PC MAGAZINE

The Best Products of 2016
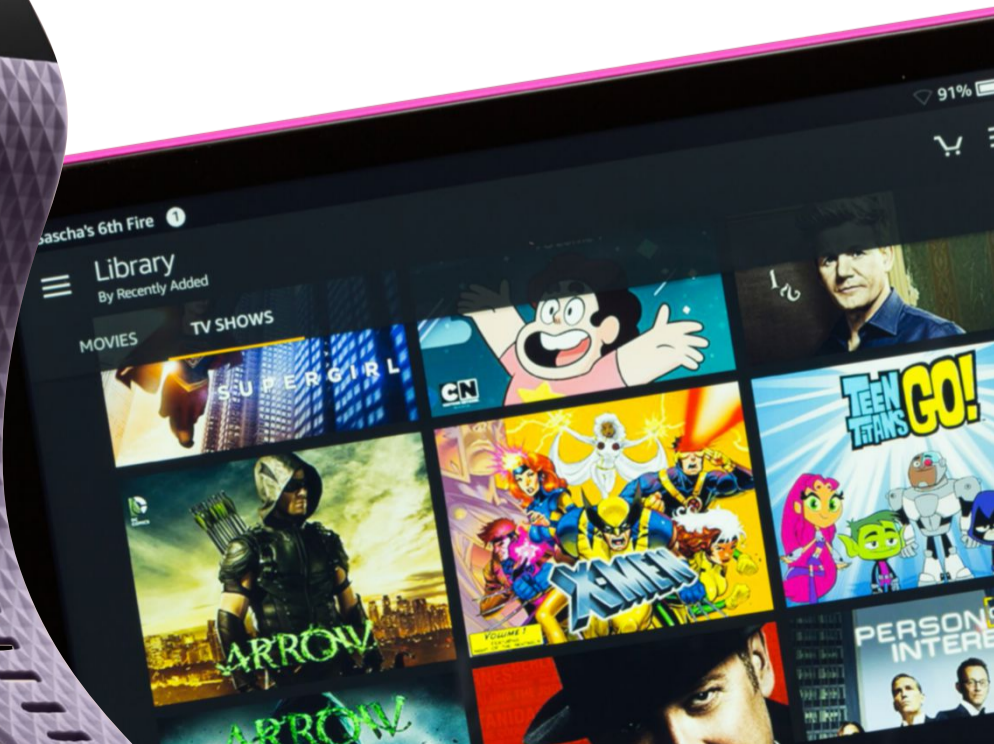
PHANTOM

COREL

Videos

Sascha's 6th Fire
Library
By Recently Added
MOVIES   TV SHOWS

SUPERGIRL

ARROW

JBL

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GoPro

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PC MAGAZINE

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2016

They were tops in our tests!

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It's on track to launch in just under two years.

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> **"Just look at how long it took to get the first true Windows phone to market."**

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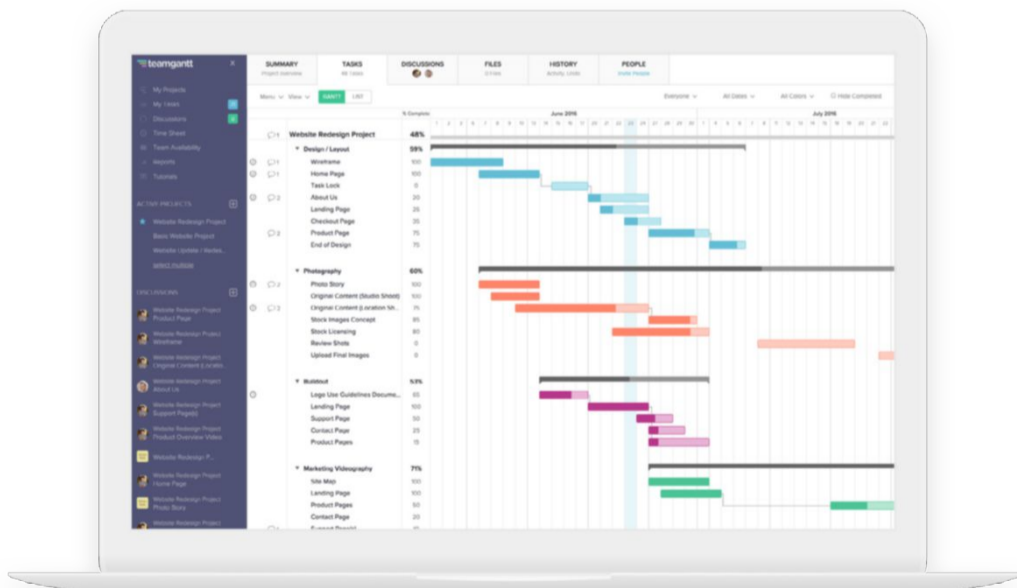
The Best We've Tested

E very tech magazine and website comes out with a "best products of the year" list at around this time. Readers love lists, and it's an easy story to do: Just open up a browser and start searching for the best of everything, then rewrite what you read online.

Here at PCMag, we do things a little differently.

The difference is that we've tested and reviewed all the products we recommend. Most testing took place in PC Labs in New York City. That's where Sascha Segan conducted his battery run-down tests on the Apple iPhone 7 Plus, Matthew Buzzi ran PCMark 8 on the new Microsoft Surface Book, and Jim Fisher used Imatest to measure high-ISO image distortion on the Nikon D 500.

But our testing isn't limited to the Labs. Increasingly, our testers have to take products home. When Will Greenwald asked if he could fire up the Char-Broil Digital Electric Smoker, I thought an outdoor location might be more appropriate. And we're currently evaluating home security systems, which have to be tested in an actual home and over an extended period.

After all the testing, our editors and analyst argue over the best products of the year and create this list of the top 100. All of them are killer, the best of the best. But what makes PCMag's review operation exceptional are all the products that *don't* make this list. The products we recommend as best of the year represent fewer than 4.5 percent of all of the consumer products we tested in 2016. When Sascha recommends the iPhone 7 Plus, know that he's also tested the Samsung

Galaxy S 7 and every other iPhone made. Mathew ran PCMark 8 on more than 100 PCs this year to get to his top picks. And Jim spends hours shooting with the cameras and lenses he reviews.

Keep in mind that this list is focused on consumer products. If you're looking for business products—office printers, network routers, VoIP services, accounting solutions—we've reviewed those as well. Just head over to PCMag.com.

Our "best products of the year" story is the culmination of a massive amount of work done by expert staff dedicated to helping you make better buying decisions. Every year, it makes me proud to work here. I hope you enjoy it.

Finally, I want to acknowledge the passing of Bill Machrone, Editor-in-Chief of *PC Magazine* from 1983 to 1991 and affiliated with the magazine for many years afterward. Please read Michael Miller's tribute to Bill in our Opinions section in this issue Memorial gifts may be made to the Carol G. Simon Cancer Center / The Overlook Foundation (overlookfoundation.org) or to the National Brain Tumor Society (braintumor.org).

dan_costa@pcmag.com
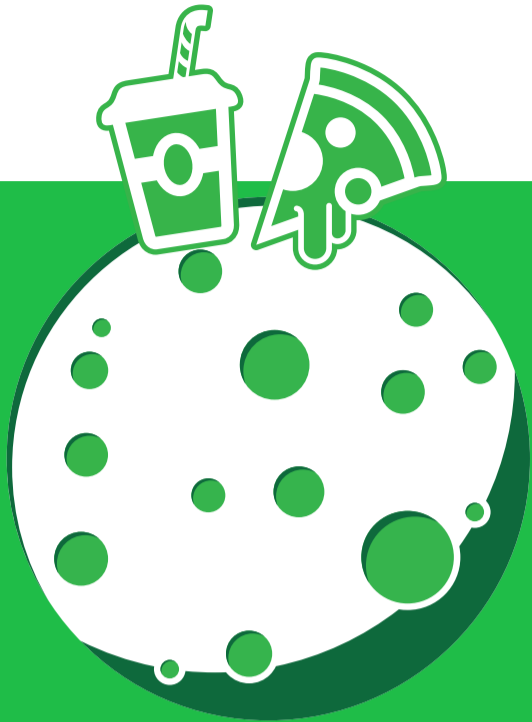
Fast Food on Other Planets

Max Eddy responded to Elon Musk's proposal to make humanity a multi-planet species with this opinion column in our November issue. Reader responses ranged from thoughtful to… well, "skeptical" is a good word.

