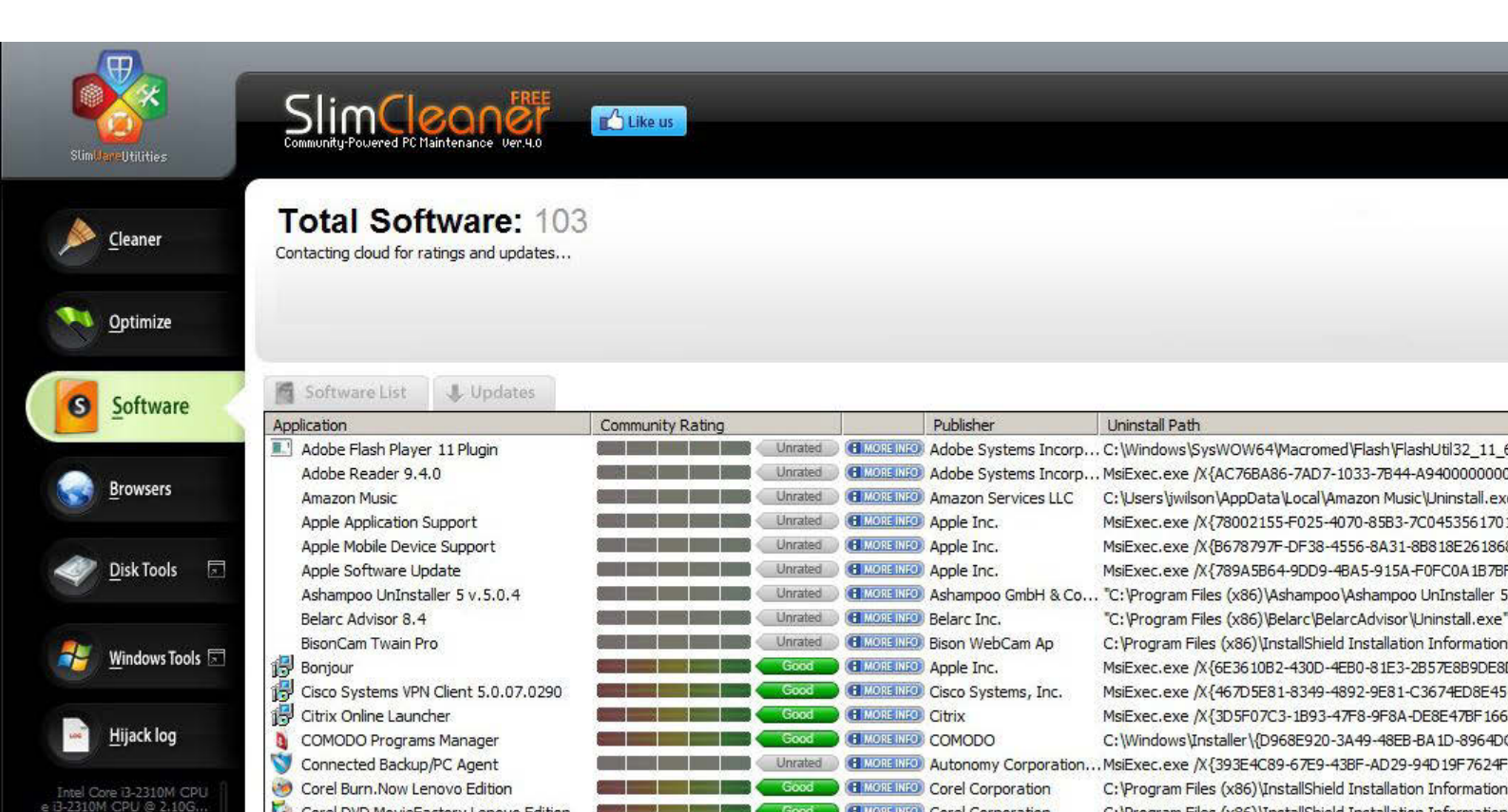
The Browsers section informs you what browsers you have installed and displays an impressive amount of information about each, including the default homepage and any installed toolbars, extensions, and plug-ins. (You can also select which search engine you want that browser to use.) Once cleaned, Internet Explorer opened far more swiftly than it had in months.

With the Shredder you can delete files or entire folders by overwriting them with data. There are different shredding levels, each of which offers increasing security: Quick (one overwrite), Safe (three overwrites), Thorough (seven overwrites), and Guttman (a whopping 35 overwrites). Once a file has been overwritten, it can't be recovered, so use this feature carefully.

Hijack Log lists all of the programs and plug-ins that are vulnerable to third-party attacks that can take over your computer. Windows Tools organizes system tools (Device Manager, System Information, and more) in one easily navigable interface. Another aspect of SlimCleaner that I liked a lot: A Revert Optimizations button on each screen lets you roll back the settings should you need to.

You can schedule tune-ups to run on a daily or weekly basis, and you can make a portable version of the software by taking a trip to Settings.

SlimCleaner's other features include Intelligent Defrag (for running a personalized drive defragmentation routine based on your specific PC hardware), Software Updater (for checking for software updates and installing them directly from SlimCleaner), Solid-State Drive Optimization (for



UP-TO-DATE UPDATES
Use SlimCleaner to manage your software and you can be sure you always have the most up-to-date versions of all of your programs.

Application	Community Rating	Publisher	Uninstall Path
Adobe Flash Player 11 Plugin	Unrated	Adobe Systems Incorp...	C:\Windows\SysWOW64\Macromed\Flash\FlashUtil32_11_6...
Adobe Reader 9.4.0	Unrated	Adobe Systems Incorp...	MsiExec.exe /X{AC76BA86-7AD7-1033-7B44-A94000000000}
Amazon Music	Unrated	Amazon Services LLC	C:\Users\jwilson\AppData\Local\Amazon Music\Uninstall.exe
Apple Application Support	Unrated	Apple Inc.	MsiExec.exe /X{78002155-F025-4070-85B3-7C0453561701}
Apple Mobile Device Support	Unrated	Apple Inc.	MsiExec.exe /X{B678797F-DF38-4556-8A31-8B818E261868}
Apple Software Update	Unrated	Apple Inc.	MsiExec.exe /X{789A5B64-9DD9-4BA5-915A-F0FC0A1B7BFE}
Ashampoo UnInstaller 5 v.5.0.4	Unrated	Ashampoo GmbH & Co...	"C:\Program Files (x86)\Ashampoo\Ashampoo UnInstaller 5\unins000.exe"
Belarc Advisor 8.4	Unrated	Belarc Inc.	"C:\Program Files (x86)\Belarc\BelarcAdvisor\Uninstall.exe" "C:\Program Files (x...
BisonCam Twain Pro	Unrated	Bison WebCam Ap	C:\Program Files (x86)\InstallShield Installation Information\{F2672232-FF17-4D...
Bonjour	Good	Apple Inc.	MsiExec.exe /X{6E3610B2-430D-4EB0-81E3-2B57E8B9DE8D}
Cisco Systems VPN Client 5.0.07.0290	Good	Cisco Systems, Inc.	MsiExec.exe /X{467D5E81-8349-4892-9E81-C3674ED8E451}
Citrix Online Launcher	Good	Citrix	MsiExec.exe /X{3D5F07C3-1B93-47F8-9F8A-DE8E47BF1669}
COMODO Programs Manager	Good	COMODO	C:\Windows\Installer\{D968E920-3A49-48EB-BA1D-8964DCDF0CA9}\uninstall.exe
Connected Backup/PC Agent	Unrated	Autonomy Corporation...	MsiExec.exe /X{393E4C89-67E9-43BF-AD29-94D19F7624F7}
Corel Burn.Now Lenovo Edition	Good	Corel Corporation	C:\Program Files (x86)\InstallShield Installation Information\{A3BE3F1E-2472-42...
Corel DVD MovieFactory Lenovo Edition	Good	Corel Corporation	C:\Program Files (x86)\InstallShield Installation Information\{50E69032-BFB7-45...

optimizing the layout of files on SSDs to speed up loading programs and opening documents), and Duplicate Finder (for quickly finding and eliminating unnecessary duplicate files). Eliminating duplicate files proved a bit tedious as I couldn't do a mass elimination—I had to delete each file one by one.

PERFORMANCE IMPROVEMENTS

I tested SlimCleaner's ability to whip a PC back into shape by running the Geekbench system performance tool and measuring boot times twice: once before using SlimCleaner and once after; each test was run three times and averaged.

Before SlimCleaner scrubbed the system, the 2GHz Intel Core i7-920XM-based Style-Note notebook with 4GB of RAM and an 80GB Intel SSD drive achieved a 5,914 Geekbench score and booted in 50.3 seconds. After using SlimCleaner, the Geekbench score rose to 6,338 (just short of System Mechanic 14's 6,369 score), and the boot time decreased to 41.1 seconds (a bit behind Iolo System Mechanic's 39.7 seconds).

Those numbers wouldn't mean much if they didn't translate into noticeable performance improvements—fortunately, they do. Windows, iTunes, and Steam opened with extra pep that wasn't present when the machine was junked up.

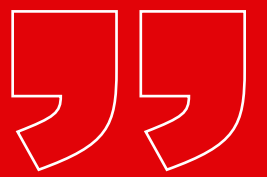
THE FREE TUNE-UP CHAMP

SlimCleaner's collection of system-improving tools makes it *PC Magazine's* new Editors' Choice for free PC tune-up utilities. Its community-based monitoring and tune-up tools make it a utility I will return to often. Iolo's System Mechanic 14 is slightly more powerful, and its dynamic PowerSense power-adjusting feature is especially useful. But if you just want to speed up a sluggish PC without spending any money, SlimCleaner Free is worth a try.

JEFFREY L. WILSON



If you just want to speed up a sluggish PC without spending any money, SlimCleaner Free is worth a try.

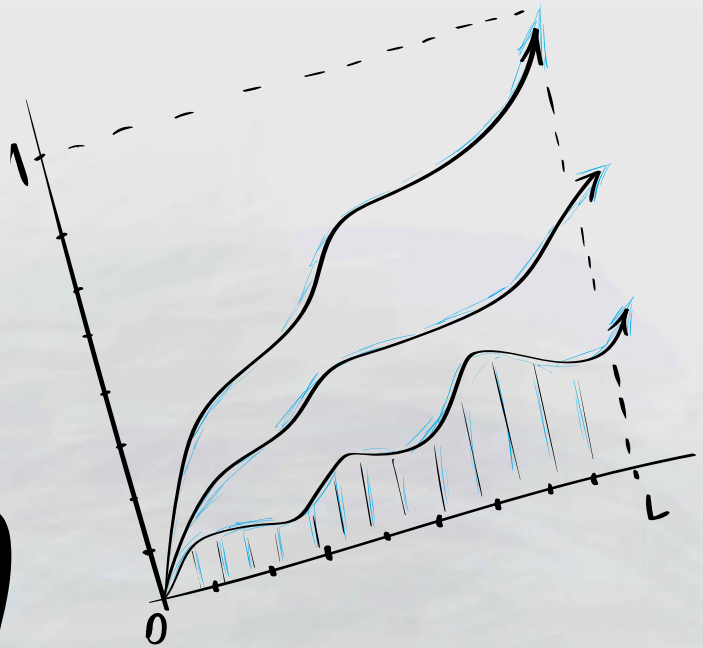


Features

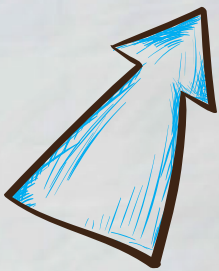
~~THE BEST BACK-TO-
SCHOOL GEAR~~

~~10 FOR 10~~

the best



Back To School

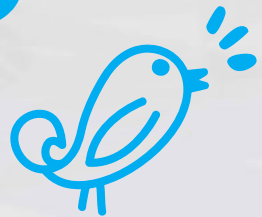


gear



Regardless of what you're studying or where you're studying it, you need technology that will keep you productive and keep you connected. Each of the products in this story won *PC Magazine's* Editors' Choice award and is the top value in its category, so you'll get all the functionality you need—and not have to go crawling back for more student loans.

BY MATTHEW MURRAY



LARGE SMARTPHONE

Samsung Galaxy Note 4

\$299.99 with contract / ●●●●●●

Armed with an incredible Quad HD AMOLED display, cutting-edge Snapdragon 805 processor, and useful software tweaks and stylus features to complement its premium design, the Galaxy Note 4 is an impressive 5.7-inch phablet that will win over even the most entrenched one-handers.



mobile



SMALL SMARTPHONE

Apple iPhone 6

\$199.99 with contract / ●●●●●●

Android lovers may never be convinced to switch to the iPhone 6, but it's perfectly sized for most people, and for making the most of the ever-elegant iOS operating system and the dazzling array of third-party apps. Superb features, including an excellent camera and top-notch Wi-Fi performance, improve this already-winning phone.

CONVERTIBLE TABLET

Acer Aspire Switch 11

\$649.99 / ●●●●○

Convertible tablets give you tablet convenience with a laptop's ease of use, all in one package. Our favorite affordable model is the Acer Aspire Switch 11, which is equipped with a fine 1080p touch display and a hinge that facilitates switching between any of four distinct usage modes. With the Switch 11, you'll always have just the computer you need, just when you need it.



mobile



SLATE TABLET

Apple iPad Air 2

\$499 and up / ●●●●○

Apple's never-ending process of product refinement means the iPad keeps getting smaller even as it also gets more powerful. The iPad Air 2 is the everyday tablet you need if you don't want to be weighed down by yet one more device, but you still value performance and want easy access to a sprawling software library.



BUDGET ULTRAPORTABLE HP Stream 13

\$229.99 / ●●●●○

If you need a full Windows PC but don't have a ton of money to shell out for one, HP's Stream 13 is a canny compromise. Speedy solid-state storage, long battery life, and lots of ports make this 13.3-inch laptop one of the most useful and versatile budget models you can buy—and you can get it for less than \$250.

Laptops

HIGH-END ULTRAPORTABLE Apple MacBook Air (13-inch)

\$999 and up / ●●●●●○

On the other hand, if you do have a bit more money and still want a featherweight system, why not get the best? Apple's trailblazing, ridiculously thin MacBook Air is still the standard by which other ultraportables are judged; its unusually powerful processor and amazing battery life (more than 12 hours) keep it justifiably at the head of the class.





CHROMEBOOK HP Chromebook 11

\$299.99 / ●●●●●

Not everyone needs (or wants) to install software in order to do all their necessary work. If this is you, don't waste money on computer you don't need. Pick up the beautifully designed Chromebook 11 and run all your programs on the Web—which you'll be able to access from anywhere thanks to the built-in Verizon LTE mobile broadband (though you'll need to pay extra for data).



laptops

PERFORMANCE LAPTOP

MacBook Pro

\$1,999 / ●●●●●

Alienware 15

\$1,199 / ●●●●○

When you're studying something that requires a truly powerful computer, don't skimp on the hardware. Less than \$2,000 will get you a top-tier laptop from either Apple or Alienware, which you can customize to meet all the most demanding needs of your coursework and the software you'll have to run.



PRINTER

HP OFFICEJET PRO 6230 ePRINTER

\$99.99 / ●●●●○

Printers may not be as important as they used to be, but you'll still want to have one around. Though it costs just \$99.99, the HP Officejet Pro 6230 ePrinter has Ethernet, Wi-Fi, and Wireless Direct, for effortless printing in nearly any wireless situation. A duplexer, ample paper capacity, and low cost per page seal the deal.



hardware



PORTABLE STORAGE KINGSTON DATATRAVELER MICRODUO 3.1 (64GB)

\$23.99 / ●●●●○

For sharing data between your smartphone or tablet and your PC at a moment's notice, you need something that's both speedy and convenient. Kingston's DataTraveler microDuo meets both these requirements: It's only an inch long, and dual USB ports (micro and 3.1) make transferring your files a snap, no matter where you are.

BUDGET CAMERA

OLYMPUS PEN E-PL6

\$299 / ●●●●○

Your smartphone camera isn't as good as you think it is. So even if you're not a hard-core photographer, get a dedicated camera for those times when image quality really counts. The mirrorless Olympus PEN E-PL6 is small, light, and takes terrific images—all for a value price that can't be beat.



cameras



D-SLR

CANON EOS REBEL T6s

\$849.99 / ●●●●○

When the time comes to step up to an even more capable camera, you don't need to shell out more than \$1,000 to score a knockout one. With the Canon EOS Rebel T6s, you get first-rate image quality, speed, and ergonomics, along with built-in Wi-Fi and plenty of other features that will help you take your shooting to the next level.

wearables

SMARTWATCH PEBBLE WATCH

\$99 / ●●●●○

Since the first Pebble appeared, other smartwatches have been released that look cooler or have more exciting features. But the original model still represents one of the best balances you can find between features and price, with a solid notification system and an ever-expanding app store giving you lots of options now—and tons of potential for the future.



FITNESS TRACKER MIO FUSE

\$149 / ●●●●○

Though it doesn't quite have Fitbit's name value and is missing some features (such as a sleep monitor and altimeter), the affordable Mio Fuse is an ideal tracker for active people who want the most help staying in shape. A built-in heart rate monitor is a great convenience, and its step, distance, and calorie monitoring make it useful on rest days, too.



**BUDGET
EARPHONES
SOL REPUBLIC
RELAYS SPORT**

\$49.99 / ●●●●●

Sure, the SOL Republic Relays Sport may have been designed primarily for use while exercising. But the earphones fit securely regardless, and their audio quality, with robust bass and crisp, clear highs, will impress you even when you're not out running.



*Music
&
Audio*



**NOISE-CANCELING
HEADPHONES**

BOSE QUIETCOMFORT 25

\$299.95 / ●●●●●

A quiet environment is a must for studying—or even just keeping your sanity—so if you can't find one naturally, Bose's QuietComfort 25 noise-canceling headphones will help you create one. In addition to sporting the best noise-cancellation technology you can get, they're comfortable, they sound terrific, and now you can also use them with the noise canceling off.

BLUETOOTH SPEAKER

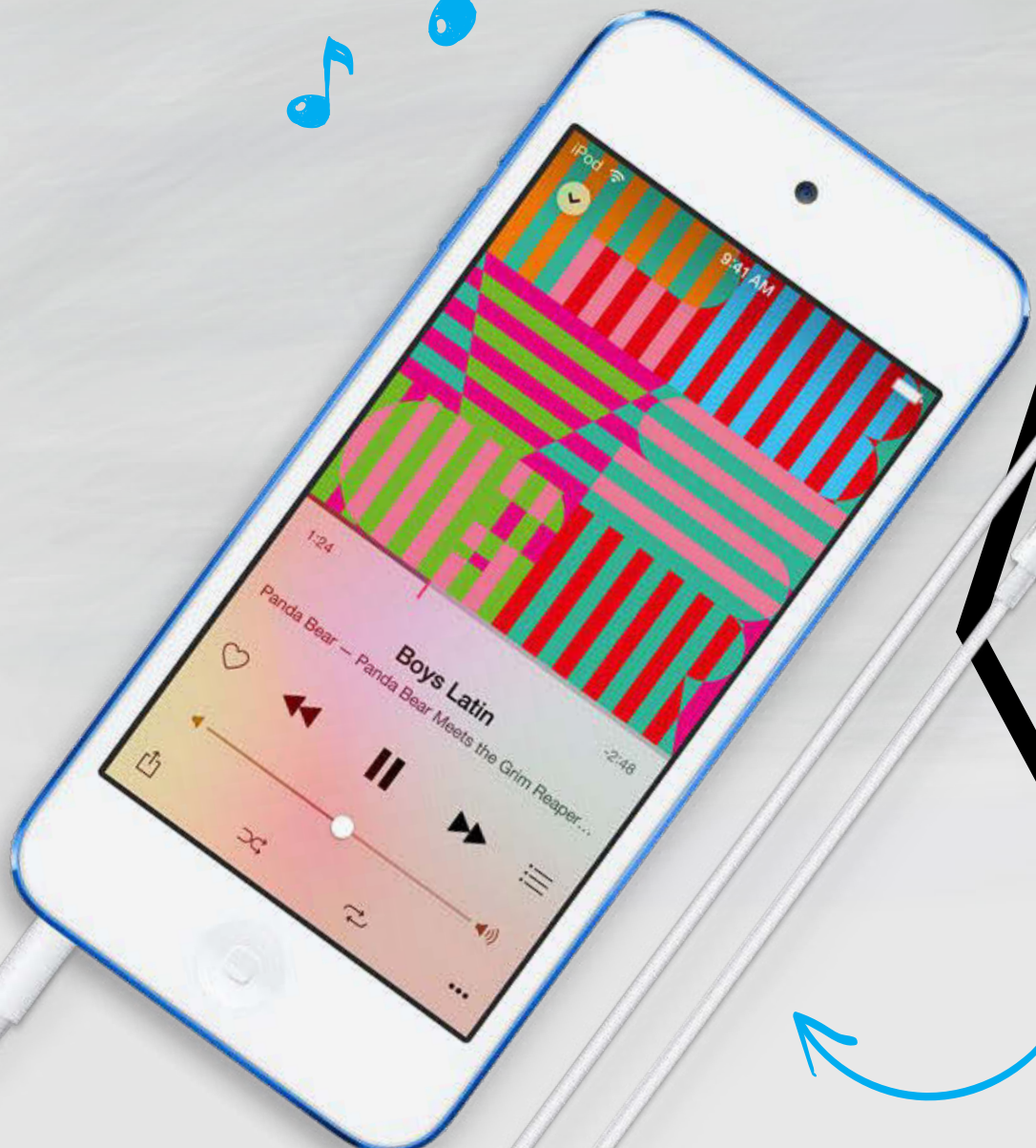
JBL CLIP+

\$49.95 / ●●●●○

Bluetooth speakers are handy accessories, but it can be easy to spend more than you need to, without getting one that matches your lifestyle. If you want a speaker that's as mobile as you are, go with the JBL Clip+. In addition to sounding amazing for its small size, the Clip+ has a new splash-proof, washable design that means you can take it almost anywhere without fear.



Music & Audio



MUSIC PLAYER

APPLE IPOD TOUCH

\$199 AND UP / ●●●●●

Apple just released its newest version of what, after all these years, is still the best music player on the market. Sleekly designed and available in five colors, the new iPod touch also has a high-res camera and a powerful processor. But the main reason to get it remains its ability to give you easy access to your music library and thousands of apps—with no phone required.



HDTV **INSIGNIA NS-55DR420NA16**

\$549.99 / ●●●●○

Just because you're on a budget doesn't mean you can't have a big, good-looking TV. This Insignia set measures a full 55 inches, uses Roku TV to power its streaming features, and delivers a better picture than some HDTVs that cost more. And all for less than \$600.



fun stuff



VIDEO STREAMING DEVICE

GOOGLE CHROMECAST

\$35 / ●●●●○

If you already have an HDTV you're happy with, jazz up its ability to play online content with the Google Chromecast. It streams content from Netflix, YouTube, Google Play, Hulu, and more. Though you'll need a mobile device to use it and its other features are limited, the Chromecast is still a winner with an unbeatable price.



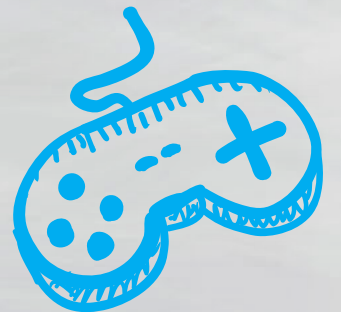
PORTABLE GAMING NEW NINTENDO 3DS XL

\$199 / ●●●●○

Look beyond its name: Compared with the company's previous models, the New Nintendo 3DS XL boasts superior glasses-free 3D, an additional jolt of processing power, and a second analog stick. Add in backward-compatibility with games for both the DS and the original 3DS, making for a truly massive software library, and you have the clear choice for most go-anywhere gamers.



fun stuff



CONSOLE GAMING SONY PLAYSTATION 4

\$399.95 / ●●●●○

Maybe the Xbox One is better as a media hub—but if you have a connected HDTV, how much do you need it? If you're going to get a console, you want one that offers the best gaming experience—and that's the PS4. Good streaming support and plenty of killer features make this our choice for a way to spend your leisure time. (Once you're done studying, that is.)



FEATURES

10 *for* 10

The Windows logo, consisting of four blue squares arranged in a 2x2 grid, is positioned in the center of the page. It is partially overlaid by the large white numbers '10' and '10' that form the main title. The background of the entire page is a scenic landscape of snow-covered evergreen trees and mountains under a twilight sky.

Windows 10 combines the sleek desktop functionality of Windows 7 with the touch-oriented tile interface of Windows 8 to create an operating system that's the best of both worlds, regardless of what kind of device (or devices) you use. Here are ten ways you can make the most of Microsoft's next (and last) OS.

BY MICHAEL MUCHMORE AND MATTHEW MURRAY



Get Start-ed

Windows 10's reprise of the Start menu has been much applauded, particularly by those who lamented losing its navigational control in Windows 8. But the version used in Windows 10 is not a simple return to form. Instead, it combines the earlier hierarchical design with Windows 8's tiles, while giving you total flexibility as to its appearance. Simply click and hold the mouse pointer on the edge of the Start box and drag it to the size you want, then add new tiles (by opening the All Apps screen and right-clicking) or remove old ones (with another right-click) as you see fit. Or, if you prefer, you can clear them all away for the full, clean Start menu experience.

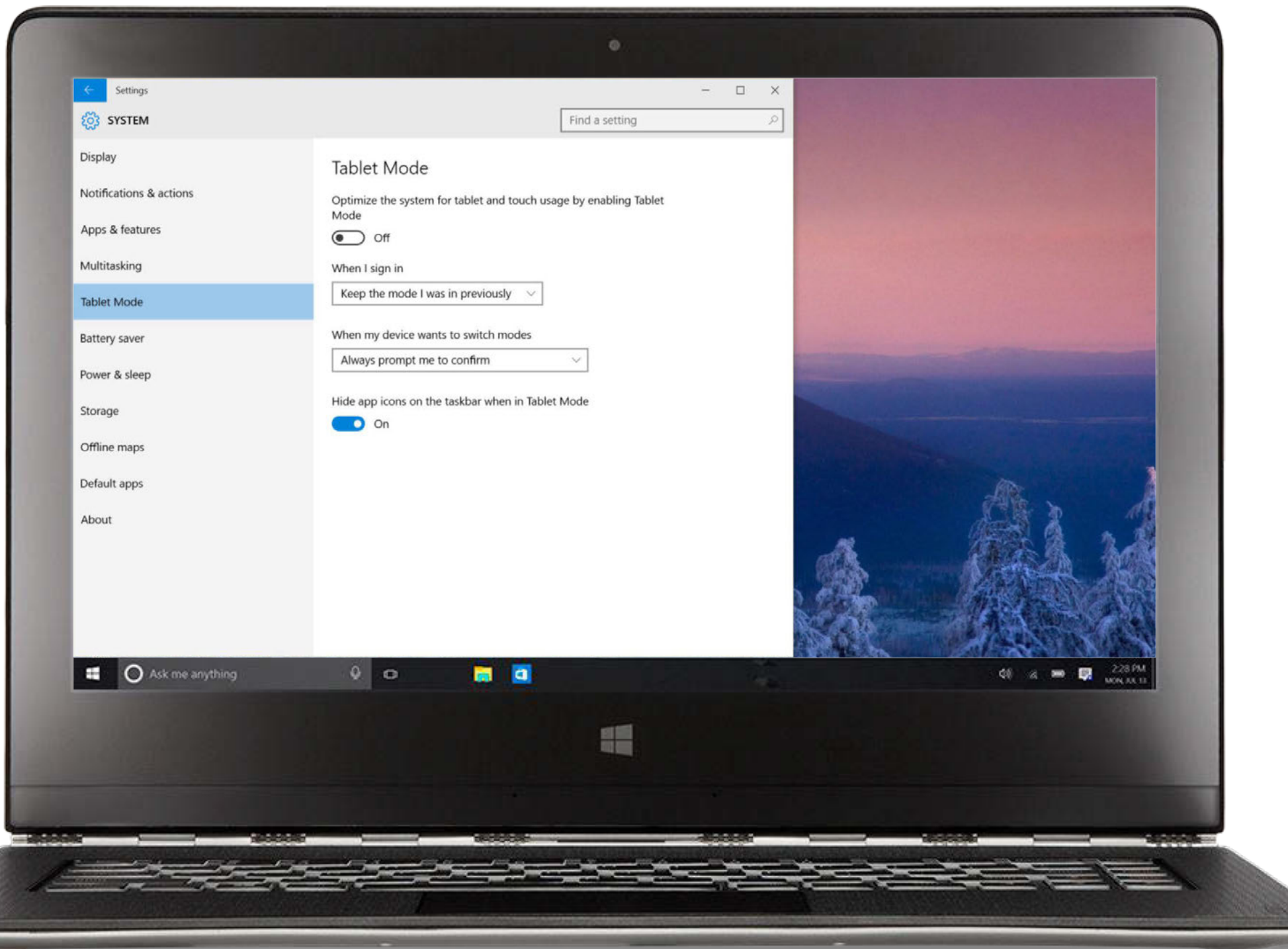
There are even more settings for the Start menu, which are accessible from the Settings > Personalization > Start page of the control panel. From here, you can even re-enable the full-screen Start page (toggle it with the "Use the Start menu instead of the Start screen" option, though you'll have to log out and then back in to see the change). You can also turn on or off recently accessed apps and groups, and content and app suggestions; and get granular with the Customize List option, which lets you choose links that appear below the frequent items, such as Settings, Explorer, and so on.



2 Hold Court With Cortana

Unlike Siri or Google Now, Cortana, Windows 10's digital assistant, lets you control what it knows about you, so that it can pop up relevant reminders and display info of interest. You do this by making selections in Cortana's Notebook, or in the Contacts or Maps apps. The last two let you tell Cortana which contact is your spouse, and which places on the map are your home and workplace. That way, Cortana can present you with a reminder to call your spouse, or let you know how long a commute will take based on current traffic. Or ask Cortana to send an email for you. She will.

Like Google Now (and now Siri, to some extent), Cortana can listen for a key phrase, in this case "Hey, Cortana!", and wake up to answer your requests. But before she can do any of this, you need to enable her. You can do this the first time you click in the Windows 10 search box (now permanently accessible from the taskbar). This also involves granting permission to use your location, microphone, contacts, email, messages, and browser history, though you can adjust these permissions to taste. Cortana can show you local news, sports, and weather info, and even tell you a joke or two.



Do the Old Switcheroo

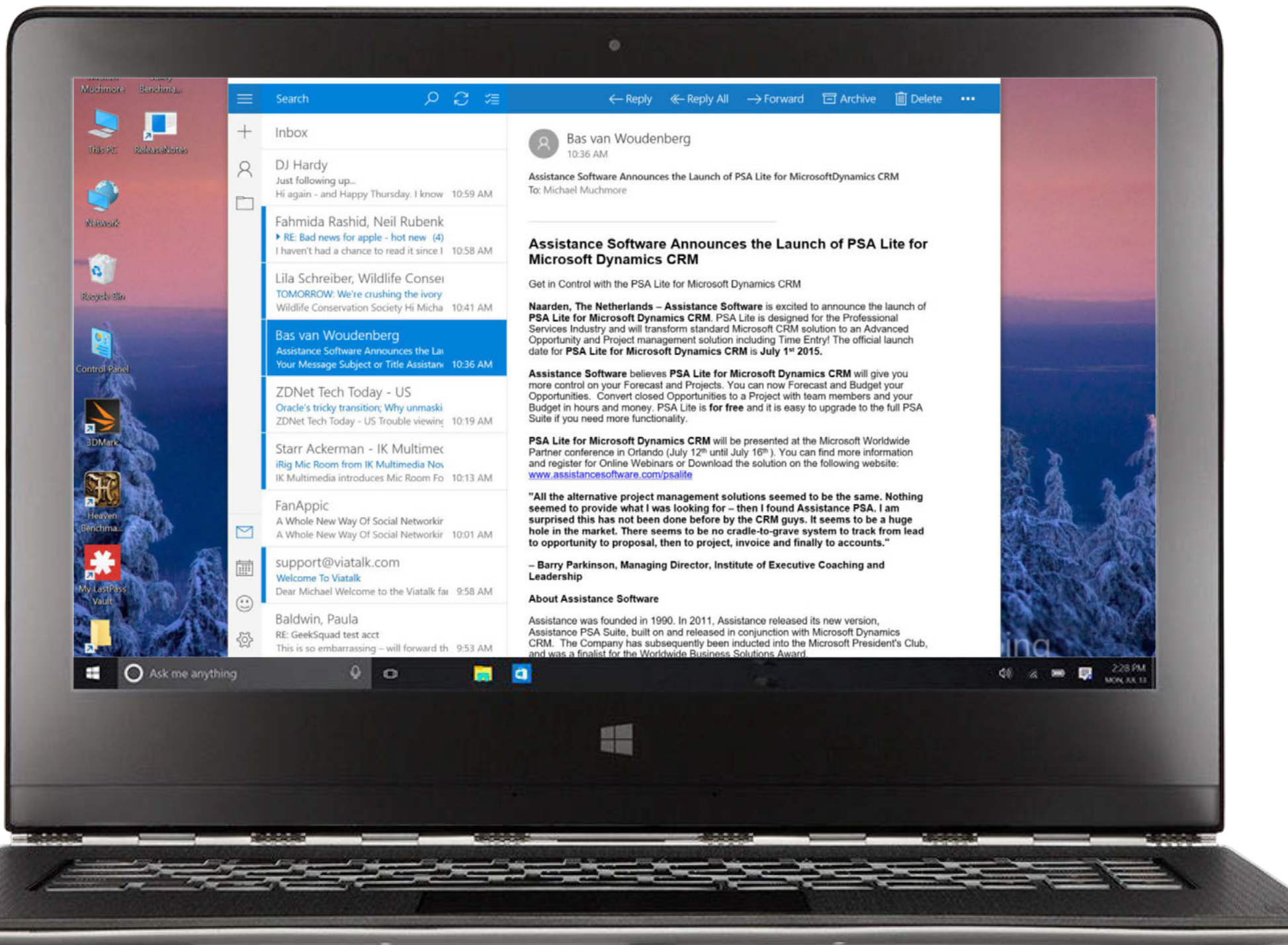
The Continuum feature keeps your experience consistent regardless of what kind of device you sign into. If, for example, you pull your Type Cover off of your Microsoft Surface Pro 3, you'll see a notification asking whether you want to switch to tablet mode. You can adjust this behavior by going into the Tablet Mode category of System settings. Have Windows immediately enter Tablet mode, take you to the desktop, or retain whatever your previous mode was. Choose whether to have prompting when the device wants to switch modes, or if you're fine with it always going into one mode or the other. Or turn off Tablet Mode altogether. You can even hide app icons on the taskbar, if you want.



4

Take Your Desktops Virtual

We've always found switching among apps and applications snappier in Windows than in other desktop operating systems, but with Windows 10 comes yet another option: multiple virtual desktops, which make it easier to organize your work and your applications in ways that make the most sense to you. There are two ways to start working with virtual desktops. Click the multi-screen icon in the taskbar, then click the "New desktop" icon that appears over on the right; or create a new desktop from an application you're already running by opening up the task switcher (Windows key+Tab) and dragging the application onto the "New desktop" icon. Once you're running multiple desktops, switch between them at your leisure by clicking the button again and choosing the thumbnail of the one you want.



Check Your Mail and Calendar

The Mail app, integrated with Windows 10, is loaded with useful features that make it easier for you to read and respond to messages on any device. Designed to mimic the look and feel of the full version of Outlook, it offers a collapsible conversation view with email preview panel, and integrates buttons for the dynamic calendar (which has full Google Calendar support) and contact apps. Basic formatting options let you adjust, Word-style, how your messages look to their recipients. You can easily add multiple mail accounts (including POP) from any provider. Moving, deleting, and changing the read status of emails is a cinch using customizable swipe gestures. If you just want to change the way Mail looks, you can change the default image in the preview pane to a picture of your choice.



Make Your System Your Home

As part of File Explorer's major Windows 10 revamp, there's a new Home screen that facilitates access to all your most important files—wherever they might be. You don't need to do anything with the Frequent folders if you don't want to (they'll propagate automatically). But you can tweak the Favorites section to your heart's content. Navigate to a folder and click the "Add to favorites" button to always display it (alongside must-have shortcuts for the Desktop, Documents, Downloads, Music, OneDrive, Pictures, and Videos). If you don't like this functionality, you can turn it off by going to View > Options from the Ribbon, clicking the "Open File Explorer" drop-down, and then selecting "This PC."

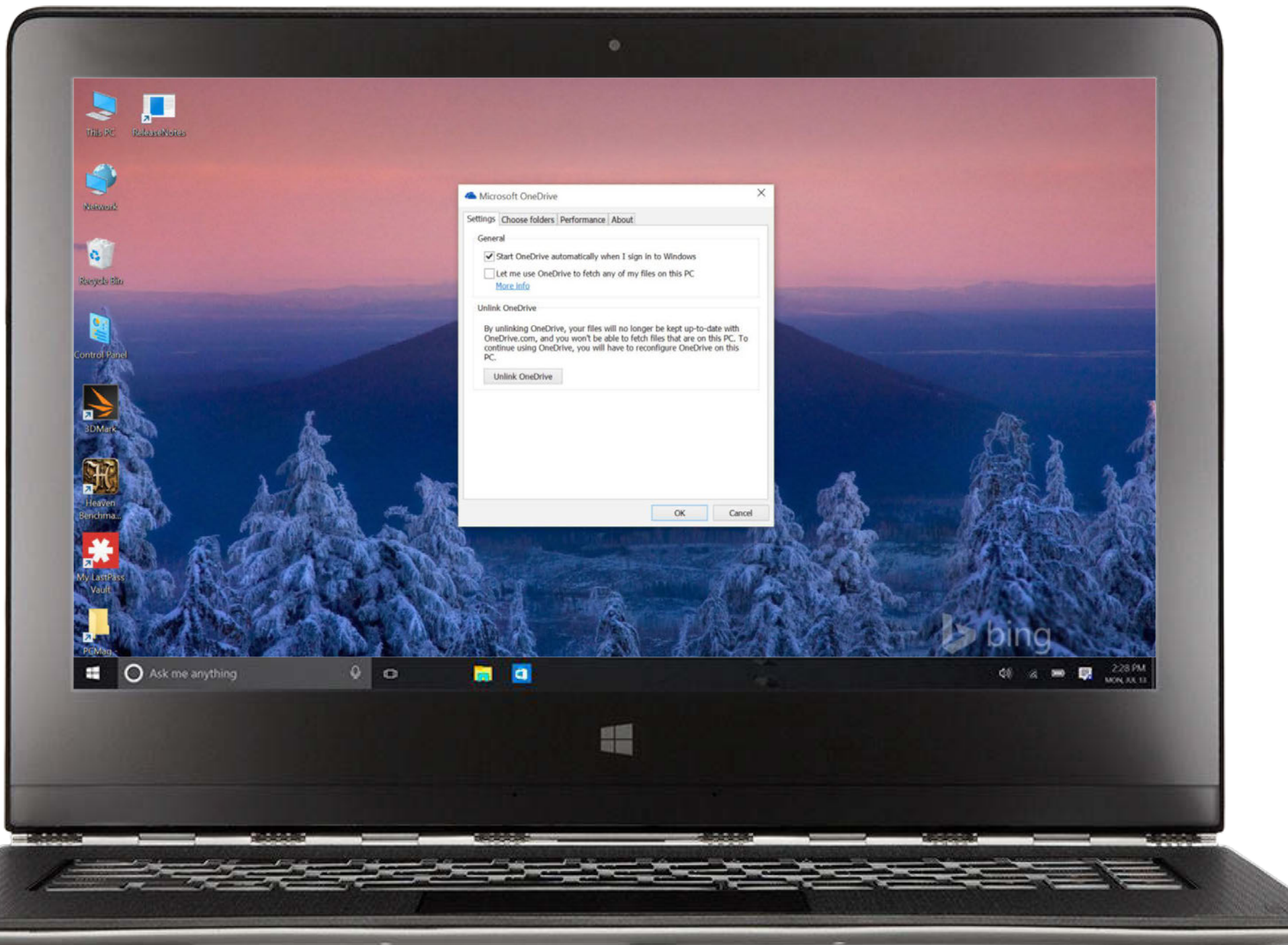


Explore the Shortcuts

If you're using Windows 10 on a system with a keyboard, that can still be the quickest way to perform some tasks. Most of the old standards still work, so don't forget about those, but the new ones offer plenty of handy functionality.