"HEY ELON, DON'T MAKE ME SPEND 30 YEARS IN A PIZZA HUT ON MARS"

I don't think any modern or future bank is going to offer indentured servitude as a repayment option. A bank could decide to give you a loan and you would pay it out of your wages. There will be a labour shortage on Mars so I expect wages will be similar to those seen at offshore oil rigs and mines.

— *Dallas*

MAX EDDY REPLIED:

I don't think there will literally be indentured servitude. My concern is that contractual work arrangements with low or no pay in an extreme environment could recreate it in all but name. In an earlier draft, I also talked about minimum wage fast food workers, which may be a more apt discussion. For many people, wages are so low that they cannot access the job training, education and so on that would lead to a higher-paying job.

The matter is further complicated by what sort of sovereignty Mars would even have. Inevitably in this scenario you are going to have people of many nationalities living in one place, and it is far from infeasible that they have Internet access. Who has jurisdiction over whatever laws and protections that would be proposed, and what if they conflict with the laws and regulations of their corresponding nations on Earth?

— *it me*

I'm a little bit more worried about the little details of stuff going wrong. One guy using one of his self-driving cars paid with his life for one of these details… Idiots that watch too many Hollywood movies and think we can actually execute such a plan in our lifetime are in for either a great disappointment or painful death. Eventually we'll be able to execute such a plan, don't take me wrong, but I'm positive will take a century or more.

— *ricardo*

Why do you assume there will be pay? People going are going to be fighting for their lives.

—*John Murdoch*

This whole deal is a subterfuge for NASA spending. A better idea would be to send one guy beyond low earth orbit and bring him back to Earth.

—*Starlink9c*

I hope Elon Musk is on the first flight to Mars.

— *Mark S*

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.

# MIT and Lamborghini to Create Even Better Supercars BY BILL HOWARD

L amborghini and the Massachusetts Institute of Technology are partnering to develop technology and products that should make future Lambos faster, lighter, less expensive (maybe), and more crash-resistant (possibly). Even though Lamborghini is part of the huge Volkswagen family, supercar companies need to continuously improve if they intend to survive and prosper.

The two companies recently announced a three-year partnership to underwrite 50 students studying abroad in Italy and working with Lamborghini on research and development. Much of the work is expected to be in developing composites that make the car lighter and stronger.

It's not MIT's first car project: In fall of 2015, the university entered into a partnership with Toyota to further develop self-driving cars. That's part of a $1 billion program that includes Stanford University as well. The two coastal cities, along with Carnegie Mellon University, are among the university leaders in autonomous driving research.

With MIT, much of the work will be in Cambridge, MA, along with the year-abroad program for students. Italy is already a popular junior-year-abroad destination for American students, especially for art history majors (who often minor in drinking espresso and smoking-to-stay-skinny).

MIT also compares its Lamborghini-Italy program to one formed a decade ago between Boeing and the University of Washington, which helped Boeing devise a faster method of creating carbon-fiber parts. Normally it's a painstaking, multistep process, far slower than stamping a piece of metal in a press.
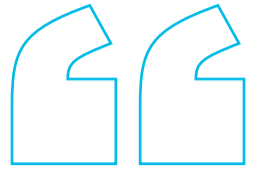
> **Much of the work is expected to be in developing composites that make the car lighter and stronger.**

LET'S WORK TOGETHER
The Italian company will collaborate with MIT students mainly on researching new materials in the automotive field.

As for Lamborghini, the company says it wants to explore better and more cost-effective composite parts. Supercars, including Lamborghini's Aventador, already have some carbon fiber parts, including roof, hood, and trunk panels that will save weight and lower the car's center of gravity and tubs (the chassis) that are ultra crash-resistant.

Carbon fiber wheels would be a worthwhile project, since the greatest performance gains come from reducing unsprung weight, meaning the tires, wheels, and brakes. But it's hard to monitor carbon fiber wheels for hidden damage, and it's likely CF road wheels would first be a club-racing or track-days option.

The car maker also needs to work on hybrid designs in which the electric motors act as turbochargers, even for those cars that have physical turbochargers. Electric motors provide torque instantly and at low rpm, while turbos need several tenths of a second to spool up.

Lamborghini, like all automakers, is aware that Germany's legislature voted to push that country, and possibly the entire EU (which often follows Germany's lead on things automotive) to move beyond combustion engines by 2030. That means even more R&D work on EVs, or hydrogen fuel cells that drive electric motors.

NASA Completes James Webb Space Telescope

BY RYAN WHITLAM

T he James Webb Space Telescope (JWST) comes up a lot when we talk about the very boundaries of our understanding of the cosmos. For more than a quarter century, the Hubble Space Telescope has been our best window to the wider universe, but it can only do so much. The JWST is the next step, and NASA has announced that it has completed construction of the telescope: It's on track to launch in just under two years.

The journey to this point was almost derailed a few times. The JWST was an expensive project at its inception, with an estimated budget of $5 billion. A series of delays and technical issues nearly resulted in the cancellation of the JWST in the 2012 US federal budget. Luckily, the project survived and is now back on track. But the cost did end up ballooning to about $8.5 billion. By comparison, the Hubble cost $2.5 billion.
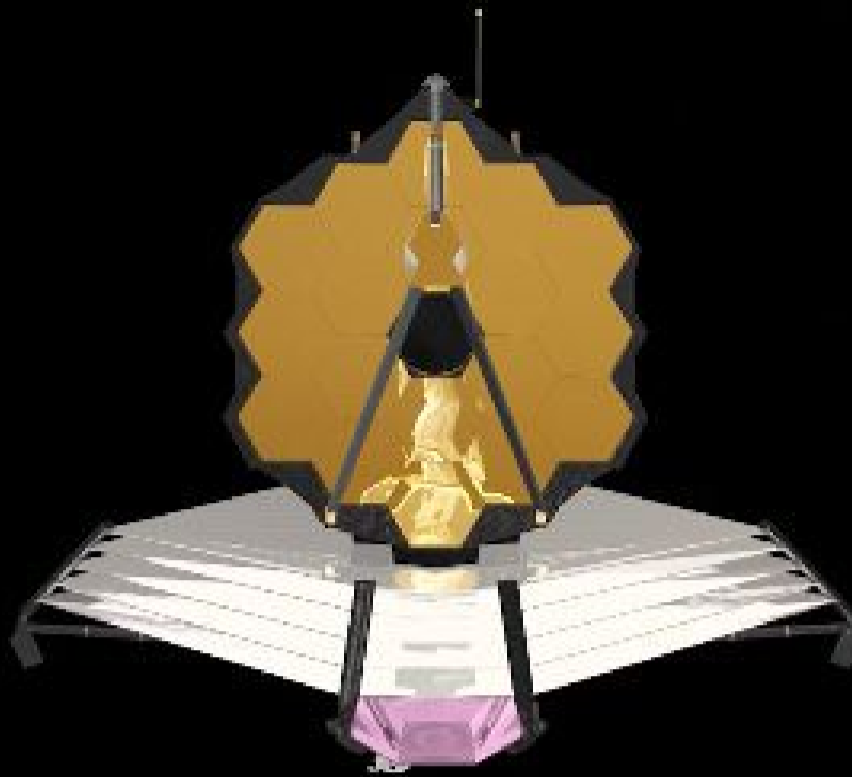
The JWS was designed to far surpass the Hubble's capabilities. If you've seen even a few of the stunning images from Hubble or seen how often its data is cited in scientific studies, that should excite you. For starters, the JWST has much larger reflecting mirrors, a total area of 270 square feet composed of 18 hexagonal beryllium-coated mirrors—the Hubble's mirror has an area of just 48 square feet. This means the Webb Telescope will be able to see much fainter objects than the Hubble can.