- Windows key: Display the Start menu
- Windows key+Tab: Launch Task View
- Windows key+Q: Use Cortana to search Windows and the Web (via speech input)
- Windows key+S: Use Cortana search Windows and the Web (via keyboard input)
- Windows key+I: Open Settings
- Windows key+A: Open Notifications
- Windows key+L: Lock your device
- Windows key+Ctrl+D: Create a new virtual desktop

- Windows key+Ctrl+F4: Close current virtual desktop
- Windows key+Ctrl+Left or Right Arrow: Switch to previous or next virtual desktop
- Windows key+Up, Down, Left, or Right Arrow: Position a window on your screen
- Windows key+H: Share content
- Windows key+K: Connect to wireless displays and audio devices
- Windows key+X: Open Start button context menu



Sync Files and Settings to the Cloud

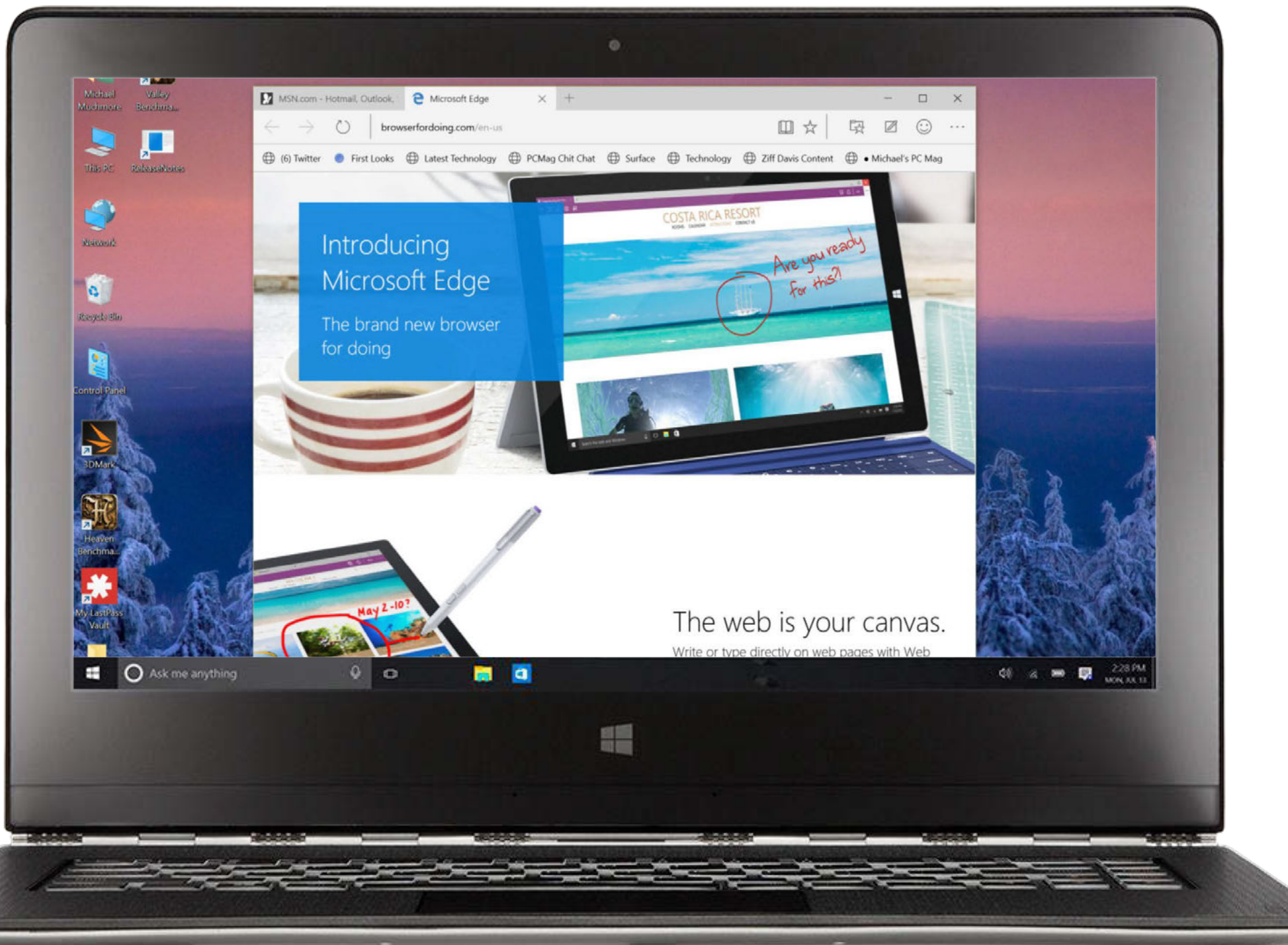
What's not to like about a free cloud storage service that keeps all your devices in sync? Just as with Windows 8, you can make sure all your devices behave with as much harmony as you want them to, so you can easily use the same lock image, desktop wallpaper, and email accounts anywhere you are. Enable this during the Windows 10 setup procedure, or later by going to the Settings > Accounts page.

With OneDrive you can access files in your online storage from mobile apps for all major platforms, and configure your PC for file fetching, which lets you get at any file on the PC, even if you haven't specifically saved it to OneDrive. You do this by right-clicking on the cloud icon in the taskbar notification area and choosing "Let me use OneDrive to fetch any of my files on this PC."



Get in the Game

We know that not everyone owns an Xbox, but for those who do, the new Xbox Windows 10 app adds a portal to a lot of long-desired and long-reserved-for-Steam gaming features to Microsoft's fold. Record and share your greatest gameplay moments with Game DVR. See who among your friends is playing what game, what clips of their own games they want to share, and send them messages and invites from your computer. Buy Windows 10-exclusive games without having to go through a third-party app such as Steam or Origin. Stream games from your Xbox One to any room in the house by way of a Windows 10 PC or tablet. Track achievements and engage in high-intensity multiplayer gaming sessions across devices. These capabilities are leaps and bounds ahead of anything Microsoft has offered natively in the past.



10 Take Your Browsing to the Edge

Users have long been frustrated with Internet Explorer's lack of compatibility with some newer sites, to say nothing of the slow performance of earlier versions. Windows 10's new Edge browser makes a clean break, and offers speed, compatibility, and features on par with what's offered by the likes of Chrome and Firefox. Search directly from the address bar. Use the Hub sidebar feature to display your favorites, history, current downloads, and automated reading list. Highlight, draw, or type on webpages using Paint-like editing tools. If you want to read with fewer distractions, select Reading View to clear away the junk and focus just on the words. There's even access to Cortana right in the address bar, in case you need clarification or assistance on anything while you're browsing.

GET ORGANIZED

**Making the Move
to the Cloud**

TIPS

**Smart Tricks for Polishing
Google Chrome**

ENTERTAINMENT

**The Ultimate Cord
Cutter's Guide**

CONNECTED TRAVELER

**Free Travel Apps for Your
Next Road Trip**

Digital

Life

Making the Move to the Cloud

BY JILL DUFFY



After years of working in a hybrid system, where some of my files were local and some were in the cloud, I recently made the switch to working entirely online. Here's what you need to know if you're considering doing that, too.

TIPS FOR MIGRATING TO THE CLOUD

When deciding to keep all your work in the cloud and store none of it locally, you'll face one big challenge: figuring out what to do with all your old files. My advice: Don't waste your time trying to perfectly migrate or reorganize all of your old data, which you might never look at again anyway.

Instead, focus on how you will organize or store new data going forward. In my case, I started using Google Drive for all my new documents immediately. I

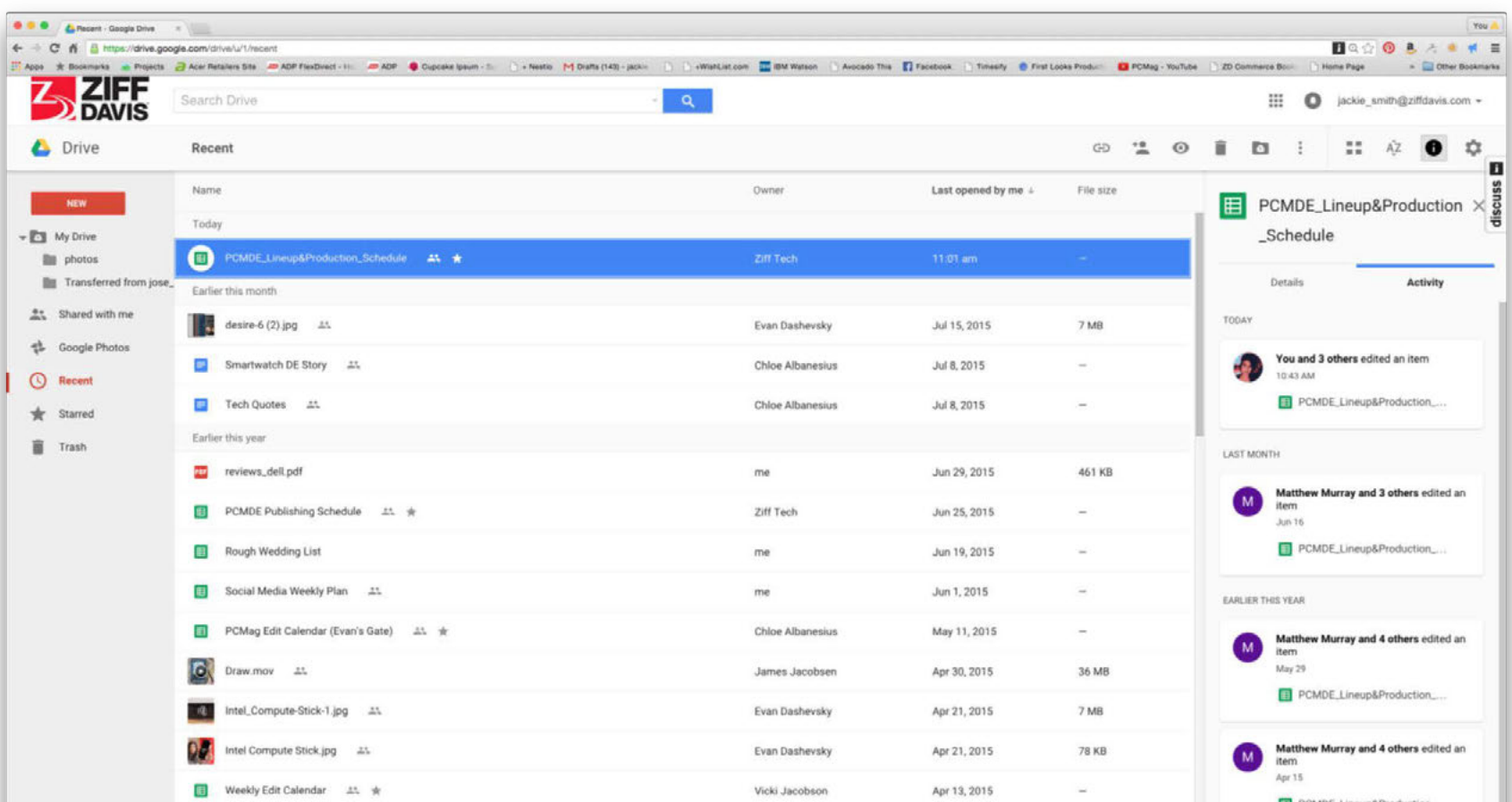
created new folders in Google Drive online that mirrored my desktop's organizational system. When I started a new file, I made it a Google Doc. I paid more attention to the present than the past.

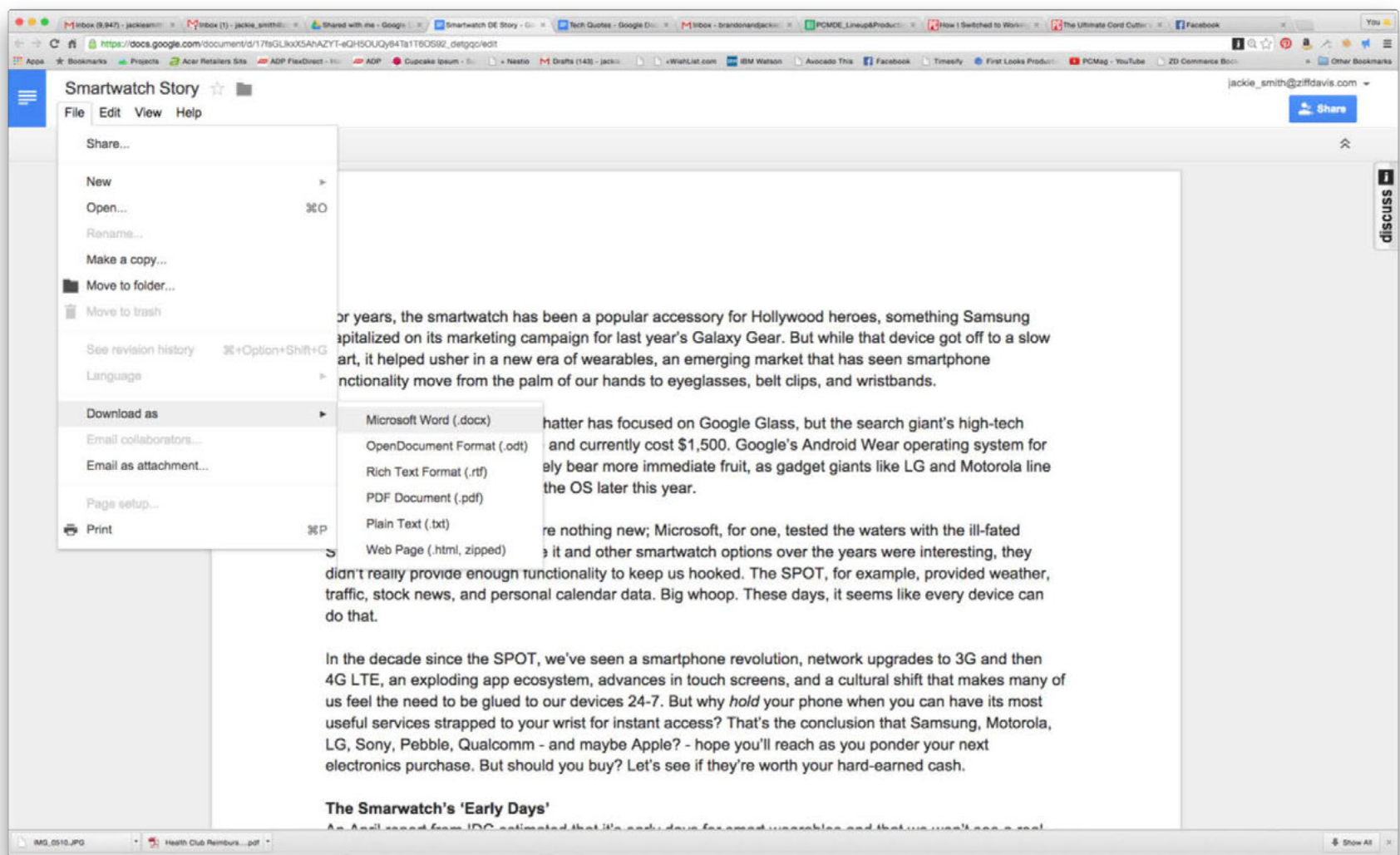
I did have a few files that I would classify as neither old nor new, but “ongoing”—created long ago, but still relevant and in use today. In my case, they tend to be spreadsheets in which I log work as I complete it. For example, I have one I use to keep track of articles I write, the dates they publish, and other metadata. I'm continually adding to it, and it's always useful and relevant, even though I created it years ago.

To migrate these ongoing files, I simply uploaded them to Google Drive and converted them to Google-formatted files. Excel files became Google Sheets. Easy. Still, I kept those highly valuable original copies of the files on my computer for about a month, just in case—saving your originals for an overlap period is always a good idea.

Another piece of advice is to test that the online service you choose works on all your devices. Open different files. Now turn off your Wi-Fi and try to open them. Did you have offline copies of files that you expected to have? Can you edit? Do you need to install any apps or plug-ins to do the work you want to do? It's harder than you might think to make the time to run these trials, but it sure beats showing up somewhere and discovering that you're not able to do anything you had planned.

Once I got rolling with my new system of working entirely in Google Drive (but before I wiped out all my locally stored data), I installed the Google Drive syncing component on my computer and backed up the last two years' worth of data to the cloud. I didn't test every single file, but I felt better knowing I had pulled in much of my old data just in case I ever need it.





THE PROS OF WORKING ENTIRELY ONLINE

Automatic backups. I know most people who don't back up their data now aren't going to start anytime soon. When you work in Google Drive, you don't have to think about backing up. It happens automatically and often. Plus, Google Drive comes with a generous amount of space: Everyone with a Google account gets at least 15GB, and buying more is cheap. Plus, there are other loopholes that give you more still. For example, files you create in Google Drive, like Google Docs, don't count toward your storage limit.

Compatible with Office. Although I create and edit files exclusively in Google Drive, not everyone with whom I collaborate does. Many people still use Microsoft Office. With Google Drive, you can export any Google file type to a Microsoft format. With just a few clicks, I can turn a Google Doc into a DOCX (Word) file.

Collaboration. For collaborating in real time, nothing beats Google Drive. You can share files with other users, manage who can view and edit them, and even have a chat going with your collaborators as you work on a file together.

Local syncing. As I mentioned, I was able to quickly back up my old files to Google Drive because it has a local syncing component. This feature lets Google Drive do double duty as an online collaborative office suite and a file-syncing and backup program.

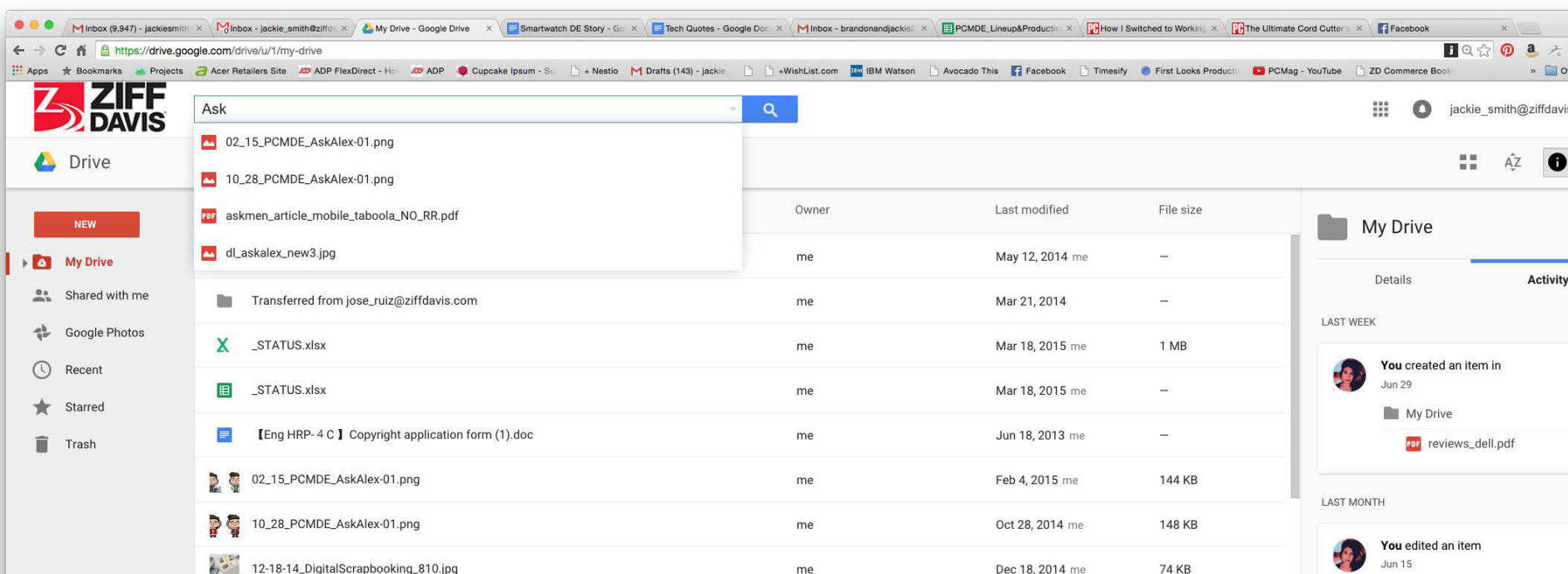
Price. Google Drive is free. Microsoft Office costs about \$100 a year. Need I say more?