The most significant improvementis that the JWST has been designed to see far into the infrared section of the electromagnetic spectrum, which the Hubble can't do very well; it's just too warm to accurately scan the infrared. Anything emitting heat shines brightly in infrared, so the JWST has been designed to run extremely cool, as close to absolute zero as possible. It will be positioned at the L2 Lagrange Point. This point of orbital equilibrium will keep the Earth between the telescope and the sun, thus blocking all its infrared interference.

With an eye toward the infrared, the JWST will be able to peer through dust and gas to see the previously unseeable. It could also spot objects at extreme distances (and thus from the distant past). You know how we constantly lament our inability to actually image nearby exoplanets? The Webb Telescope might be able to change that, too.

NASA is currently running tests on the telescope to ensure it's ready for action. After that, it will be packaged up in preparation for its October 2018 launch aboard a European Ariane 5 rocket.

The James Webb Space Telescope is finally completed. Now we just have to get it into space.

Ford Previews Truly Autonomous Parking-Assist Tech BY TOM BRANT

Despite their convenience and wow factor, current-generation self-parking vehicles don't exactly park themselves: the driver must still change gears and keep a foot on the brake pedal, and the systems are often stymied by curved street curbs.

Ford hopes to change that with a new, completely autonomous self-parking feature currently in development at the automaker's European research and development facility. In a YouTube video, Ford demonstrated how its new park-assist feature can achieve parallel and perpendicular parking at the touch of a button. In addition to steering, the car also moves the gearshift and controls the throttle and brake.
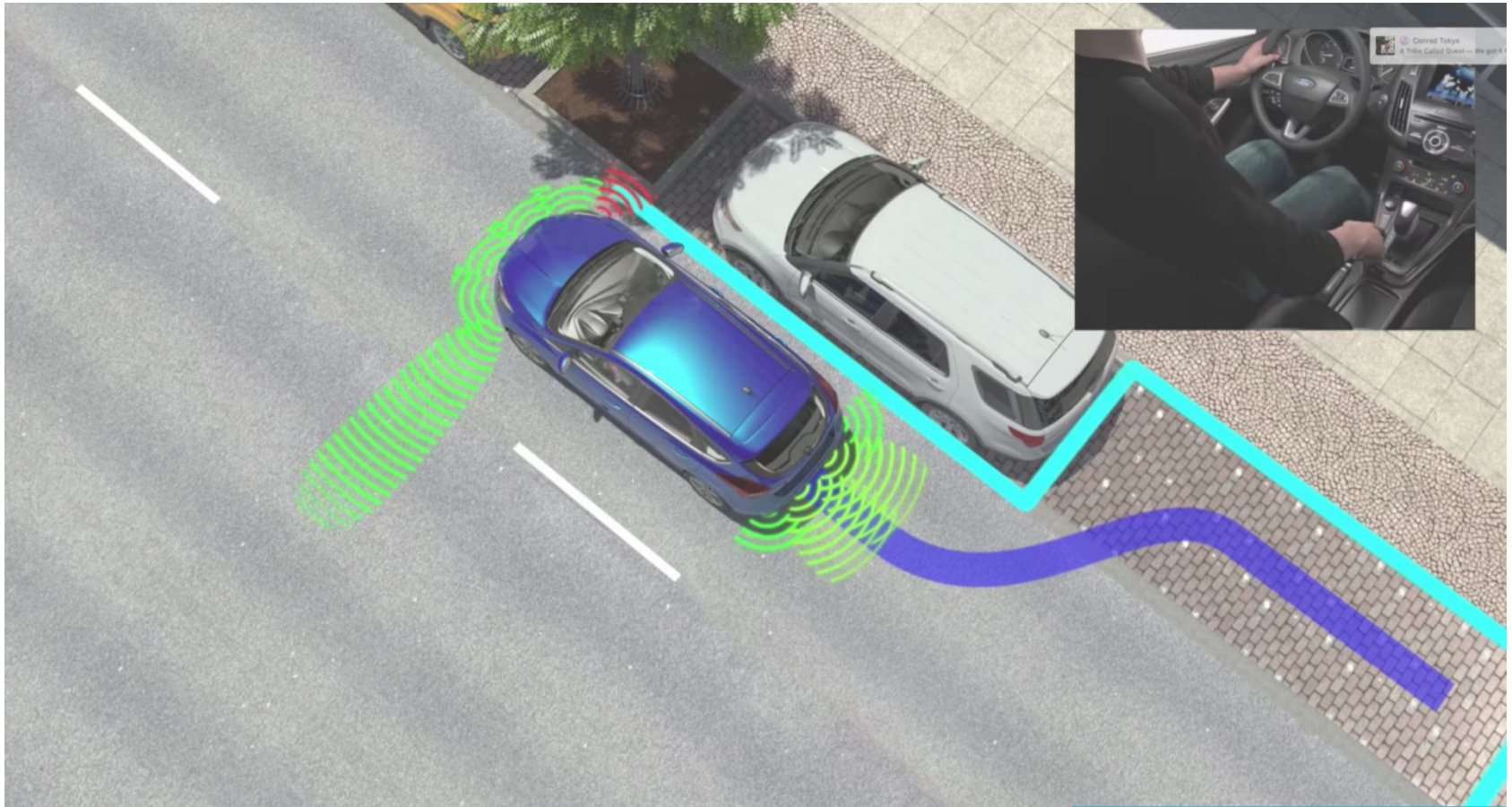
In other words, it is true self-driving technology, the likes of which few drivers other than Tesla owners who spring for the controversial Autopilot feature have experienced on public roads so far. One of the unknowns, though, is how accurate the sensors will be. During PCMag's test drive of the Cadillac CT6, for instance, the self-parking feature worked flawlessly on straight curbs but issued disappointing "self-parking failed" messages on even the slightest of curves.

TRULY AUTONOMOUS Ford's system is more advanced than current systems, which still require drivers to control the gears, throttle, and brake.

Ford says the new parking feature will be available on production cars within two years. It also unveiled several other driver-assist features in development, including evasive steering assistance and wrong-way alerts.

Using cameras and radar, the evasive steering feature scans for imminent collisions. If it detects an obstacle in the road ahead too close to avoid via emergency braking, it will calculate a path around it. The process is not fully automatic, though, relying on the driver to turn the wheel first and then providing steering assistance until the car passes the obstacle.

Meanwhile, wrong-way alerts don't actually control the vehicle. Instead they use windshield-mounted cameras and information from the car's navigation system to detect whether a driver is driving the wrong way on a one-way street.

Are You Ready to Hack Consciousness?

BY SOPHIA STUART

For many years, the concept of "consciousness research" was avoided in academic circles, as freshly minted neuroscience PhDs competed for grant money that was mostly tied to products that could be monetized in the future. Then artificial intelligence studies changed tack, people started to wonder how to make machines sentient, and bio-mimicry entered the fray.

Of course, everyone hit on the same thorny problem: How do we first define human consciousness? Surely we need to understand that before we build machines that think. So—in that vein—do you fancy participating in the largest experiment to date of detecting human consciousness, its origins, and effects?

adam m. curry
founder,
entangled

If you're up for it, apply for the closed beta test of Entangled, an app designed to capture, analyze, and share human consciousness research.

To help explain what that actually means, we met up with Entangled creator Adam M. Curry, who discussed life, the universe, and why Random Number Generators might be the key connecting humans and computers in new ways. Here's a portion of our conversation.

ENTANGLED WEB
"I think the hardcore reductionist view of reality is breaking down, and that consciousness needs to be front and center in both our updated physics and our future technology," says Curry.

PCMag: I think you're the first person I've met who has an asteroid named after them. How did that come about?

Adam M. Curry: When I was 17, I won a science competition for an invention that converted electro-gravitational phenomena into signals [that can help forecast seismic events, like earthquakes]. MIT's CERES program provided that asteroid prize. (Laughs) Let's just hope the 'Adam Curry Asteroid' isn't one involved in a near-Earth collision in the future.

Your advisors on Entangled include Princeton's Dean Emeritus Dr. Robert Jahn, whom you met while interning at the Princeton Engineering Anomalies Research program (PEAR), and Pixar co-founder Loren Carpenter. I guess I'm trying to portray you as someone on the serious peer-reviewed side of science as opposed to, well, you know.

I appreciate it; thanks for that.

So let's get right to it. What is Entangled? And why now?