THE CONS

Privacy and security concerns. People who don't want to use a cloud service at all are almost always concerned about privacy and security. Someone else is storing your data in a location that you probably can't pinpoint. Google does encrypt your files stored in Drive by default, but the company also manages the keys for you, which is a red flag to some. If you don't trust the company storing your files, or if your files contain highly sensitive information, migrating to the cloud might not be for you.

Offline access. Working in the cloud means you need an Internet connection. Navigating the online versus offline rules and configurations can be a real pain. Sometimes things go wrong or not as you expected. With Google Drive, it's possible to work offline, although there are a lot of caveats. I've found that loading the files I want to work on before I leave an area with Wi-Fi is a good solution, but again, only if I'm running Chrome. Then I can work on these files with ease, as long as I don't accidentally close the tab. But it can get messy. When I'm done editing offline, I still need to connect the device to the Internet to get the changes into the cloud. Sometimes it causes problems. Let's say I work offline on a laptop while I'm on an airplane. The plane lands, I get in a taxi, and then I remember another change I want to make. If I open my phone and load the file using a data connection, I'm going to see the old copy before all the changes I made on the plane because I haven't synced them yet. Let's say I forget that point, and I make a few changes via the phone. When I do finally connect my laptop to the Internet, Google is going to tell me that something's out of whack. There are solutions, but none of them are clean or simple. Get ready to copy and paste.

Search works, except when it doesn't. When you store your files with Google, the first name in Internet search, you have high expectations for the search tool. Finding files in Google Drive has been hit or miss for me. When I search by filename, I'll usually find what I need, but not always. Underscores in filenames



in particular seem to throw Google for a loop. Google does search the contents of your files, which helps, but it still might take some trial and error to find what you need. When other collaborators share files with me, those are the ones I often have the hardest time finding, with or without search. I frequently end up relying on files marked as favorites (with a star) as well as the list of recent files that Google Drive offers.

Online distractions. To work in Google Docs, you must have a browser window open, and being online can be a slippery slope—for many, it's an invitation to surf the Web and not get real work done. If you're better at getting work done when you unplug from the Internet, working in the cloud is probably not for you.

SHOULD YOU MOVE TO THE CLOUD?

Working exclusively in the cloud has its benefits, but it also comes with some frustrations. As I said, working online doesn't necessarily mean using Google Drive, but many of the pros and cons will be the same across similar solutions. Some questions you should ask yourself before moving to the cloud are:

- Do I have reliable Internet access most of the time?
- Am I willing to learn the rules of working offline versus online?
- Will working in the cloud give me access to files in a way that I don't have now, and that I'll actually use?
- Am I willing to organize where my work is stored so that I can find it easily?
- Will I be able to resist the temptations of surfing the Web if I'm always connected?

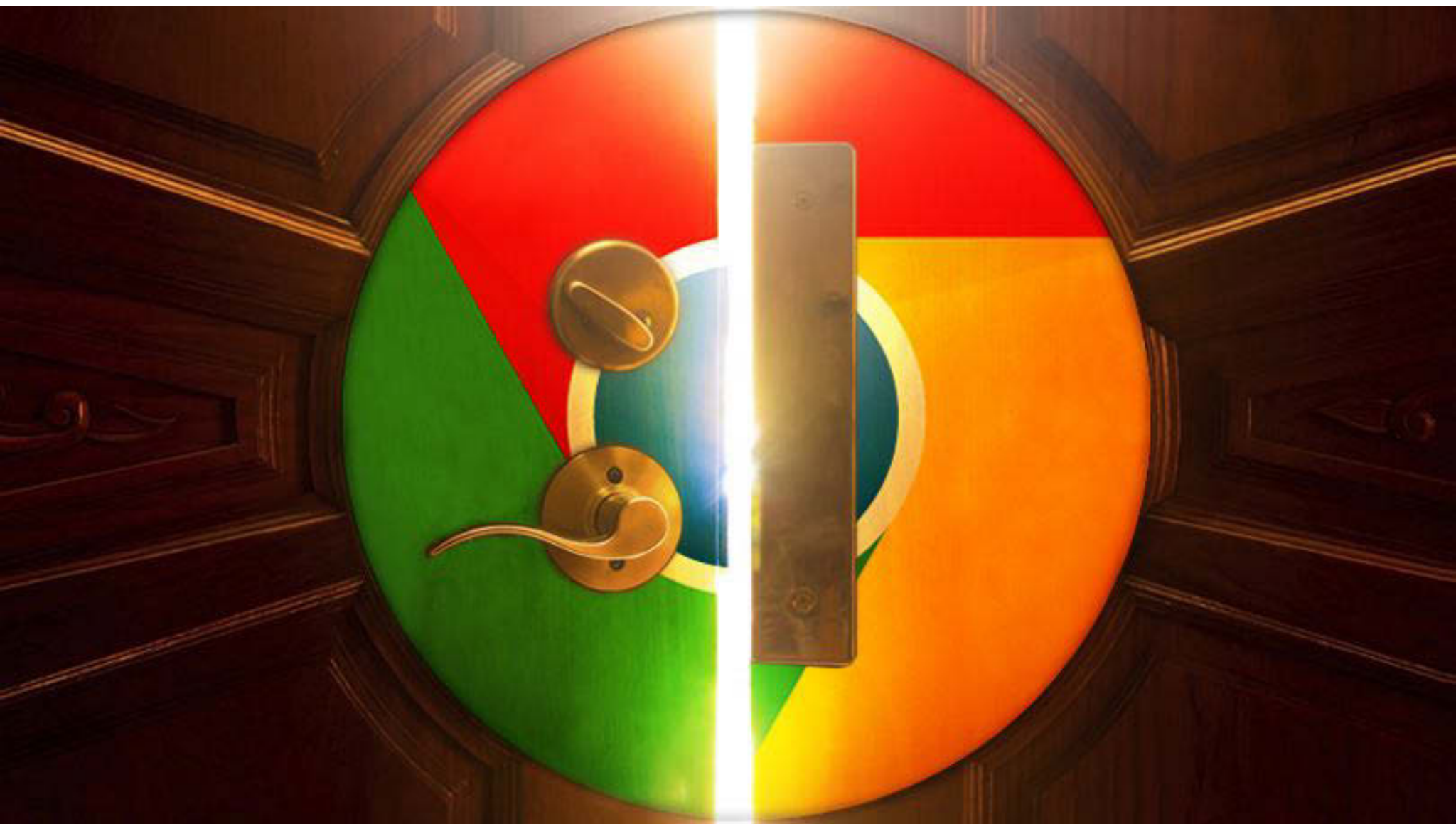


**Being online
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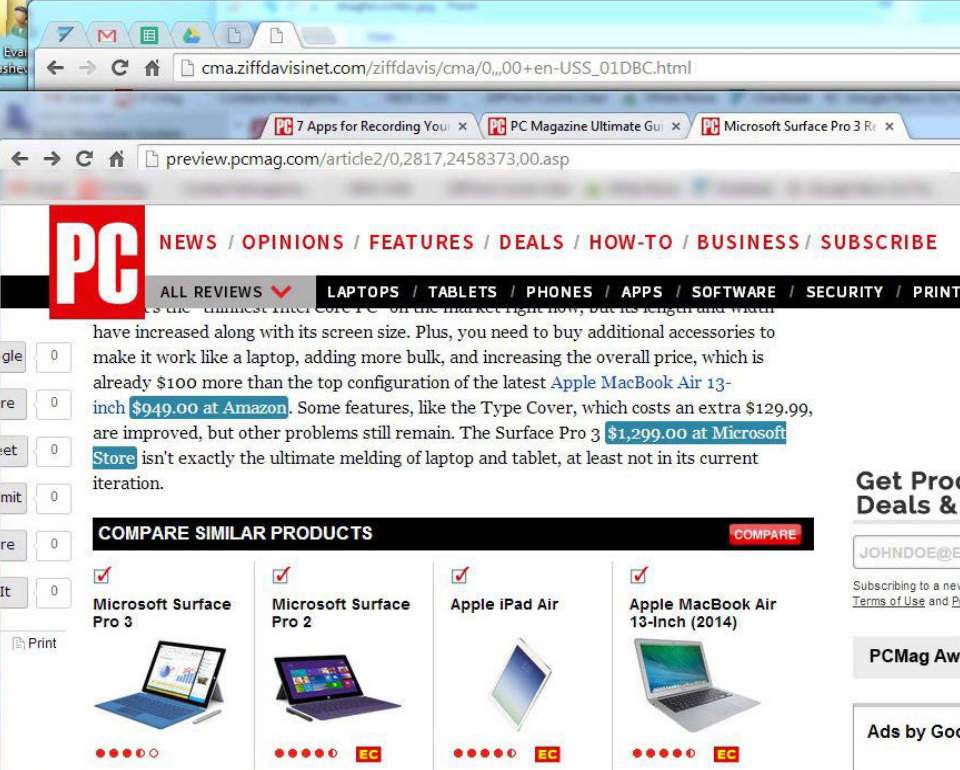


Smart Tricks for Polishing Google Chrome

BY EVAN DASHEVSKY



The sleek, minimalist package known as Google Chrome. By any measure, it's a popular browser, and if you're not using it, you should at least consider checking it out. One of the reasons for Chrome's popularity is its clean, polished UI and its versatility. Although Chrome's abilities multiply greatly when you consider the near-bottomless library of extensions available for download, there's a bounty of stock functionality embedded all throughout Chrome's guts that you may not even know about. Here are a few of our favorite Chrome secrets.



DRAG MULTIPLE TABS AT ONCE

Most people are familiar with the ability to drag and drop Chrome tabs into their own browser windows, or mix and match them between browser windows, but you may not know that it can be done with more than one tab at a time. Just hold down the Ctrl key on a PC or the Command key on a Mac and click on all the tabs you wish to move and you can move them as one.

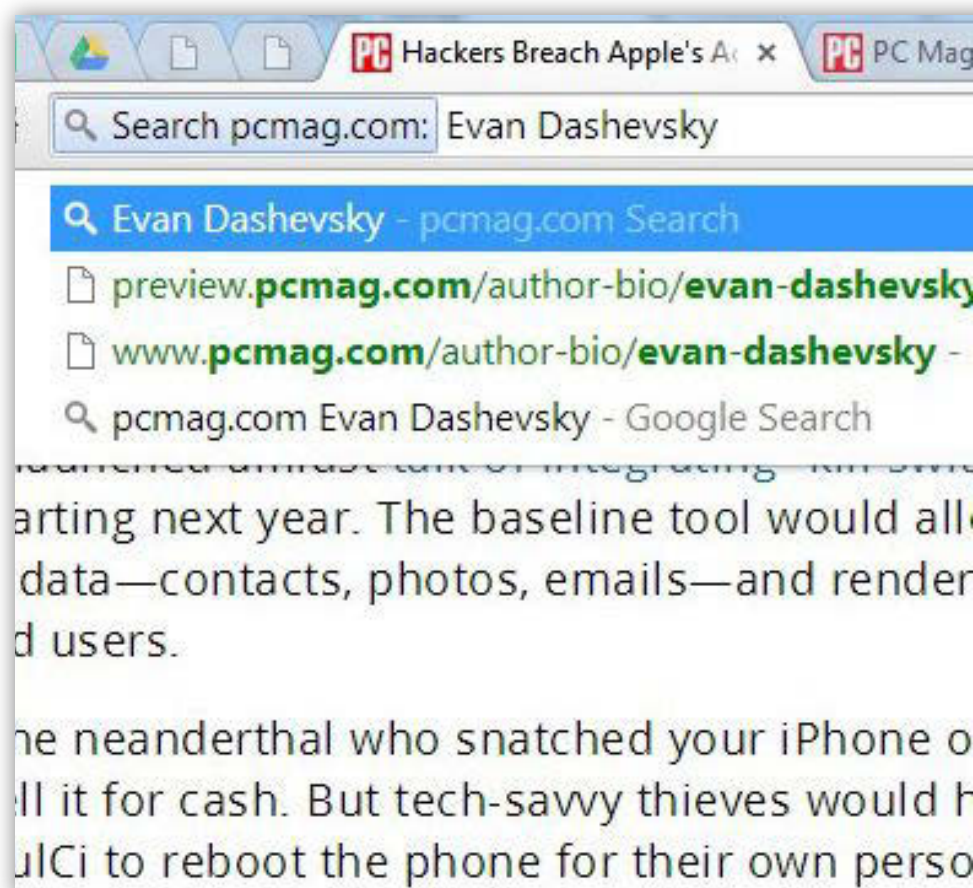
OMNIBOX SEARCH DIRECTLY INTO INDIVIDUAL SITES

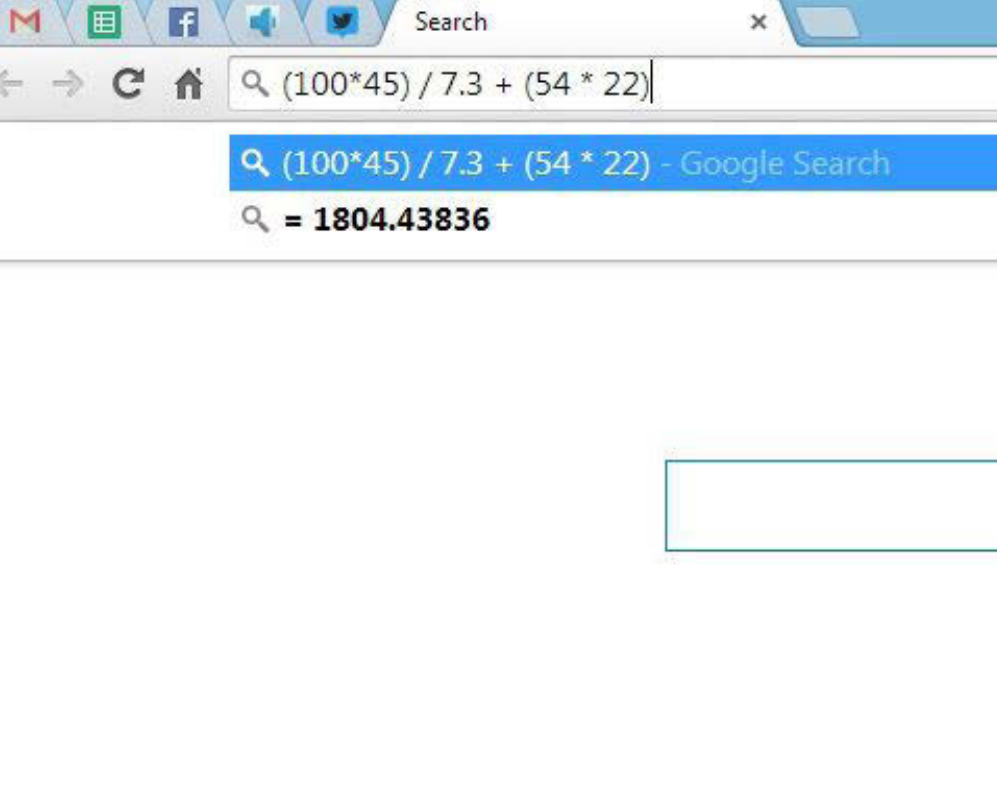
You can automatically search through many websites without actually going to those sites, provided that they're in your list of search engines (if not, we'll get to that below).

This is beneficial if, for example, you want to go directly to the Wikipedia article on orangutans and skip the steps of going to the front page of Google or Wikipedia first. If this trick is enabled, you simply start typing "Wikipedia," and the far-right side of the omnibox will prompt

you to press Tab to search within the site (in this case, Wikipedia). Once you press Tab, a solid block will appear in the left side of the omnibox that says "search Wikipedia," after which you can type your search within in that site (in this case, "orangutans"). Hit Enter and in just seconds you'll be taking in the Internet's collected knowledge about our fuzzy orange friends.

This function isn't even just specific to reference or search sites. You can use the omnibox to search directly through nearly any site, as long as it's included in your managed list of search engines. If a site is not included in your list, right-click on the search box on the site and click the option: "Add as search engine..." Then you can have direct search access to Twitter, Google Drive, Gmail, CNN—anything with a search box, really. On a Mac, hold down the Control button when you click on the search box.





CALCULATE NUMBERS AND CONVERT UNITS

As you may or may not know, Google will calculate basic math in the search bar. But did you know that you can access a similar math function in your omnibox without ever going to Google.com? Just type in a basic math problem and the correct answer will appear in the suggestions below the omnibox. Similarly, the omnibox can perform Google-like unit conversions. As you type, Chrome will automatically convert your number into a unit that you may or may not want. If you type “9 inches,” Chrome may automatically suggest conversion to centimeters. If you want a different conversion, just type an equal sign with the conversion you do want (such as “9 inches = km” or “9 inches = mm”).

These tricks only work if your default omnibox search is Google—you won’t get an answer if your default is, say Yahoo or Bing—and you’re not typing into an incognito window.

DRAG A URL TO THE BOOKMARKS BAR

If you come across a website you will want continual and easy access to, you can quickly add it to your Bookmarks Bar by highlighting the URL and dragging directly down to the Bar. You can edit it later if you want to change the name. You can also drag a URL in from sources other than Chrome.

DRAG TO SEARCH

Highlighting a word and performing a drag-and-drop is fundamentally the same as performing a cut-and-paste, so it stands to reason that you could just highlight a word or phrase and drag it into the omnibox to perform a Web search. Conversely, you can also just right-click on highlighted word or phrase and you will prompt a pop-up option to conduct a Google search (on a Mac, Control+click on a highlighted word).





USE KEY COMMANDS TO BROWSE THROUGH TABS

If you ever need to read something quick on another tab, hold down the Ctrl key (or Command on a Mac) and a number 1 through 9. Each number is associated with a different tab starting with 1 all the way to the left and moving incrementally through 9 tabs as you move to the right.

OPEN SPECIFIC PAGES AT START

If you end up going to the same websites every time you sit down at your computer, you can set Chrome up to open those same sites automatically. In the Settings menu, go to the “On Startup” section (or just type *chrome://settings/startup* in the omnibox) and click on the option to “Open a specific page or set of pages.” Next to that option is a “Set pages” link, which lets you choose your starting sites (it will even autofill from sites in your recent history, or you can choose the tabs you currently have open).

OPEN A SEARCH IN NEW TAB

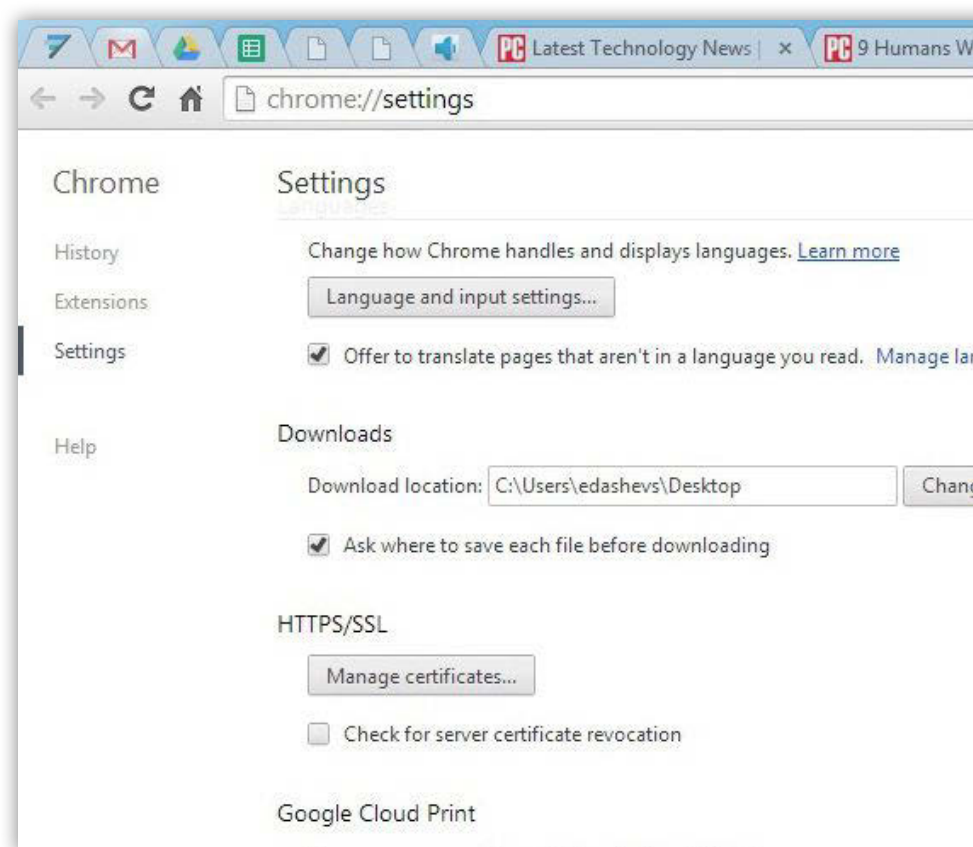
By default, searching in the omnibox for “taco” and hitting Enter opens a search

for everything “taco” in your current tab. But sometimes you want to look up information without losing the site you’re on. Fortunately, there’s a key command workaround: Hold down the Alt button on a PC or the Command key on a Mac and hit Enter on your search; this will open the search in a new tab.