Entangled is a mobile app that explores the boundaries between consciousness and physical reality. It's designed to be a fun exploration into some of the deepest questions we can ask: What is the nature of our mind? Are thoughts things? How deeply are we connected to one another?

Consciousness is a hot topic right now; areas like AI [artificial intelligence] are forcing us to ask these questions...to move forward. And basically, the answer boils down to whether or not consciousness is just an illusion of the brain, or if it's something more fundamental to the fabric of reality, localized by—but not restricted to—the brain. One way to test that is by looking for tiny correlations between mind and matter that the illusion model can't explain. So that's what Entangled does. It's like a crowdsourced investigation into mind-matter interaction, where each phone is a node in a giant network.

Can you explain how Entangled uses random-number generators (RNGs)?

We use RNGs to test for those mind-matter interactions. RNGs are based on sampling noise in the physical world and converting that into random 1s and 0s. Some use electron tunneling, a quantum effect that produces the bits. In Entangled, we're sampling insignificant bits from hardware in the phone. So the idea is that those bits can behave less randomly when consciousness interacts with that system, which could imply that consciousness has an informational influence beyond the brain, however small.

What's your timing on all this?

The alpha came back from our dev team on October 15, and we hope to open up the closed beta to our waitlist in time for New Years.

So, to put it simply, you'll have thousands of people in the closed beta who run Entangled in the background of their phone recording 1s and 0s, and when a statistically significant 'blip' happens among enough users' RNG output, you'll record when and where it took place?

Right. We're looking for statistical mean shifts that correlate to events that polarize world attention, like PEAR did with The Global Consciousness Project around hurricanes, earthquakes and—most noticeably—spikes that happened within its RNGs dotted around the globe at the same time as 9/11.

PEAR had less than 100 RNGs around the globe; you might well have 10,000 just for your beta. Isn't this the largest experiment to date?

The proliferation of mobile devices now has made Entangled possible. That's why we're living in an exciting age for this type of experimentation.

What exactly are you trying to prove with Entangled?

I just think it's important to ask the questions we're asking. I think the hardcore reductionist view of reality is breaking down, and that consciousness needs to be front and center in both our updated physics and our future technology.

Are we going into connected minds 'Borg' territory?

(Pauses) Um. Well, we'd like to examine whether there is a such a thing as the collective unconscious.

This is going to be fun?

We hope so.
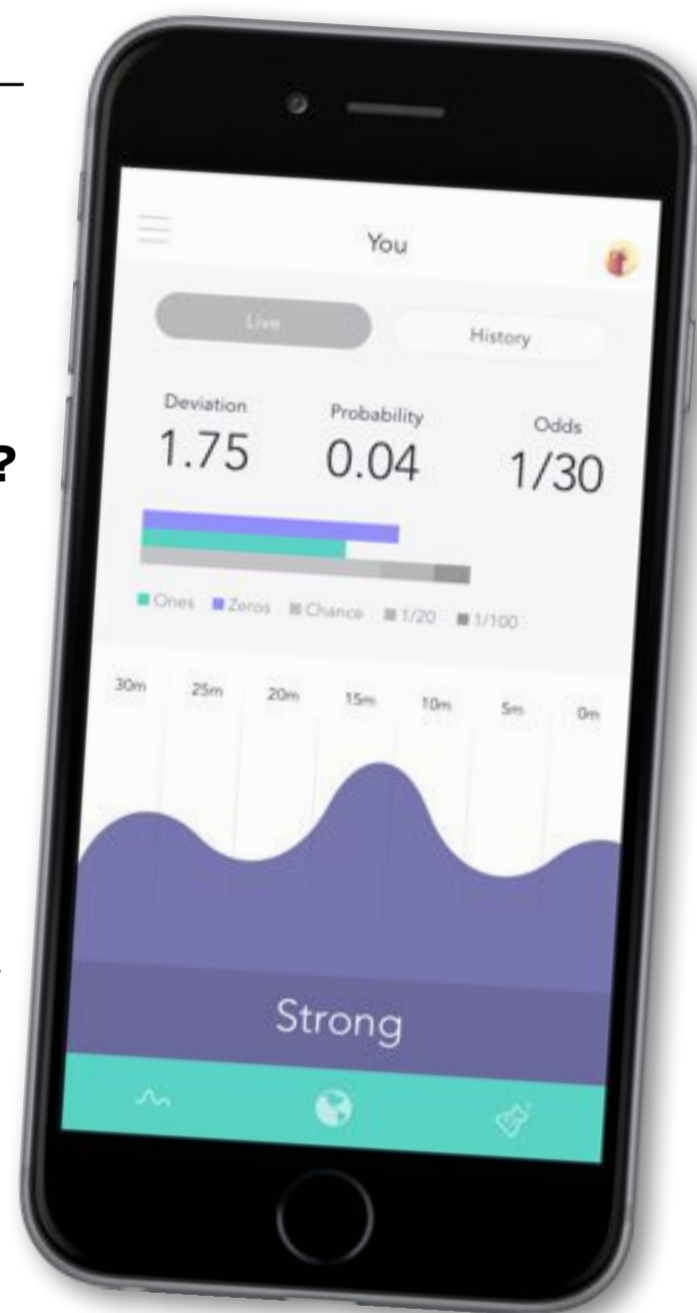
BETA TEST YOUR CONSCIOUSNESS
You can join the Entangled waitlist at http://www.consciousness-app.com.

Is Entangled an extension of the Quantified Self movement?

Absolutely, but it's taking it further in what we're trying to measure. So, let's say there's a significant spike in your local area [among app users]—you'll see it as a heat map and get a push notification.

A more sophisticated scientific version of when an earthquake rocks us during the night in L.A. and everyone wakes up and freaks out on Twitter?

Exactly. And if a 'collective unconscious' is real, can Entangled actually predict those earthquakes? We can explore that with the app.

Can it prove which of us are pre-cogs?

If that's the terminology you like to use. We can, on that train of thought, ask users to opt-in to experiments, so, on a certain day and time, we can do a 'mass attention' experiment and see what happens.

Let's stay practical. You mentioned Entangled is open source, so there will be APIs that others can use for their own apps, taking consciousness data as an ongoing stream. Give us some examples of how third-party developers can use it.

Architects could use the live stream for responsive environments by plugging into our platform. And, of course A.I. researchers could use it as a model of human behavior while building out artificial consciousness. For now, we're into gathering empirical data in a large-scale experiment that no one has managed to do before. My goal is to build the consciousness layer of the Internet.
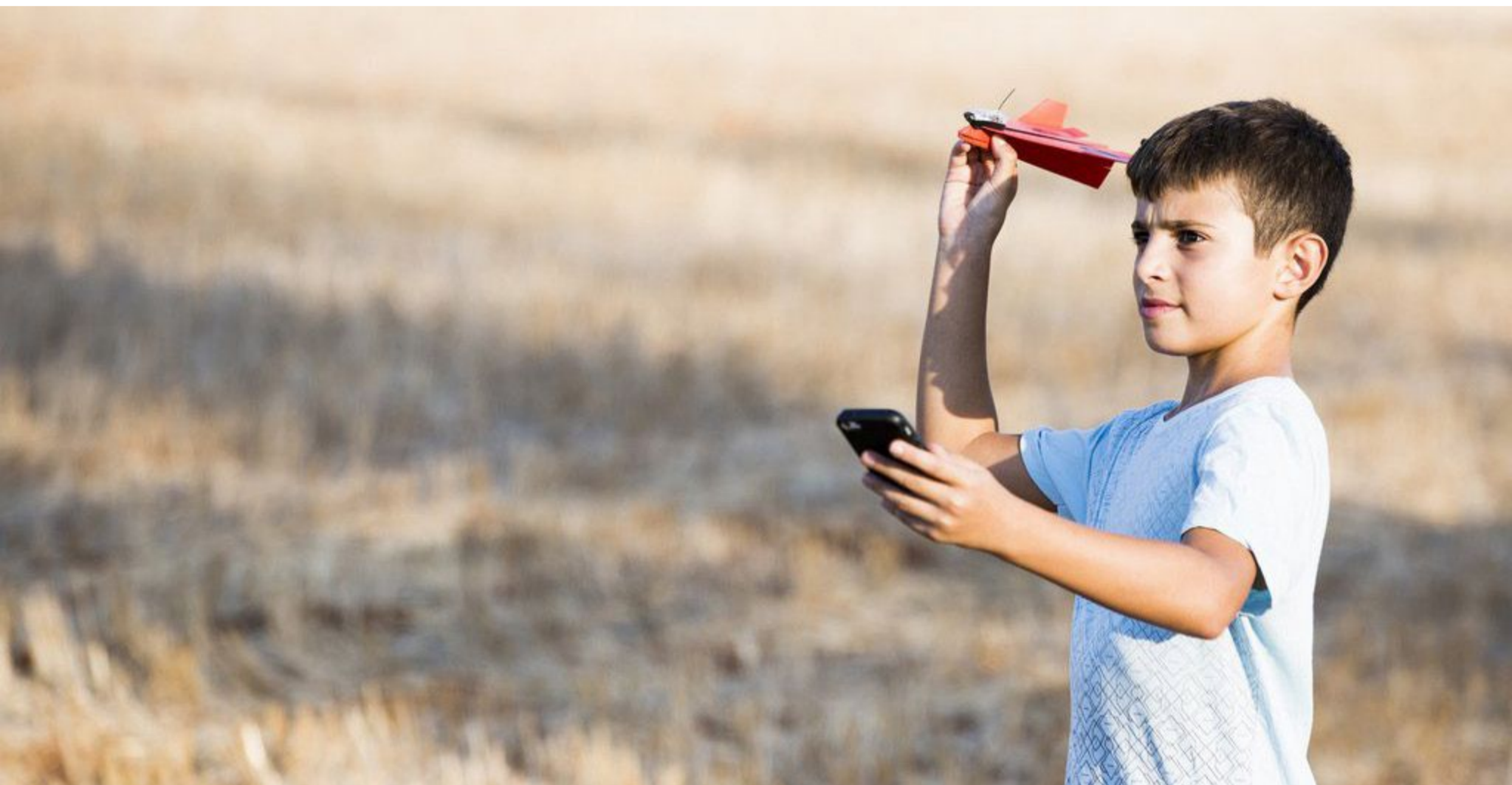
A fine and lofty goal. Do you ever get a chance to step back and think, as a geek, the stuff we absorbed from sci-fi movies and comic books is almost here?

Being in touch with the future before it arrives is amazing.

See you inside the beta. I'm #8371.

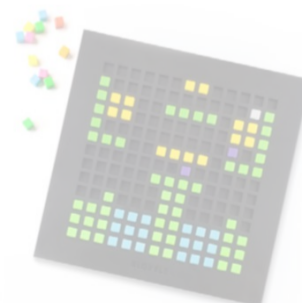# What We Love Most This Month

BY STEPHANIE MLOT

POWERUP 3.0

Technology has come a long way since the folded paper gliders of ancient China. PowerUp 3.0 lets pilots remotely control a paper airplane (actually, it's carbon fiber) via a Bluetooth-connected handset. Take all the necessary precautions—check the range, battery-level, and thrust-level indicators—and use a built-in compass and artificial horizon to steer the crash-proof plane. The toy takes 25 to 30 minutes to charge and lasts about 10 minutes in flight.

$49.99 poweruptoys.com

What We Love Most This Month

BY STEPHANIE MLOT

## FISHER-PRICE THINK & LEARN CODE-A-PILLAR

Aimed at preschoolers, the Code-a-Pillar encourages little learners to rearrange the colorful insect's segments in various combinations, learning problem solving, planning and sequencing, and critical thinking skills along the way. The starter pack includes a motorized head and one sound segment, three straights, two right turns, and two left turns; expansion packs add more moves, sounds, and lights.

$50.00 fisher-price.mattel.com

What We Love Most This Month

BY STEPHANIE MLOT
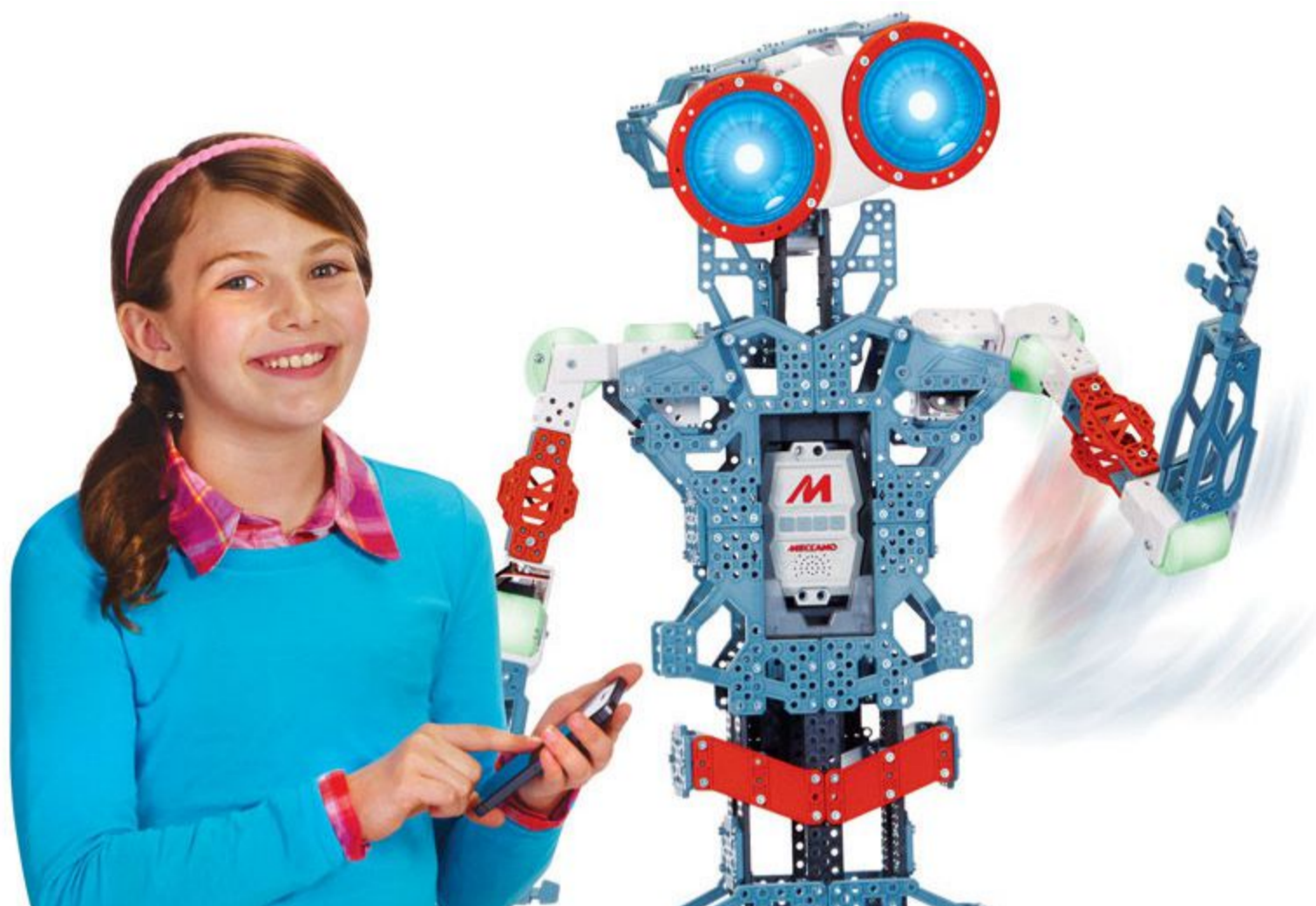
## MECCANOID G15KS PERSONAL ROBOT

Described as a "4-foot tall wisecracking best friend," this bot is built by you, using 1,100-plus pieces. It features voice recognition, 64MB of flash memory, and 10 motors to control its head, arms, and feet. Eight servo motors, meanwhile, deliver realistic movement—including some slick dance moves. You can program the robot in three ways: Simply move its arms and head or speak to it, use the Motion Capture feature on the Meccanoid mobile app, or swipe the on-screen Ragdoll avatar to control the robot's gestures.