AUTOMATICALLY DOWNLOAD FILES TO YOUR DESKTOP

This tip may not be for everyone. But if you want quick access to a file you just downloaded without having to open an additional window to get to it, you can have every file automatically download to your desktop.

To change where files automatically download, go to Settings (*chrome://settings/*), scroll down and click the Advanced Settings link, and then scroll down to Downloads, and then specify the location. Alternatively, you can click the option for Chrome to ask you where documents should go before every download. Use what works best for you.





OPEN ACCIDENTALLY CLOSED TABS

Have you ever mistakenly closed a tab? We all have. Thankfully, Chrome is a forgiving browser and makes it possible to get your tabs back. All you have to do is press Ctrl+Shift+T (or, on a Mac, Command+Shift+T) and Chrome will reopen any recently closed tabs. You can keep hitting the key combination for more closed tabs, working your way back through your browsing history.

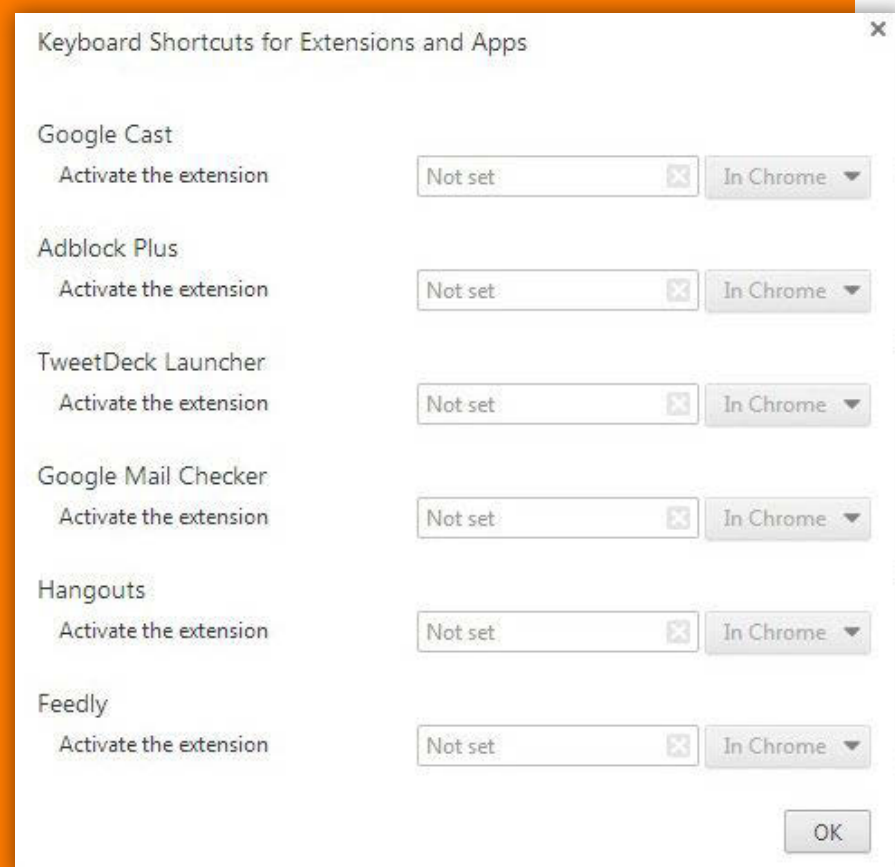
ZOOM IN AND ZOOM OUT

On a PC, you can zoom in or out on a page by pressing Ctrl while rolling your scroll wheel up or down (or by pressing Ctrl+Plus or Ctrl+Minus). Once you zoom in or out from the default, a magnifying glass icon will appear in the right side of the omnibox. You can click the magnifying glass to manually zoom in or out or hit "Reset to default" to return to the normal

full view. Conversely, you can also click Control+0 to return to the default. On a Mac, you can zoom in and out by pressing Command+Plus or Command+Minus. Pressing Command+0 function will still bring you back to default magnification.

CREATE CUSTOM KEYBOARD SHORTCUTS FOR EXTENSIONS

We've shown you some hidden keyboard shortcuts, but you can also create your own for all your downloaded extensions. If you go to the Extensions window (*chrome://extensions* in the omnibox), you will find "Keyboard shortcuts" at the bottom of the window. (Note: You will only see this option if you have downloaded and enabled extensions).





TRANSLATE ANYTHING

Chrome already has built-in Google Translate for entire webpages. But if you just want information on a select phrase or passage, you can get it with two clicks. First, install the official Google Translate extension. Then you can highlight any unfamiliar text and click the little Google Translate icon that sits in the top-right side of your browser screen.

EASILY DELETE BROWSING HISTORY

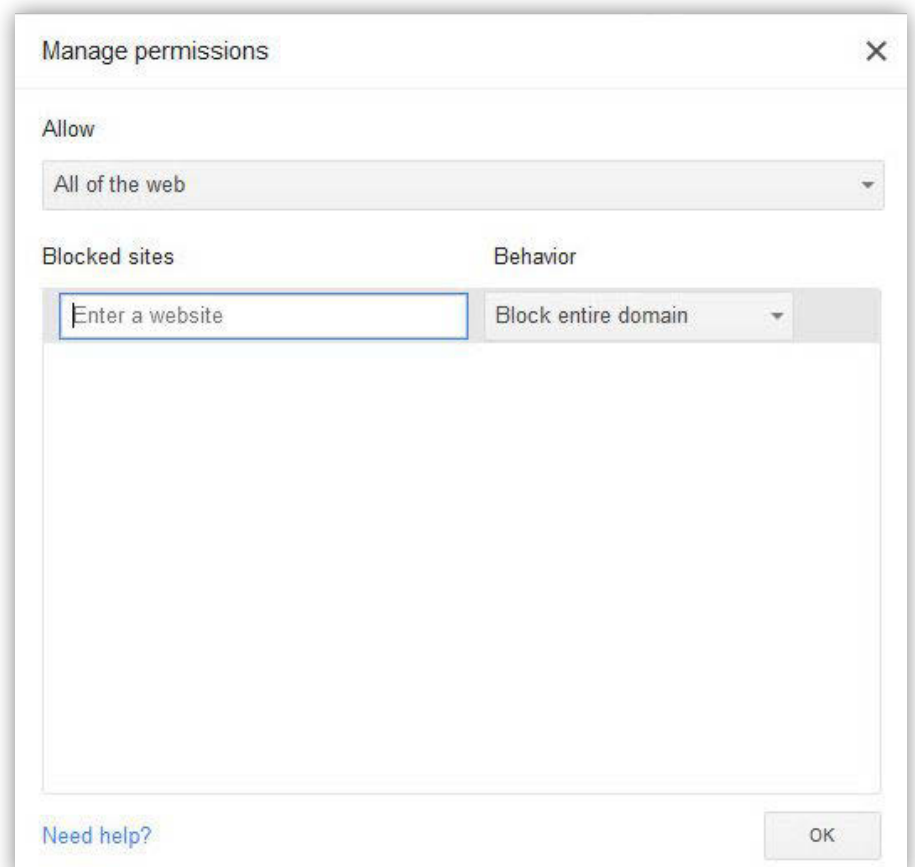
If you ever want to delete your browsing history, including past URLs, cached images, passwords, and cookies, you can do that all through the “Clear browsing data” window in Settings. You can access it quickly by pressing Ctrl+Shift+Delete on a PC or by pressing Shift+Command+Delete on a Mac).

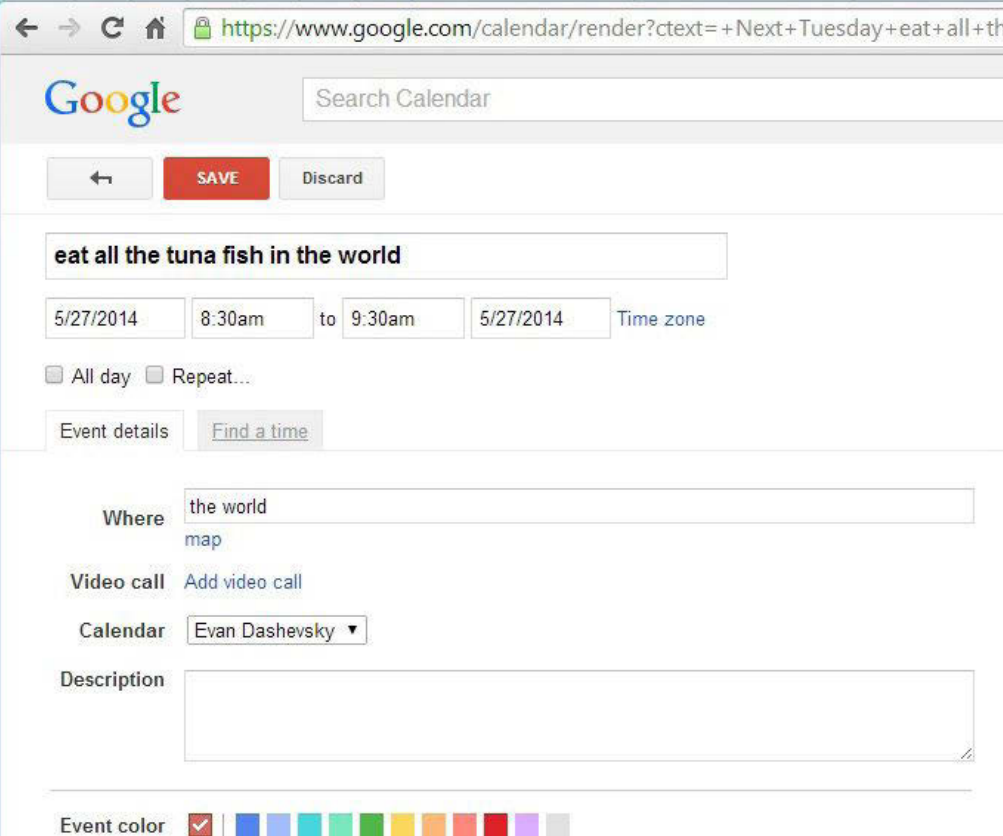
CREATE A PROFILE FOR YOUR KID

You wouldn't let the tiny little people in your world run free without supervision, right? So don't let them run wild in the digital world unsupervised, either. Chrome lets you set up a separate profile for your kid that you monitor and control.

Create a new profile by going to Settings > People > Add person. Make sure to click the box next to “Control and view the websites this person visits” from your account and click Add. These supervised identities will not be set up with their own Google identity (which means they are theoretically not being tracked and targeted by Google's ad business). A few minutes later, you'll receive an email link leading you to the supervised user's page. Once there, you'll have the ability to block certain sites, keep SafeSearch on lock, and view that user's Web activities.

You can then log your kid into Chrome under his or her own identity by clicking the identity tag up in the top-right corner of the browser window. You also have the ability to set up multiple identities for multiple children.





ADD EVENTS INTO GOOGLE CALENDAR FROM THE OMNIBOX

You can use your Omnibox to access Google Calendar's "quick add" function. Go to Settings, scroll down to Search, click on "Manage search engines..." (<chrome://settings/searchEngines>), and a new window will open. Scroll all the way down until you see three fields labeled "Add a new search engine," "Keyword," and "URL with %s in place of quotes."

In the first field, just type *Google Calendar*; in the Keyword field, type *Calendar* (or whatever omnibox prompt you would like to use when you use this function). In the third field, type this, and then click Done: <http://www.google.com/calendar/event?ctext=+%s+&action=TEMPLATE&pprop=HowCreated%3AQUICKADD>.

Now type *calendar* (or whatever you chose to put in the keyword field) in the omnibox and hit Tab, and you should get a solid tab box that says "search Google

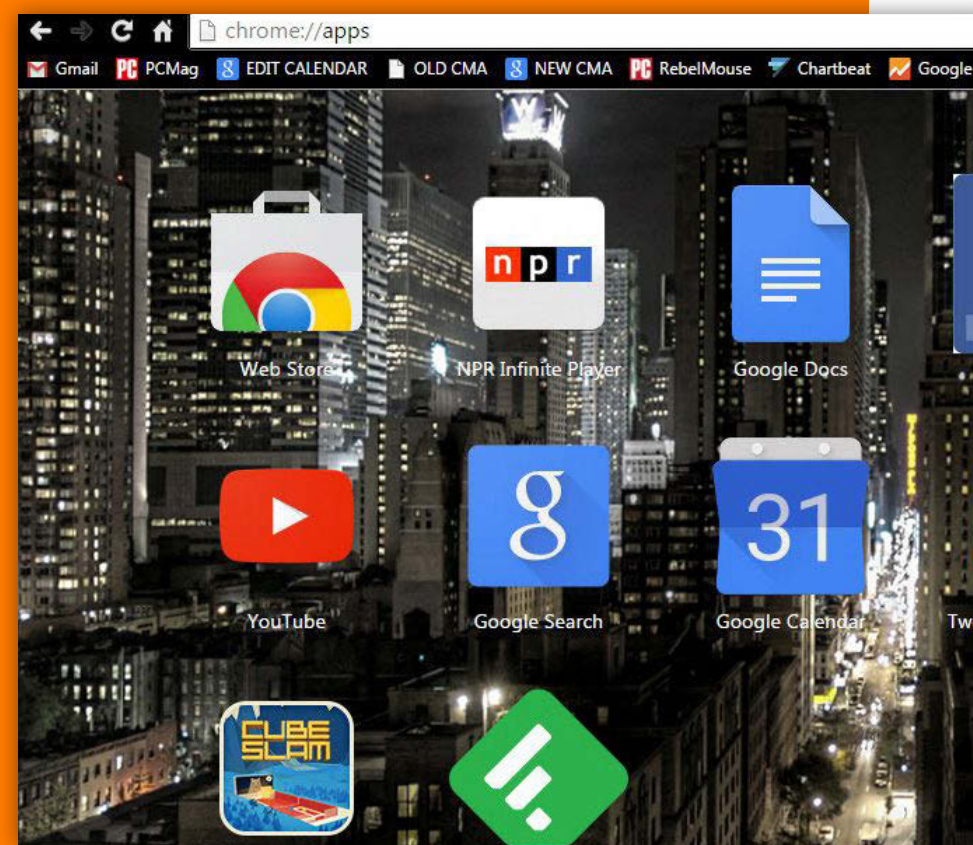
Calendar." Don't let the "search" part fool you—you will only be adding information.

Use plain sentence-style English to describe a future event with all the whats, wheres, and whens. Google is fairly adept at wringing out the details and translating it into a Calendar event. Then just click "Save" or "Discard."

ADD SOME COLOR WITH THEMES

Tired of the default look on Chrome? You can download some (mostly free) "themes" from the Chrome store. Just click over to the Theme section and click to install; there's no need to restart.

These themes mostly just change the edge of your browser, unless you go to the default apps page (<chrome://apps>), in which case it becomes your background, as you can see in the image below. (In this case, I used the free "Night Time In New York" theme.)



The Ultimate Cord Cutter's Guide

BY ERIC GRIFFITH



Cable TV was once considered the ultimate entertainment necessity, but no longer. Thanks to Internet-based services like Netflix, Hulu, and Amazon Prime Instant Video, you can do away with pay TV altogether. If you have a 5Mbps Internet connection, you can cut the cable easily and efficiently. Here's our most up-to-date look at the best ways to get your favorite TV programming without needing a cable company.

HARDWARE SOLUTIONS

Because most of the major networks are still broadcasting over the airwaves, an HD antenna may be all you need. Start by determining if over-the-air HD is an option where you live by visiting AntennaWeb.org or tvfool.com. If you qualify, buy an antenna—our favorites are the Winegard FL5500A FlatWave Amplified Razor Thin HDTV Indoor Antenna (\$59.99) and the Mohu Leaf 50 Amplified Indoor HDTV Antenna (\$69.88). Setup for both is easy—you can typically just place the antenna next to your TV—though you may have to play with the position to maximize reception. If you want a DVR for recording, the TiVo Roamio (\$144.88) is our Editors' Choice.

Many of today's HDTVs are "smart TVs," which have built-in apps, app stores, and networking that let you get on the Internet and easily download the apps you want. If you don't have a smart TV, there are many media hub options, ranging from game consoles (any of the recent Xbox, PlayStation, or Wii models) and Blu-ray players to thumb-drive-size units that plug into an HDMI port on your HDTV (such as the \$35 Google Chromecast, the \$44.99 Roku Streaming Stick, or the \$39 Amazon Fire TV Stick). Larger units provide even faster performance and in some cases onboard storage: The Amazon Fire TV (\$99) or the Apple TV (\$69) are the best of your choices here. Just remember that not every hub guarantees access to every service.

KNOW YOUR CORD-CUTTING SERVICES

The key to being an effective, Internet-only cord cutter is knowing what apps are available on your hardware of choice, the programming to be found on those services, and just how much they're going to cost you. What follows is the list of apps you should have if you want almost-complete programming coverage (at least of prime-time TV across networks and cable channels).



House of Cards

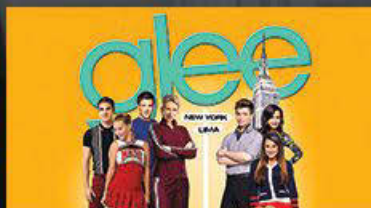
★★★★★ 2013-2015 TV-MA 3 Seasons 5.1

A ruthless politician will stop at nothing to conquer Washington, D.C., in this Emmy and Golden Globe-winning political drama.

MARCO
POLO

Based on your interest in:
Marco Polo

Popular on Netflix



Recently Watched

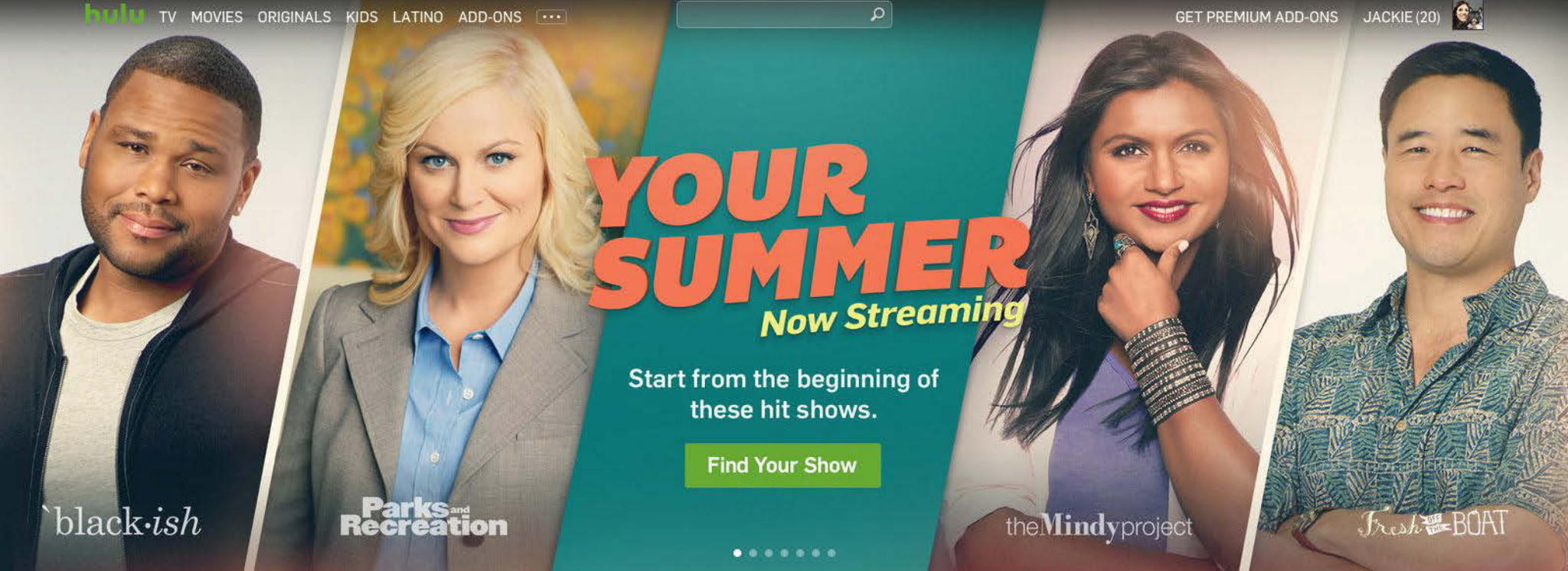


NETFLIX (\$7.99 per month with one standard-definition stream; \$8.99 for two concurrent HD streams; \$11.99 a month for four streams and the 4K content option)

Netflix is the grandpappy of online streaming, and its website just received a long-overdue revamp. It started as a DVD-by-mail rental service, and although that's still part of its business, streaming is what it's known for now.

It has a slew of original shows, including *House of Cards*, *Orange Is the New Black*, *BoJack Horseman*, *Hemlock Grove*, *Unbreakable Kimmy Schmidt*, *Marvel's Daredevil*, and more. It's also "rescued" shows that were killed too soon, like *Arrested Development*, *Star Wars: The Clone Wars*, *Trailer Park Boys*, and *Longmire*. And the list of new shows it's announced is staggering: *Marvel's Jessica Jones*, *Wet Hot American Summer: First Day of Camp*, and a new talk show hosted by Chelsea Handler are among the big ones. And those are just the TV series. Netflix is arguably better known for streaming movies, and it will be making original films with Adam Sandler and Pee-Wee Herman, a film set in the Marvel Cinematic Universe (the same as *The Avengers*), and a Christmas special starring Bill Murray.

The problem with Netflix is that the catalog of films and TV shows is constantly in flux as the studios and networks play games, look for better terms, or set up exclusives on other services. You can't always guarantee an entire series or movie will be there forever.



See what we're watching: [Like](#) 1.8m [Follow](#) 179K followers

SHOWS YOU WATCH >

Suggested ▾



HULU (\$7.99 per month, with some free content)

Hulu is literally owned by companies that run three of the major TV networks. So it's the place to go to find the latest TV shows from ABC, NBC, and Fox (plus the CW) the day after the show airs. (CBS has its own service, as we'll see.)

To view these shows on apps with media hubs, consoles, or smart TVs, you have to have the premium subscription. Hulu carries many shows from other sources, like Syfy, that for some reason can only be viewed on the Hulu website via a browser. It has a few original shows, like *Deadbeat* and *Mascots*, and it will soon bring back the Fox-canceled *The Mindy Project*, but nothing with the cachet of shows from Netflix, Amazon, or HBO. It's lining up more exclusives, though. It's the one place to watch all the seasons of *South Park*, *Seinfeld*, the original *CSI*, and a bunch of Cartoon Network and Adult Swim shows. Hulu also has a smattering of movies, but it's really about TV.

Perhaps the biggest score for Hulu: For an extra \$8.99 a month, you can soon add access to all Showtime content via Hulu (on select Hulu-supported devices)—commercial-free! That includes live access to the Showtime East and West Coast feeds. And that's cheaper than the standalone Showtime service.

The downsides of Hulu are that, even when you're paying, you still have to sit through advertising (though less than on network TV), and you only get one stream at a time.

Prime Instant Video



Related to Titles You've Watched



Watch Recently Added Prime Movies See More

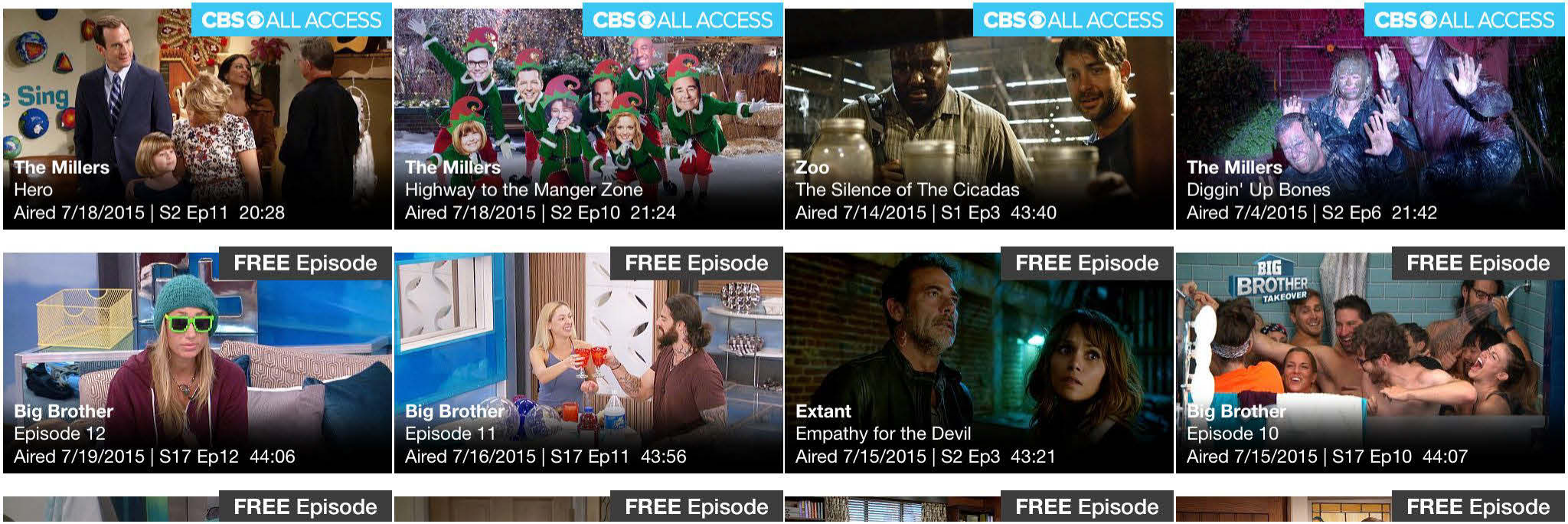


AMAZON PRIME INSTANT VIDEO (Part of a \$99 annual Amazon Prime account)

Previously called Unbox and Amazon Video on Demand, Amazon Prime Instant Video is a nice hybrid of an all-you-can-eat streaming service like Netflix and a video-on-demand store.

In taking on Netflix, Hulu, and HBO, Amazon provides its service “free” to anyone with a Prime account, which is best known for giving customers free two-day shipping. Amazon has also invested heavily in creating original TV shows, and often asks viewers to vote on the pilots they’d like developed into full seasons. To date, the best known is *Transparent*, which took home multiple awards this year. Other good shows include *Bosch*, *Mozart in the Jungle*, and *Alpha House*. Amazon has plenty of other movies and TV series; it even has a deal with HBO to carry a slew of its older shows. (Sorry, no *Game of Thrones*.)

If you have access to Instant Video on your device—and the list of compatible devices is enormous, so you probably do—then you can access videos that are “free” to Prime members, as well as any film or show you buy (watch anytime) or rent (watch it within 30 days). You can tell the difference by looking for a “Prime” banner in the Web interface. Typically, anything that’s out on DVD is available to buy or rent. However you get a video, Prime or not, it can be added to your queue, called the “Watchlist,” for future viewing; in some cases you can even download the video to watch offline.



CBS ALL ACCESS (\$5.99 per month)

When you're the top-rated network, you get to do your own thing. That's why CBS decided to launch its own streaming service late last year. Access is via the website or apps for iOS and Android only—it's not available on any media hubs at this time. You get one week to try it free before the fee is applied.

That six bucks per month, however, gets you access to episodes from some of the most popular series on TV the day after they air, including *The Big Bang Theory*, *Mom*, *The Good Wife*, and various flavors of *CSI*. CBS just put up 17 seasons worth of *Big Brother*—including the live streams from the current set. There are also a few thousand old TV shows streaming here, such as *Cheers*, every version of *Star Trek*, *The Brady Bunch*, *The Twilight Zone*, and *Hawaii Five-o*.



SLING TV (\$20 per month for basic package)

Consider Sling TV the best hope you have to get all the rest of that cable content you want—you know, the channels that aren't always the top of anyone's list, but are still highly desirable.

The service, operated by Dish Network, is entirely Internet-based and gives you access to programming from HGTV, TBS, Food Network, TNT, Travel Channel, Cartoon Network (including Adult Swim), Disney, CNN, Bloomberg, AMC, and ESPN and ESPN2. It's also available on a decent number of devices: iOS and Android apps, Roku, Amazon Fire TV, and it's coming soon to Nexus Player and Xbox. Sling TV is not available over the Web like many other services, but there are apps for Mac OS and Windows.

Signing up for the service now can get you a free Amazon Fire TV Stick or \$50 off an Amazon Fire TV, or a free Roku Streaming Stick or 50 percent off a Roku 3. There are also \$5-per-month extra channel packs, one each for sports, entertainment, kids, and news and information junkies.

Beware, however: Sling TV isn't like à-la-carte viewing of shows. It's actually showing you live TV, though some of the channels let you go back and watch anything from the last three days. At least you can jump back to the beginning of a show you're currently watching. But don't expect Netflix-like control over what you watch. Also, you only get one stream at a time, so you can't have it running in multiple places simultaneously.



Series



Game of Thrones



Angry Boys



Band of Brothers



True Detective

Movies

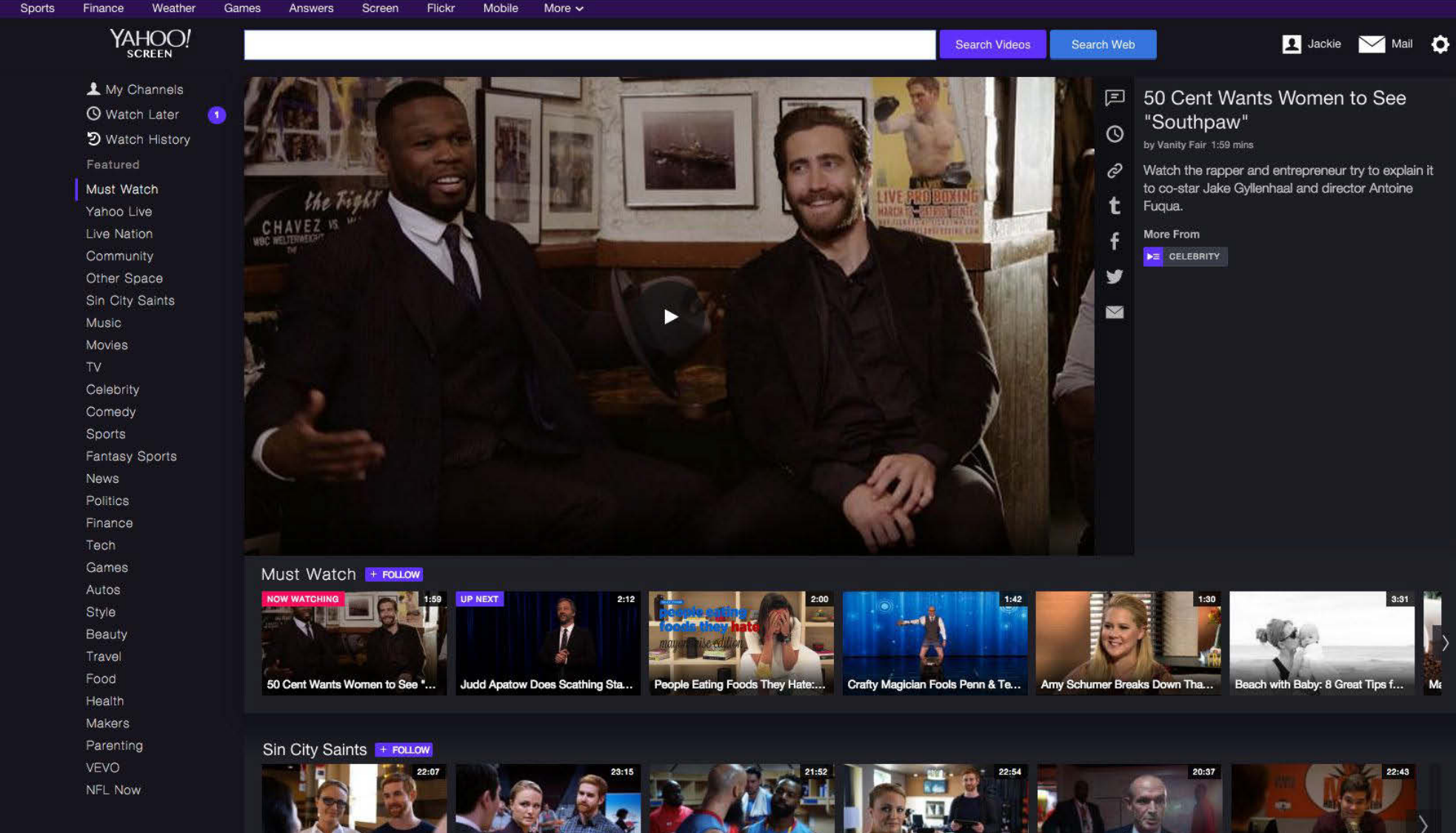


6

HBO NOW (\$14.99 per month)

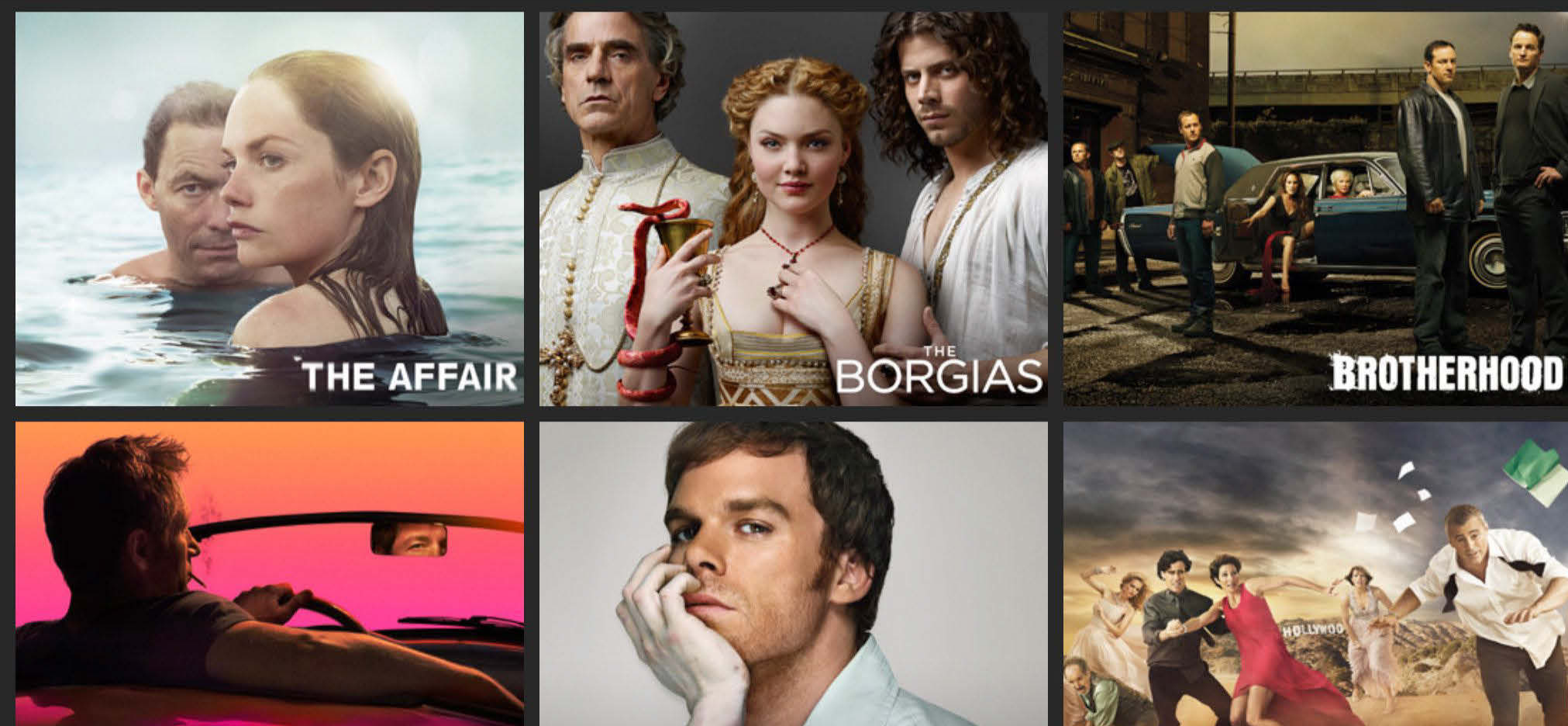
HBO GO has been around for a while, but technically only available to existing HBO subscribers with a cable plan. There are no limits on concurrent streams right now, though, so plenty of people without pay TV use shared passwords. And this will continue to be available.

But the new HBO Now lets anyone with an Internet connection and supported hardware (almost everything, with Android and Chromecast coming soon) subscribe and watch original HBO programming like *Game of Thrones*, *Veep*, and *True Detective*, plus the entire back catalog of shows and many movies. HBO Now is also available as part of Cablevision's Optimum Online service.



YAHOO SCREEN (Free)

Totally free original TV programming? Sign us up! Or don't—you don't need to have an account with Yahoo to watch its content, which is available via apps for mobile, consoles, and the Web. Yahoo's apps can be annoying, but at least when it comes to programming it's really trying. It brought back the beloved *Community* for a sixth season after NBC killed it, and it has other original shows like *Other Space* and *Sin City Saints*. Katie Couric jumped ship from the networks to be the face of Yahoo's video news and interviews. It's an interesting start, and hopefully Yahoo keeps at it.



SHOWTIME (\$10.99 per month)

Once HBO announced a standalone streaming service, it was a matter of time until rival Showtime (owned by CBS) did the same thing. That day arrived on July 12. You can subscribe for \$10.99 per month from apps on Apple or Roku devices, or via Showtime.com. Or, as mentioned earlier, you can use Hulu and pay only \$8.99 more per month—and get all Showtime programming without commercials.

Showtime original shows you can't legally get any other way include *Ray Donovan*, *Happyish*, *House of Lies*, *Homeland*, *Penny Dreadful*, *Masters of Sex*, *Shameless*, *Episodes*, *Nurse Jackie*, and more—and a revival of *Twin Peaks*, with original creator David Lynch, is on tap for 2016.

Showtime already has a service called Showtime Anytime, which is analogous to HBO GO in that it's limited to use by current subscribers to the cable channel. It's currently available on mobile devices, the Web, Roku, Apple TV, Chromecast, Amazon Fire TV, and Xbox One and 360 (but not on the PlayStation 3 or 4 consoles).