Approx. $300 (varies by retailer) meccano.com
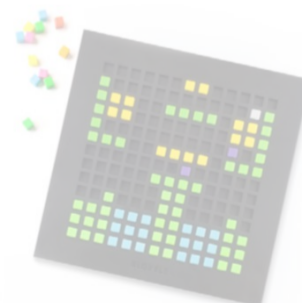
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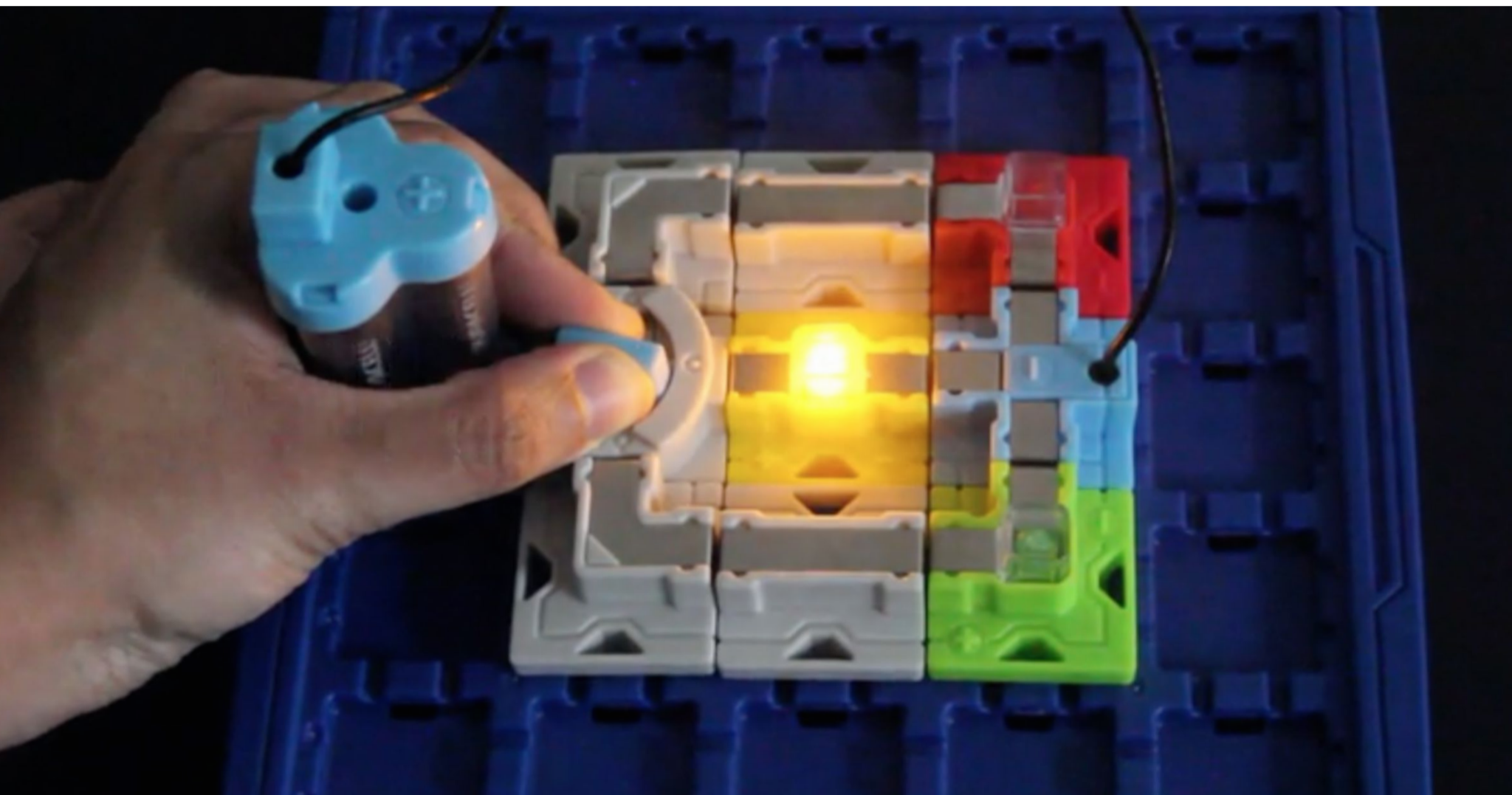


CIRCUIT MAZE ELECTRIC CURRENT LOGIC GAME

Want to be an aerospace, broadcast, or nuclear engineer when you grow up? It can start with an introduction to electrical engineering—and the Circuit Maze electric current logic game. Kids ages 8 and up can test their logic and sequential reasoning skills by working through 60 different challenges, from beginner to expert. Just remember to thank Thinkfun when you win a Nobel Prize someday.

$29.99 thinkfun.com

What We Love Most This Month

BY STEPHANIE MLOT
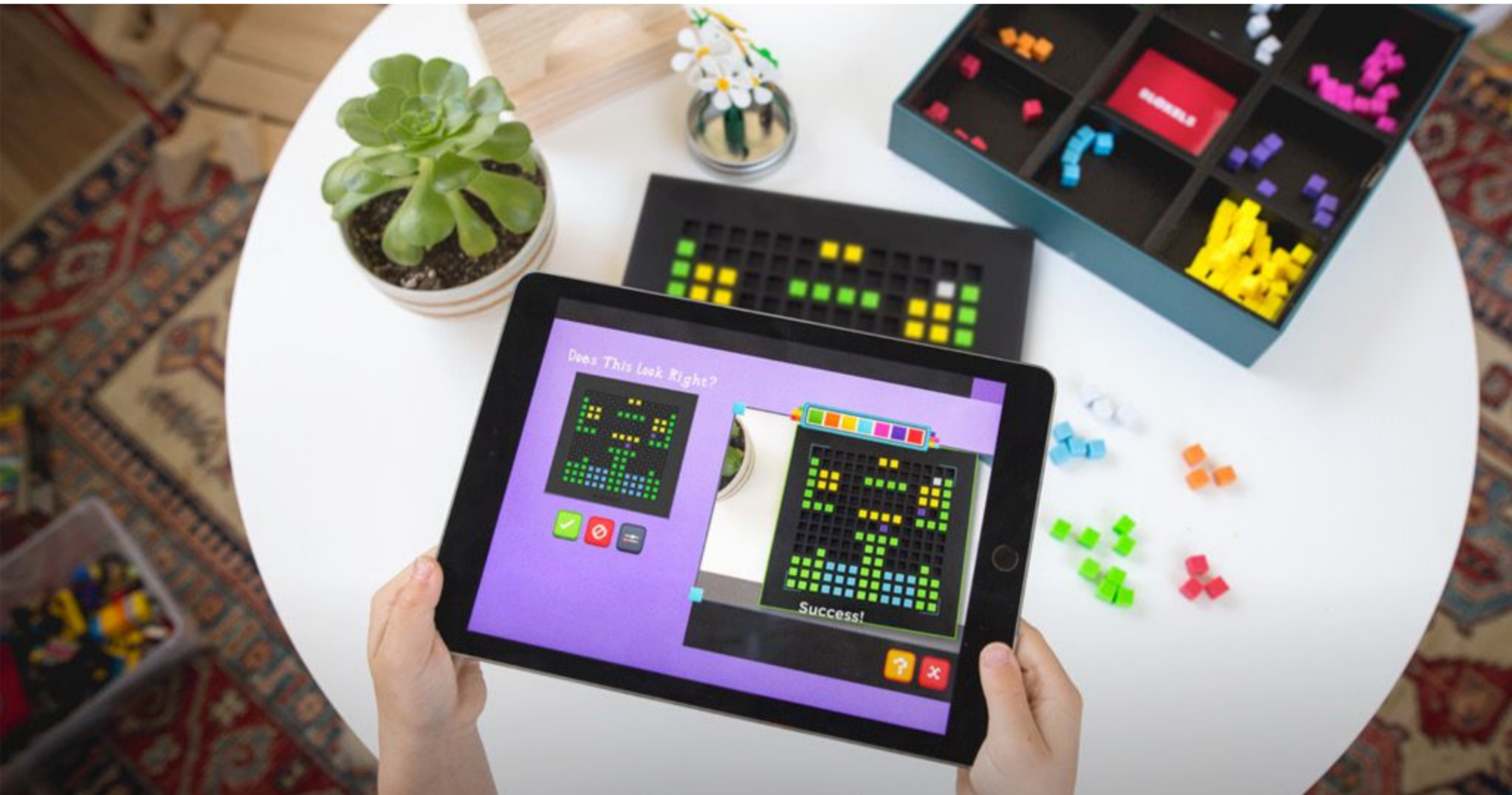
BLOXELS VIDEO GAME BUILDER KIT

Every kid wants to unwrap a next-generation gaming console this holiday season. But there's one thing Microsoft, Sony, and Nintendo can't give them: a guide to creating their own video games. Bloxels's starter kit contains a gameboard and 320 colorful blocks, as well as a builder challenge poster and guidebook with activities. It works with the free Bloxels Builder app for iOS, Android, and Kindle, where users can play their new digital games.