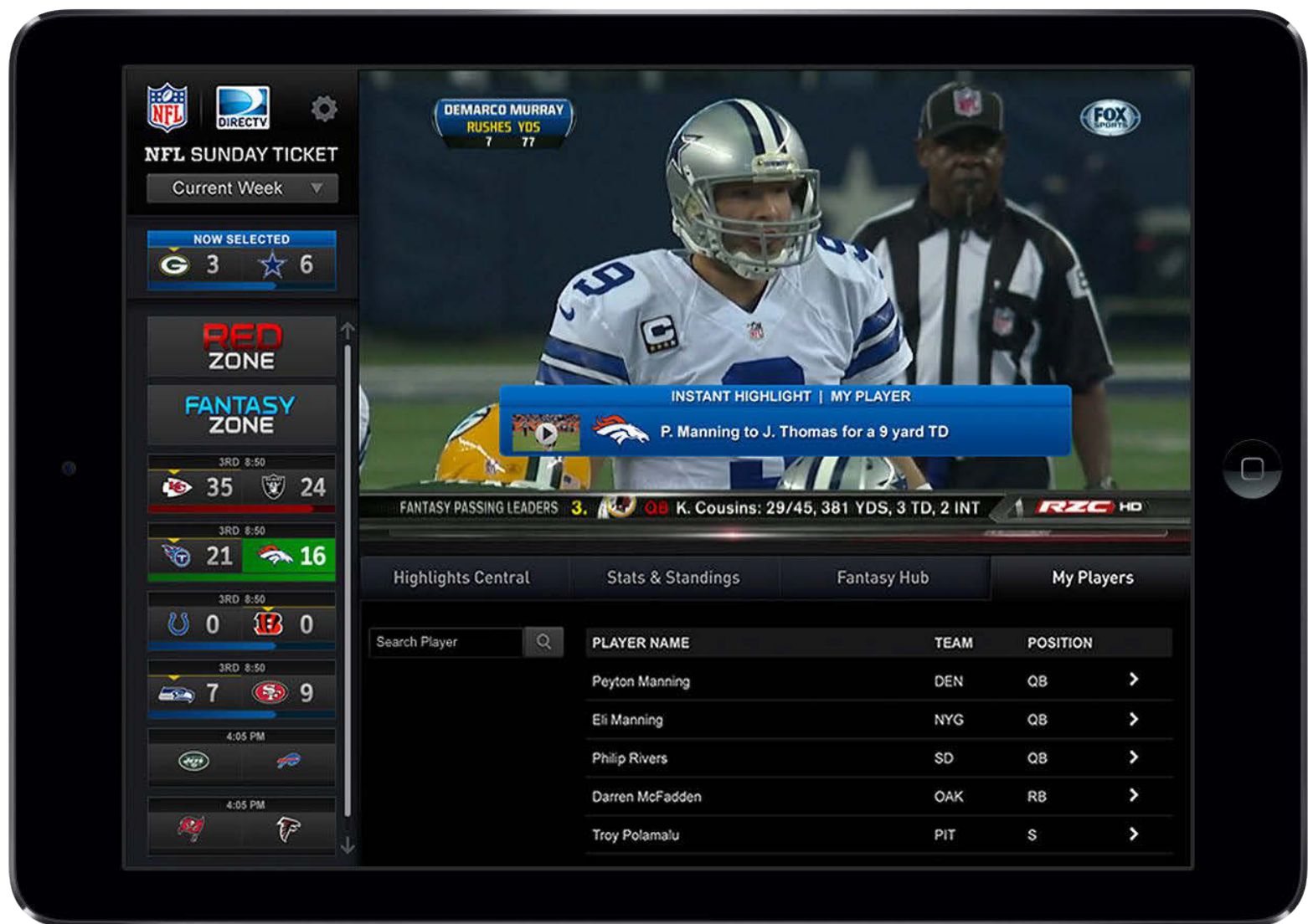
You can try Showtime streaming—including the live East and West Coast feeds—for 30 days before paying, be it for standalone service or on Hulu.

OTHER OPTIONS

What about other networks with well-known and beloved cable shows? Starz is supposedly considering a standalone premium streaming service, which would presumably replace Starz Play, which offers myriad mobile viewing options for cable subscribers. As for AMC, *Breaking Bad* is available on Netflix in its entirety, and *Walking Dead* and *Mad Men* are there sans their most recent seasons; the new *Better Call Saul* hasn't showed up streaming anywhere yet. (AMC will also stream shows to you directly, if you have credentials from a participating cable company.) Many other networks with mobile apps—A&E, Comedy Central, Nick, Food Network, FX, History Channel, Lifetime, PBS, PBS Kids, Smithsonian Channel, and TNT—are out there, though many also require cable subscriptions.



Also consider streaming services not tied directly to existing TV/cable networks. Probably the most significant is YouTube. The king of Internet video has billions of hours of video to keep one entertained, and is available as an app on just about any mobile device, media hub, or smart TV. Sony's Crackle is also pretty ubiquitous among the hubs, and offers an eclectic selection of free content, mostly with commercials. Crackle original shows include *Sports Jeopardy!* and Jerry Seinfeld's *Comedians in Cars Getting Coffee*.



SPORTS

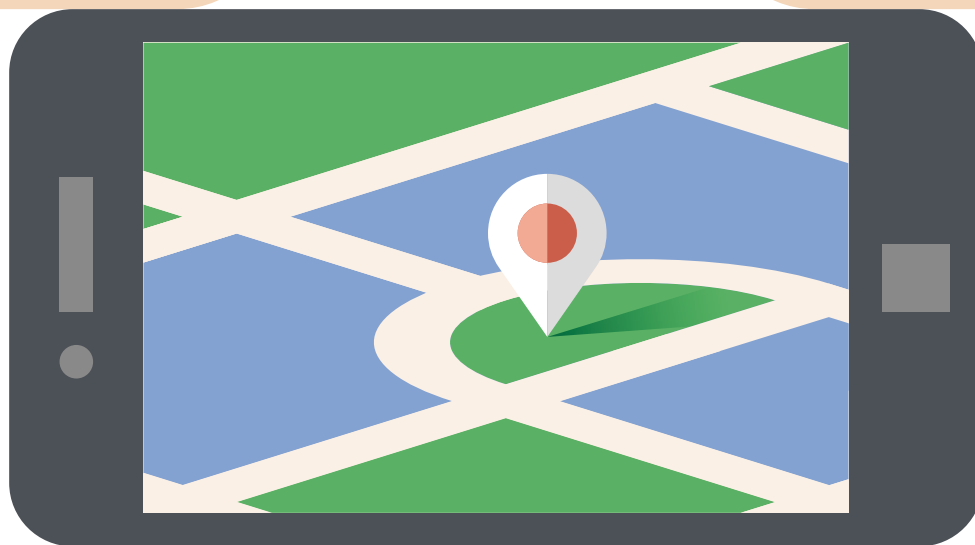
TV isn't all shows and movies. What about the big games? How do you stream those? As mentioned previously, for ESPN-aholics, Sling TV is probably the best bet. You're not going to find SportsCenter on other services, though you can watch clips at the website.

Individual leagues have their own ways of doing things. The National Hockey League has services to watch out-of-market games on devices like Roku, PS4, or phones and tablets. Major League Baseball's At Bat apps for iOS, Android, and Kindle Fire show all the games from opening day to the World Series for a fee of \$2.99 per month or \$19.99 for the year. MLB.tv streaming is available on some consoles and media hubs, and costs as much as \$129.99 per year. The National Basketball Association (NBA) has streaming games through its website. For NFL fans waiting patiently for the return of football, this year DirecTV started offering NFL Sunday Ticket over the Internet for as little as \$41.99 for six months. There's also NFL Game Rewind, where you can watch full replays of games via the Web or apps.

The problem with the sports streaming is on-purpose blackouts. If a team has an exclusive deal with someone—like a local broadcaster—your game might not be viewable on the service you've paid for.

Free Travel Apps for Your Next Road Trip

BY JILL DUFFY



Planning for a road trip, and being prepared while you're on one, is different from planning and preparing for other kinds of travel. Your car could break down, or bad weather might prevent you from reaching destinations on time. You might have to take unexpected detours. And as much as I love to plan where I'm going to eat during any vacation, mapping out every meal along the way is usually impractical. On road trips, you have to be ready to roll with the punches.

These 12 mobile apps will help you plan ahead for your road trip and stay flexible during it. They help you navigate traffic, get directions, make last-minute changes to even prepaid hotel bookings, find interesting things to see while you're on the road, and keep your tummy full of good food. Best of all, they won't add a penny to your travel budget, because they're all free. Note that I'm not recommending that you use all these apps while driving. Some of them are for use ahead of time, and some are definitely better suited for use by someone sitting in the passenger seat.



FIELD TRIP

Android ■ iOS

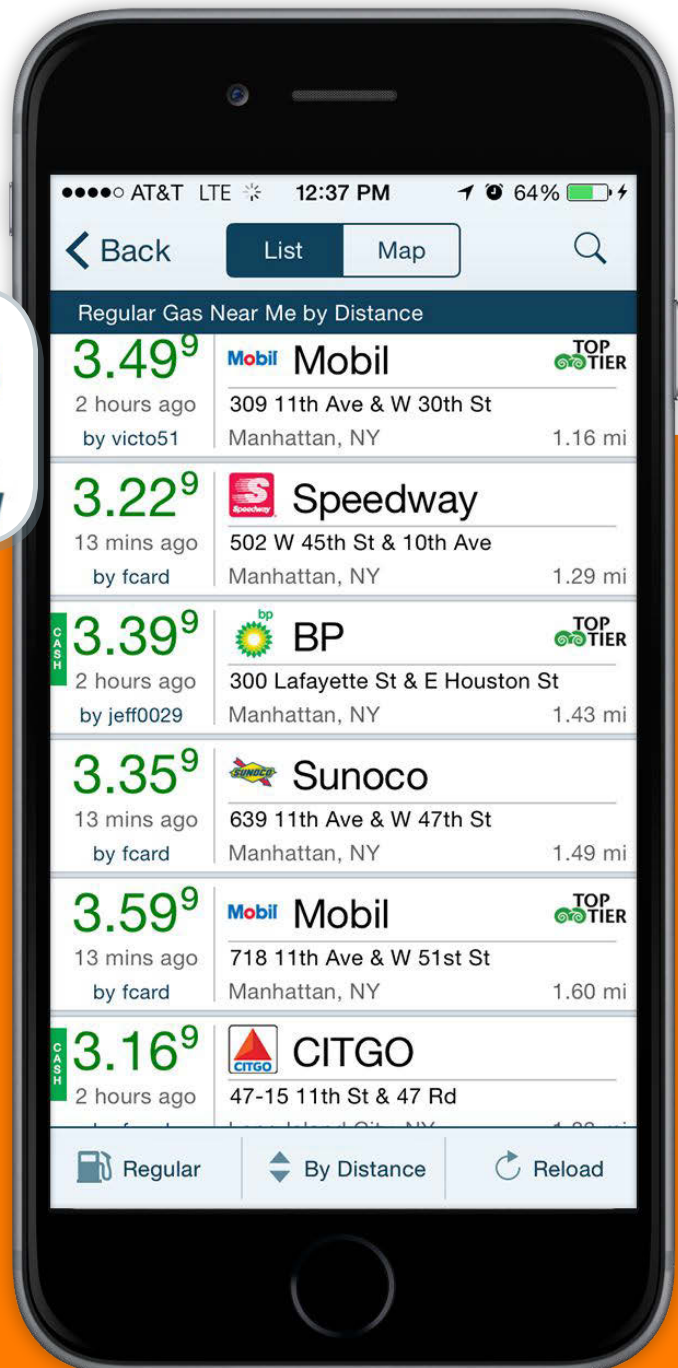
Google's Field Trip app looks for sites of interest around you, based on your location and categories you select, and it pops up cards on your phone when you're near something interesting. If you're driving and have a connected Bluetooth audio device, you'll hear the alerts instead. Field Trip taps into recommendations from travel and lifestyle publications, such as Thrillist, Zagat, and Sunset, as well as Songkick and Flavorpill for finding local music.



GASBUDDY

Android ■ BlackBerry ■ iOS ■ Web ■ Windows Phone

When it's time to refuel, you'll be happy to have GasBuddy on your phone: It helps you find gas by location and price. If you can save a couple of bucks by cruising a little farther down the road, GasBuddy will let you know.





GOGOBOT

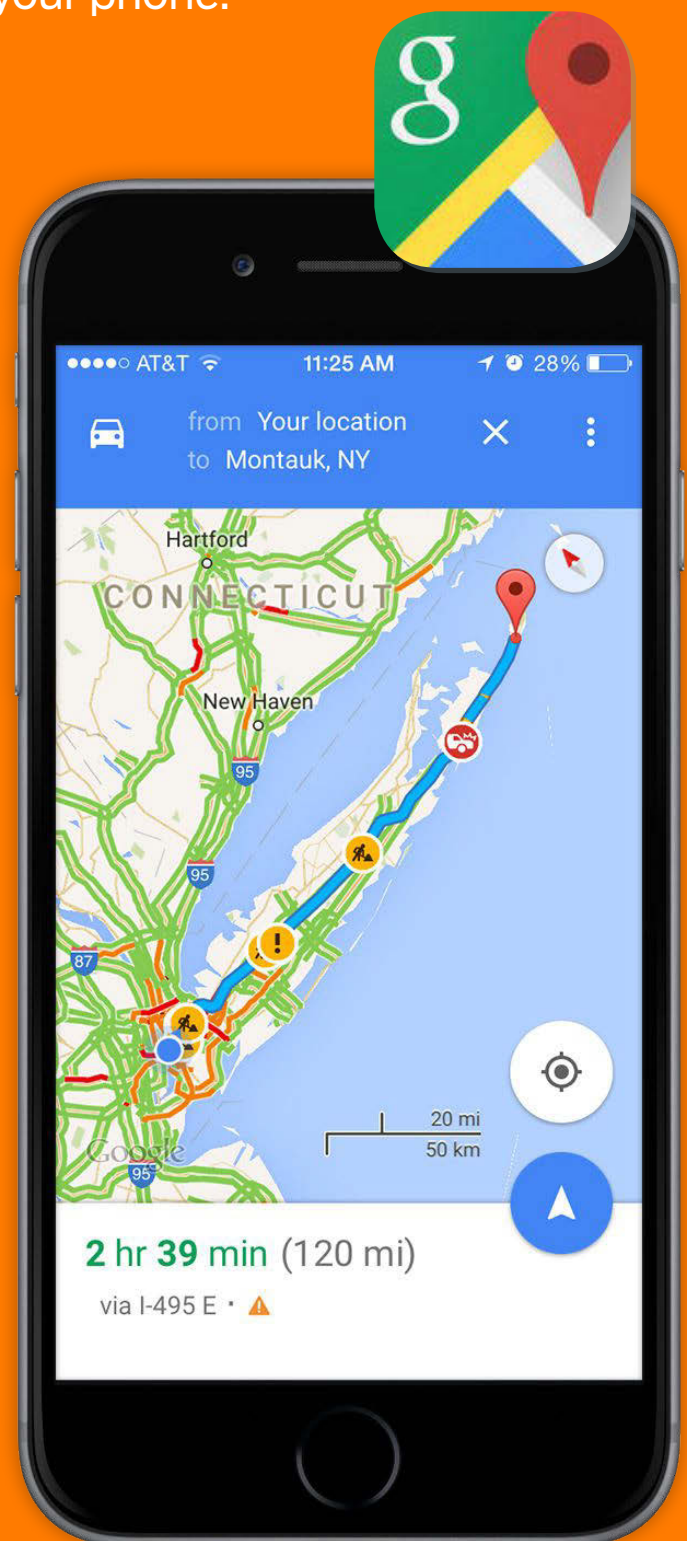
Android ▪ iOS ▪ Web

Gogobot is a social travel app that helps you find places to stay, eat, and play. Its globe-trotting community of users uploads photos, information, and ratings for the sites, and tags them based on different interests, such as Family, Foodie, Local, Outdoor, Budget, and Adventure. You can explore an area ahead of time and save points of interest to a list in the app. Photos taken by other users help you get a better sense of what you might find at different places of interest.

GOOGLE MAPS

Android ▪ iOS ▪ Web

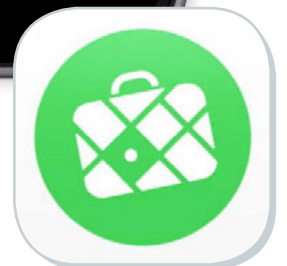
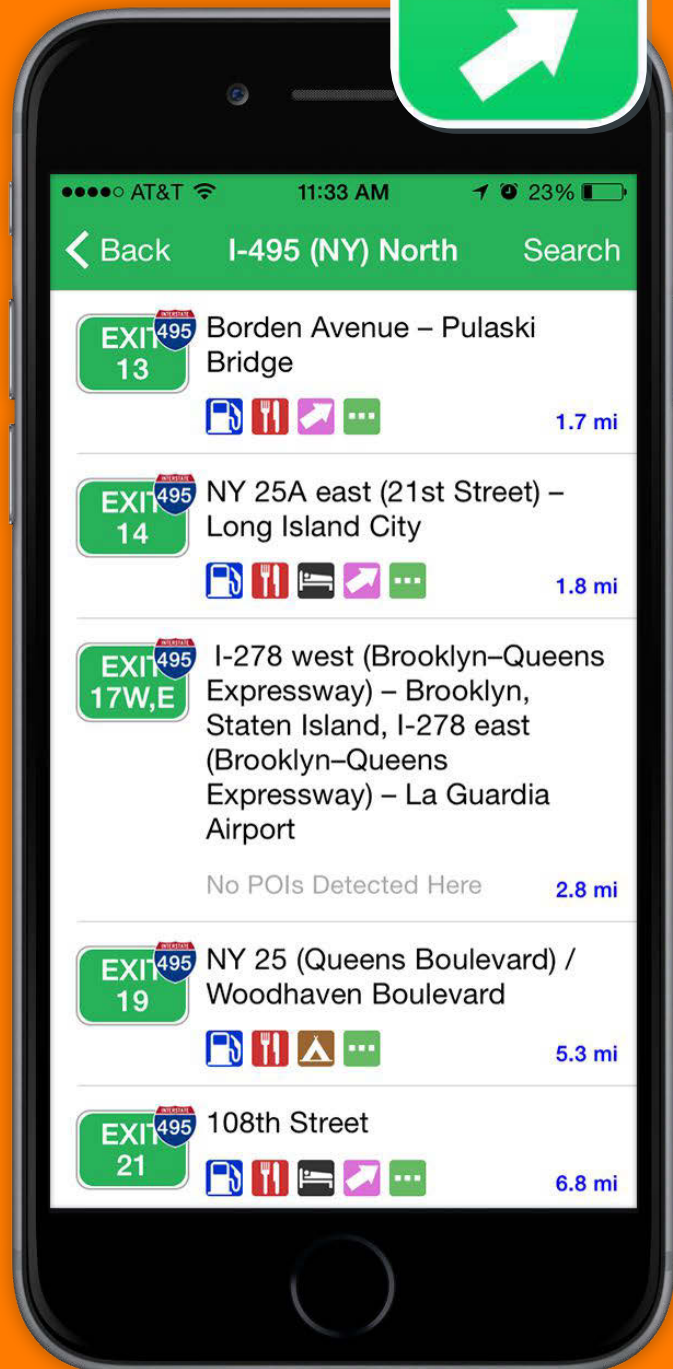
I can't even imagine driving without Google Maps. Turn-by-turn directions work well (okay, they still occasionally tell you to get off the highway and right back on again), but the real time-saver is that Google Maps detects upcoming traffic, accidents, or construction and automatically offers you a quicker route. It's a terrific in-car GPS navigation system, right from your phone.



iEXIT

Android ▪ iOS

Using your current location as a guide, iExit looks at upcoming exits and gives you a list of nearby restaurants, hotels, gas stations, rest areas, and more. If there's a particular restaurant chain or other service you love, you can mark it as a favorite and iExit will tell you if it's coming up anytime soon on your route. You'll never kick yourself for getting off the highway too soon and settling for a greasy spoon when better food options were just around the bend.



MAPS.ME

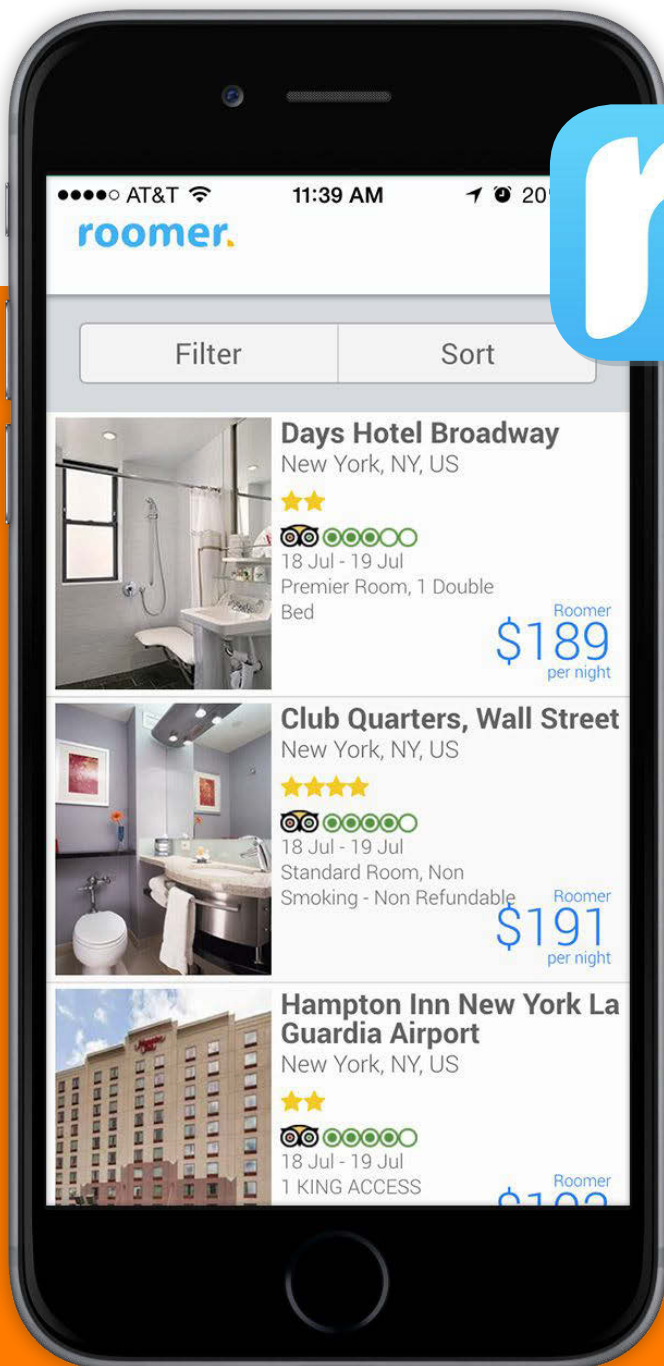
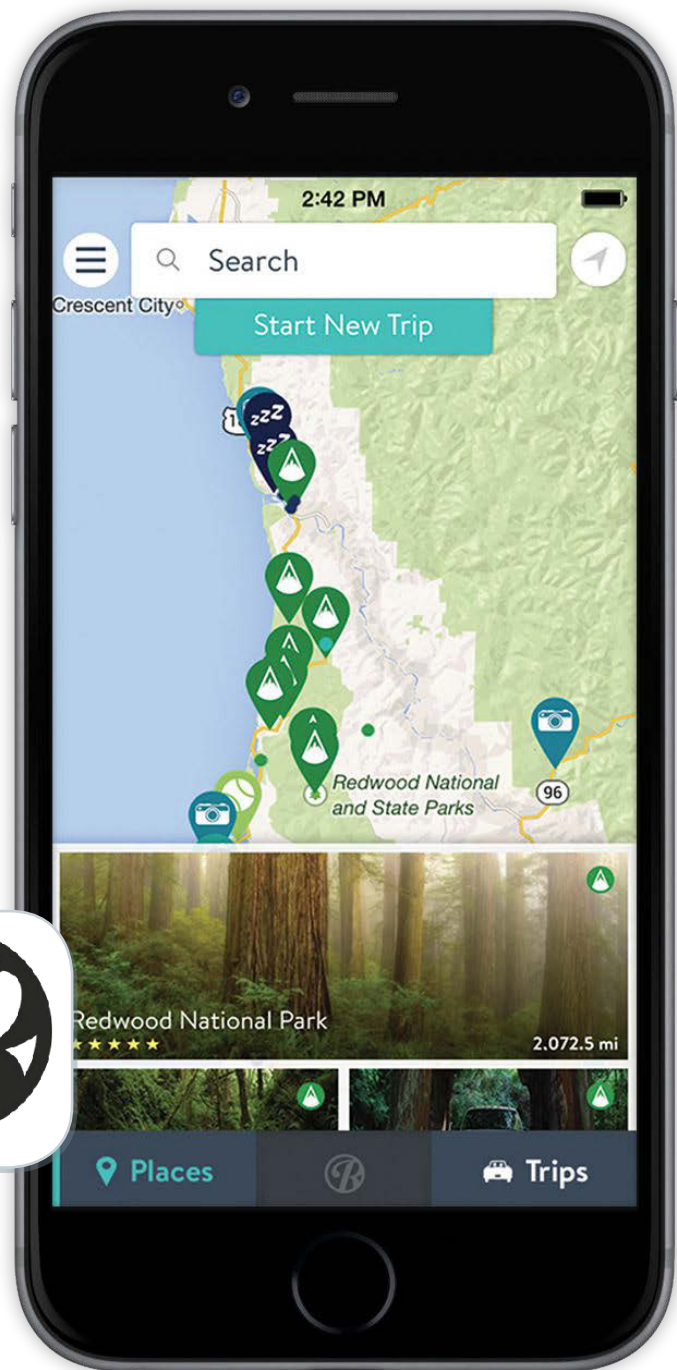
Amazon Fire ▪ Android ▪ Blackberry ▪ iOS

The Maps.Me mobile app lets you browse around the globe, zoom in on any region or city, and download a detailed map of that area to use offline. You'll see an option to download just the map, or the map with directions enabled to get you from point A to point B without an Internet connection. What I like about Maps.Me is the intricate level of detail on maps for even very remote places.

ROADTRIPPERS

Android ▪ iOS ▪ Web

Tell Roadtrippers your starting location and destination, dates of travel, and what kinds of things you're interested in finding along the way, and this app will plot your journey for you. Roadtrippers can find offbeat attractions, restaurants, museums, amusement parks, campsites, and more. When you find a site you like, add it to your trip and Roadtrippers will redraw your travel map accordingly.



ROOMER

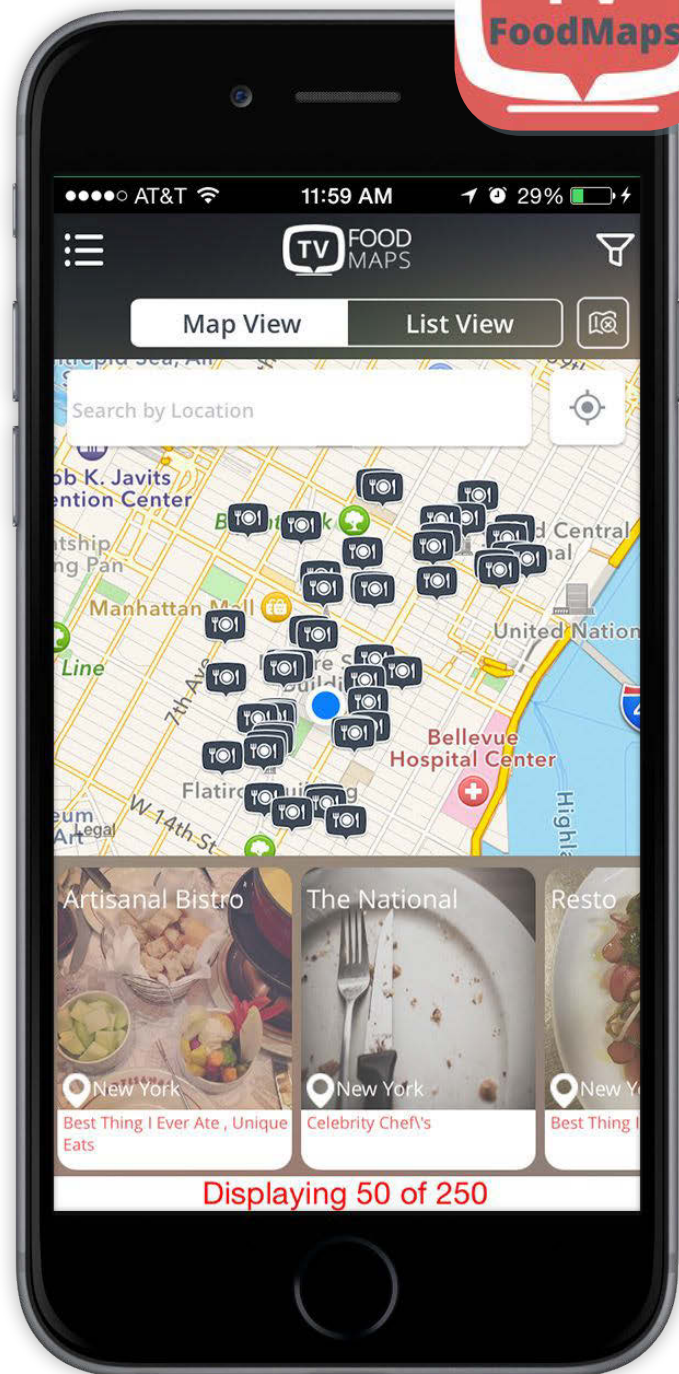
Android ▪ iOS ▪ Web

We all know we can save a good deal of money by booking hotels in advance. The problem, especially on road trips, is that we don't always get to the destination in time for the reservation, and if you've paid ahead, you're out of luck. Not so if you use Roomer. This app and website (roomertravel.com) help travelers sell their prepaid reservations to people who can use them to recoup some of that otherwise lost cost. If you need a place to stay in a pinch, you can also see if anyone on Roomer is trying to off-load a hotel room in your desired location. Everyone wins.

TV FOOD MAPS

Android ▪ iOS ▪ Web

A friend turned me onto TV Food Maps after she raved about its value on her last big U.S. road trip. This interactive app and website finds restaurants and eateries that have appeared on various television food shows, such as *Bizarre Foods American*, *Top Chef*, *\$40 a Day*, *Restaurant Impossible*, and *Diners, Drive-ins, and Dives*. What could be more American than eating your way through a road trip?



TRIPOSO

Android ▪ iOS

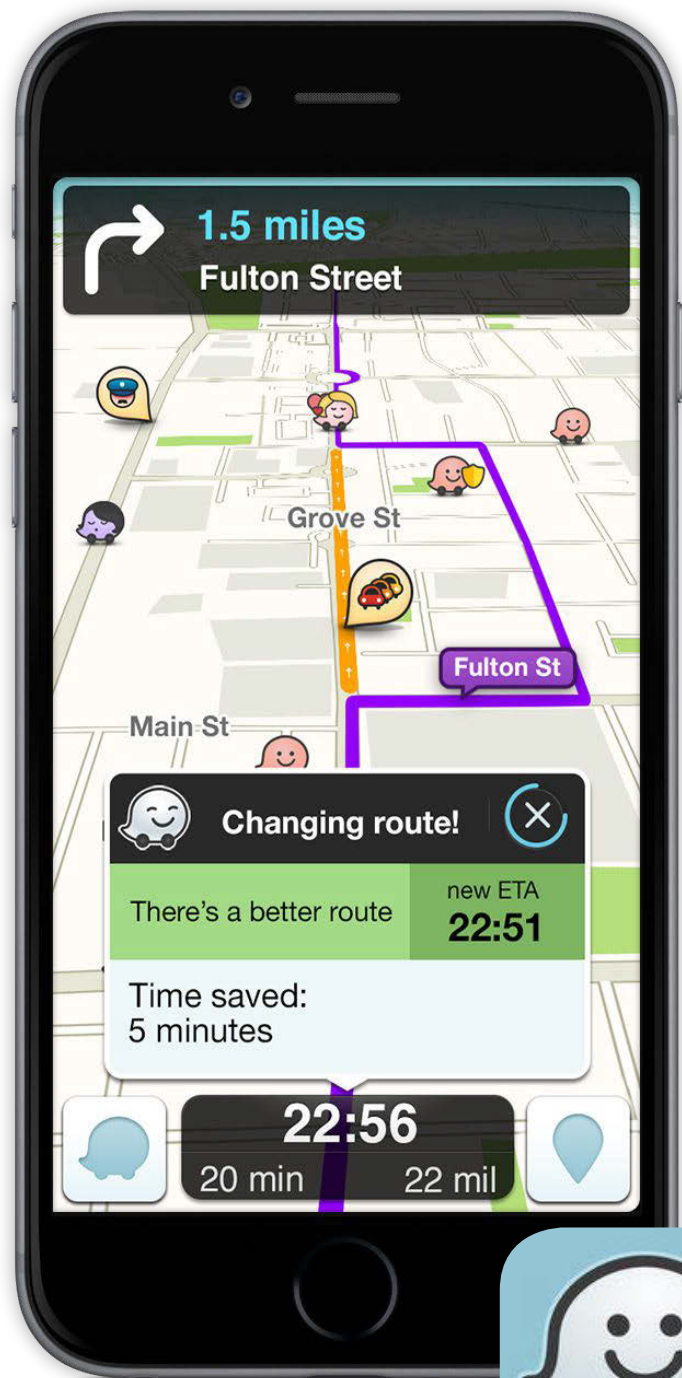
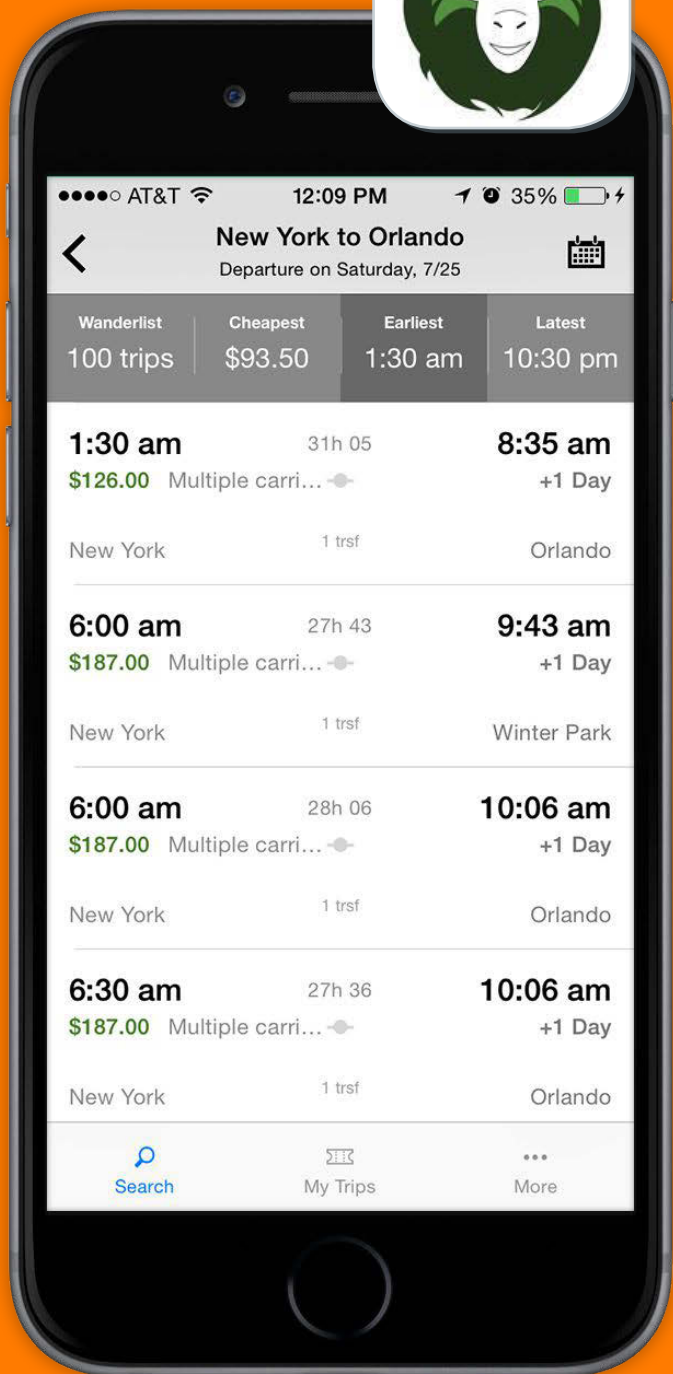
You can't be sure you'll have Internet access when you're driving through the desert or the mountains. Triposo puts offline maps and travel guides onto your phone so you can use them even in dead zones. Before you download maps and guides for any destination, Triposo tells you how much space they will take up on your phone, too. When you pull up a destination on Triposo, it offers top sightseeing suggestions, a weather forecast, and more ways to explore the destination.

WANDERU

Android ▪ iOS ▪ Web

If you don't drive but still want to take a road trip, try Wanderu.

This app and website act as a search aggregator and price comparison tool for bus and train tickets. Enter the dates you want to travel, plus your beginning and ending points, and Wanderu will look for fares on Amtrak, Greyhound, Megabus, BoltBus, Trailways, BestBus, and other bus and train carriers.



WAZE OUT

Android ▪ iOS ▪ Windows Phone

Waze is a community-driven app for traffic and other information about the road, including police speed traps, potholes, and accidents. Google Maps may tell you about major reported road problems, but Waze knows the nitty-gritty. You can even see the speeds at which cars are traveling in congestion. In cities, it's popular among taxi and car service drivers, but it's useful on highways, too. Beware, though: Waze needs to use your location information all the time, even in the background, and that will take a toll on your battery.



The Encryption Chronicles

The great data breach of at least 21.5 million U.S. government employees by a hacker or hacking group was probably the worst in the history of the United States.

This breach of the Office of Personnel Management (OPM) falls on the heels of various well-publicized breaches by retailers Target and Home Depot. Nobody knows how many other breaches have been kept secret. Years ago, some credit card processors were breached, and banks are notorious for being compromised.

In general, these intrusions are aided by the lack of strong encryption at all ends of the data transfer schema. A lot of this has to do with education, and much of it has to do with the government's policies and its discouragement of any sort of encryption within the communication infrastructure.

Even in the 1990s, when the importance of encryption was being realized, the FBI in particular was frowning upon its use and was hoping to obtain backdoors to any sort of encryption product out there. I've often joked that the American FBI would ban whispering if it could.

You can't blame criminal law-enforcement agencies for wanting complete and total access to all communications 24/7, because it takes any real work out of law enforcement and nobody in the government really wants to work hard if they don't have to. Who does?

Encryption that actually worked was considered munitions until the late 1990s, and anyone dabbling in it was subject to government scrutiny. This was the case with Philip Zimmerman, the

architect of PGP (Pretty Good Privacy), who was hounded by the U.S. government from 1991 to 1996. They made his life miserable because PGP turned up overseas.

Once the Web evolved, nothing like this could be contained in one country anymore. But that was beside the point—they were out to get Zimmerman. Since then, we've seen where weak or no encryption has gotten us: huge data breaches in everything from retailers to the government. Now it's a joke as the government moans about encryption and scares the public into believing that its concern has something to do with terrorism: If the government can get into all communications, we can stop terrorism somehow. There is no evidence to prove this, of course. In fact, all the evidence is to the contrary.

And what sorts of crimes have resulted from lack of encryption combined with a data breach? I cannot come close to imagining the amount of crime that will result from the leakage of 21.5 million records of OPM data. All the individual backgrounders in the records, along with Social Security numbers and personal details. You now have the date of birth of some hapless employee, along with their social security number, mother's maiden name, schools they attended, dad's job, everything. It's a bonanza for massive identity theft scammers.

Those of you not in the database can probably rest easy that 21.5 million people are out there who represent easy pickings for anyone in the identity theft game. Why should they bother with you?

Thanks to the Internet and the Web, you can be assured that this entire file of 21.5 million people, dossiers and all, will soon be available on some pirate system someplace, for only a small fee.

The hapless administrator of the OPM,



The OPM breach may be the worst in history, but I'm betting that's a record waiting to be broken.



Katherine Archuleta, had to quit under all the pressure put on her by the Congress. But was any of this really her fault? Unless she signed a document saying we need to be lax, I don't see it as her problem. And I'm certain other unencrypted government databases are in Washington, ripe for the picking.

This all stems from the attitude toward encryption epitomized by the attacks on Zimmerman. Encryption is only used by people with something to hide. It's bad.

In fact, if these administrators and the public in general were better educated on the matter, they would appreciate the importance of encryption and use it commonly. To this day, everyone is cavalier about it. You are seeing the results of this sort of thinking.

Just wait until your medical records are breached. What happens then? And you know that this is just around the corner, as the government has mandated that all doctors put all of your records online.

The OPM breach may be the worst in history, but I'm betting that's just a record waiting to be broken. With more and more things connected to the Internet you have to know that this is just the beginning, not the end.

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