$49.95 **bloxels.myshopify.com**
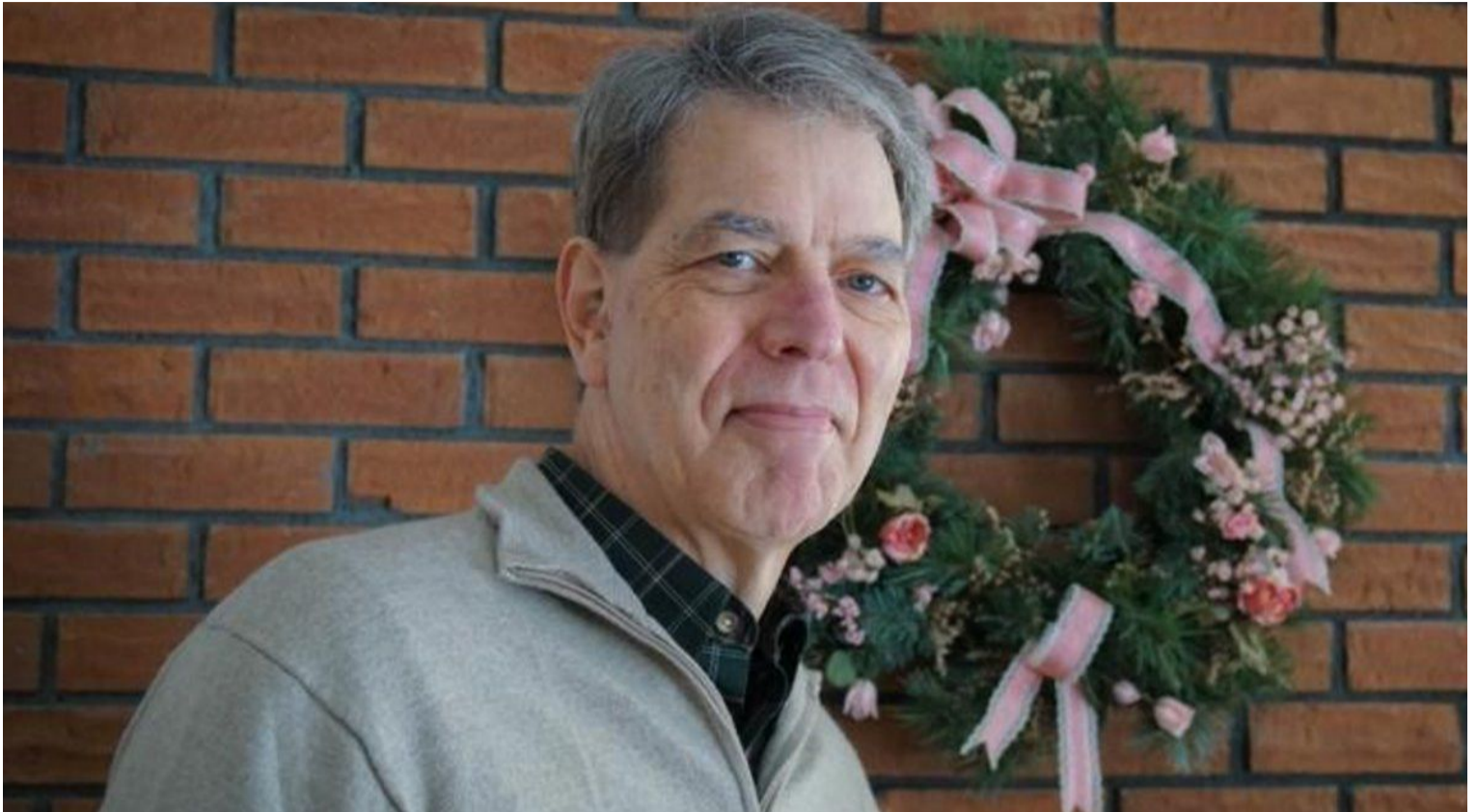
Remembering PCMag's Bill Machrone

BY MICHAEL J. MILLER

Bill Machrone, who was Editor-in-Chief of *PC Magazine* from 1983 to 1991 and continued to write a column for the magazine until a few years ago, passed away in late October.

Bill was working in information systems in New Jersey in the early 1980s when he started writing freelance articles for Sol Libes's *Microsystems* magazine, which was later sold to Ziff Davis. After Ziff Davis acquired *PC Magazine,* most of the staff left, the magazine moved to New York, and the editors who took it over were looking for new writers and editors. Bill came on as a freelancer and was quickly named technical editor in March of 1983. By September, he had become Editor-in-Chief and was the first person to hold the job for an extended period of time since founder David Bunnell left.

In Bill's tenure, the magazine grew at an enormous pace, moving from monthly to semi-monthly frequency (originally 24 times a year, later 22 times). In many ways, Bill helped define that growth. He started PC Labs

and watched it grow from "a beat-up metal desk where we used to disassemble every new piece of hardware" to a professional setting with formal benches, technicians, and even lab coats. He expanded the magazine's in-depth reviews and added a productivity section.

Always looking for precision, Bill distilled the contents of *PC Magazine* to a formula by late 1985: PC = EP2 (PC Magazine is Evaluating Products * Enhancing Productivity). Around 1984, he came up with what would be known as Machrone's Law: The machine you want will always cost $5,000. That held true for large parts of the computer market through the 1990s, and it is still true for some gaming rigs and workstations.

What began as a simple bulletin board service for people downloading the magazine's famous utilities eventually overwhelmed the local New York exchange. So Bill started PC MagNet, which soon became one of the largest online services in the country. (It was a part of CompuServe, and the only larger services in those pre-Internet days were AOL and CompuServe itself). PC MagNet later grew into ZDNet.

Probably his biggest contribution to the magazine was bringing on many of the long-time staff—names such as Bill Howard, Robin Raskin, and Gus Venditto—who helped him run the magazine for many years. By the time I took over as Editor-in-Chief in 1991, the magazine's direction and many of the key players were set.

I first met Bill in the mid-80s, while running *InfoWorld,* then a weekly newspaper covering the industry. We competed in reviews, but Bill—as always—was a cordial, friendly competitor. Before I took the job at *PC Magazine,* we had a long conversation over frozen yogurt in an airport

somewhere, as Bill explained why running *PC Magazine* was a great job and how the magazine had great readers and a wonderful staff. He was right on all counts but was characteristically modest about his own contributions. As always, it wasn't about him—it was about creating the best possible magazine and crediting the people around him.

When some of the staff initially resisted certain changes I was trying to make at the magazine— such as shortening the lead time on stories and reviews—I could always count on Bill to back me up. He couldn't have been a better colleague.

In 1991, Bill was appointed Ziff Davis's vice president of technology and founded ZD Labs in Foster City, California, which did testing for most of the other Ziff Davis publications. While there, he also was on the launch team for *Corporate Computing,* an ambitious magazine focused on testing large corporate-data-center machines that was probably a little ahead of its time. He often joked that he spent the most money ever spent on a single review when he was testing mainframes and minicomputers for the first issue of that magazine.

Later, he went on to start other magazines for Ziff Davis, including what would become *Yahoo! Internet Life*. When I wanted to start ExtremeTech as an online magazine, I turned to Bill, along with Nick Stam, to get it going, and the two of them ran the site for years. Along the way, Bill continued to write a column for *PC Magazine* until 2007, at which point it was the longest-running column in the magazine's history.

Many of these columns centered on hardware. One of his first pieces for the magazine focused on alternative graphics boards, and in his last

> **Always looking for precision, Bill distilled the contents of *PC Magazine* to a formula by late 1985: PC = EP2**

column, he told people not to upgrade their operating systems (to Windows Vista) but instead to buy new hardware. As he would put it in one column, "I'm an unapologetic wires-and-pliers hardware geek."

It was a trait he got from his father, a machinist. In the years after Bill left publishing, he put those skills to good use and combined them with his love of music to create a business with his son, modifying Blue Junior amps. Bill loved his guitars and made his own; he was also a car enthusiast and a devoted member of his church and choir.

He never lost his interest in technology. A few weeks ago, I was able to join Bill, Bill Howard, Robin Raskin, and our spouses for one last dinner, and we had an animated discussion on the crazy things going on in our lives and in the technology world.

Bill was 69. He is survived by his wife, Sharon, and children, Andrew and Stephanie.

michael_miller@pcmag.com

> I could always count on Bill to back me up. He couldn't have been a better colleague.

6 Tech Predictions for the Trump Years

It's a new world: Donald Trump's world. As 2017 hits, we're going to see the U.S. government's attitude towards a range of technologies change, whether it be about a lighter touch on regulation or a harsher look at companies that import heavily from China.

I hate making stock predictions. I'm going to try to stick to what I think you should expect and do, as U.S. tech consumers, to prepare for 2017. For each prediction, I'm also trying to provide an action you should take to put yourself in the best position for the future.

Sascha Segan is the lead mobile analyst for *PC Magazine*. His commentary has also appeared on Fox News, CNBC, CNN, and various radio stations and newspapers around the world.

SPRINT AND T-MOBILE WILL MERGE

Sprint's stock jumped after the election on the assumption that Sprint and T-Mobile, which want to merge, will do so. The merger has been blocked so far by Obama's team, and it has been widely expected that a Republican FCC will let it go through. There could be an announcement as soon as January.

While Trump has come out against the Time Warner–AT&T merger, he said he's offended by media consolidation, not broadband consolidation; a pure wireless merger may not spark his ire.

The outcome will be the end of the current wireless price wars. As we've seen in Canada, countries with three major players and no requirement to share networks with third parties

tend not to have aggressive pricing. We should expect to see wireless costs in the U.S. normalize at the AT&T/Verizon levels, bringing home more profits to investors in the combined Sprint/T-Mobile.

What you should do: Lock in a really good rate plan soon, because prices may go up. Study low-cost virtual carriers such as Ting, Republic Wireless, and Walmart Family Mobile, which may still offer deals.

VERIZON 5G WILL BE THE NEXT BIG BROADBAND COMPETITOR

This prediction wraps together a few elements. Republicans have been hostile to municipal broadband, and a key Trump adviser has indicated that he's against "set-asides" in upcoming spectrum auctions, which would prevent Verizon from snapping up most of the available airwaves. All that said, the sleepy cable monopolies, with their constant rising prices, are still ripe for disruption. Verizon's home 5G launch in 2017 will be boosted by big wins in upcoming spectrum auctions, giving you one more strong choice for home broadband going forward, and fulfilling the promise that Fios never did.

What you should do: Look for 5G home broadband promotions as soon as the service launches in your area. Switch back and forth between 5G and cable annually to keep the best promotional rate.

APPLE'S PRICES GO UP; HUAWEI AND LEECO DEAD IN THE WATER

Trump has expressed great displeasure at Apple manufacturing in China, but the company can't move its giant operations, so it'll just absorb any

new tariffs into its pricing structure. Think of it as an extra $50 hit on Apple products. Meanwhile, Chinese firms that don't already have a strong operation here—think Huawei and LeEco—will find few routes in. Motorola, now part of Lenovo, may also suffer. Americans looking for lower-cost phones will be able to turn to LG, made in U.S. ally South Korea, and Blu, a U.S. company that manufactures in China but sells its products so inexpensively that a slight price hike won't matter so much.

What you should do:: If you see an Apple product on sale, grab it. They're not going to get cheaper.

SOLAR, HYPERLOOP, AND TESLA ON THE WAY OUT

"Green" technologies are an absolute no to Trump's advisers, and as he promised to bring back jobs via coal mining and fracking, fossil fuels will remain cheap enough to make solar energy and electric cars non-viable. Gas prices will remain low. The self-driving-car revolution will continue, and aftermarket hotspot options such as the ZTE Mobley will succeed. If Tesla remains anything, it'll be a prestige brand for the Silicon Valley cultural elite.

What you should do: Look for cars with I/O ports and upgradeability for technologies such as CarPlay, Android Auto, and future cloud intelligence to make your traditional gas car smarter and smarter. AI is going to start advancing faster than the traditional car replacement cycle.

NET NEUTRALITY UP IN THE AIR

Trump has come out against net neutrality as attacking conservative media. But at the same

> "That said, the sleepy cable monopolies, with their constant rising prices, are still ripe for disruption."

time, Trump has expressed deep suspicion of media consolidation, which may cause him to cast a harsh eye on service providers that filter or price differently by content.

What you should do: Right now, nothing. This situation is too unformed for coherent action.

TWITTER AND FACEBOOK VINDICATED, PYRRHICALLY

Twitter is struggling financially, but it's how the President-Elect got his message out. I could see the government adopting Twitter as a semi-official way to communicate with people. That's going to give the service a new lease on life. Meanwhile, this was the Facebook election, with memes and conspiracy theories energizing voters. But the intense negativity and harassment on these services could be emotionally toxic to anyone who doesn't like constant conflict. In the long term, this could lead to a decline of both networks for more intimate, controlled milieus.

What you should do: If you aren't into conflict, consider moving to more closed or targeted social networks. Snapchat and Instagram, for instance, don't have the level of negativity commonly found on Twitter and Facebook (and Instagram has keyword blocking). You can form groups of friends and family in iMessage or Hangouts as well.

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> **I could see the government adopting Twitter as a semi-official way to communicate with people.**

Good Reasons to Let a Chatbot Ride Shotgun

Combining voice assistance with artificial intelligence and consumer data is a hot tech trend, thanks to Amazon's Alexa and her many "skills." So it's not surprising that General Motors plans to apply this same concept to the car to create what it's calling a "cognitive mobility platform."

The automaker teamed with IBM and its Watson voice-recognition technology for OnStar Go, which "will learn the driver's preferences, apply machine learning, and sift through data to recognize patterns in their decisions and habits." Then it will try to sell stuff to drivers who opt in.

"Marketers will offer services and suggestions that personally impact" car owners, GM said in a press release. Initial partners are limited to ExxonMobil, Glympse, iHeartRadio, Mastercard, and Parkopedia, but it's easy to imagine other companies lining up to reach a captive audience in the car.

"On average, people in the U.S. spend more than 46 minutes per day in their car and are looking for ways to optimize their time," said Phil Abram, executive director of Connected Products and Strategy for GM. "By leveraging OnStar's connectivity and combining it with the power of Watson…we're looking to provide safer, simpler and better solutions to make our customers' mobility experience more valuable and productive."

Car tech expert Doug Newcomb has written for *Popular Mechanics*, *Road & Track*, and other publications, and is the author of *Car Audio for Dummies*.

Doug Newcomb

GM added that it plans to "deliver personalized content through the dashboard and other digital channels to more than 2 million OnStar vehicles with 4G LTE connectivity by the end of 2017."

And while some may find this intrusive, there are good reasons to let a chatbot ride shotgun.

ALREADY BOMBARDED BY ADS

We're already constantly bombarded by ads on our computers, phones, and TVs. After booking a flight online, I get ads from airlines in my Facebook feed—as if I'm ready to book another trip.

If OnStar Go can be smart about it and present good and services that are relevant to me and my location, I'm willing to give it a shot. GM gave several examples of the service employing contextually relevant information to solve a problem, like reminding a new dad to pick up diapers before going home or giving "a traveling foodie dining recommendations from celebrity chefs when driving in a new city."

While I'm way past the diaper years (for my kids, not me), I wish I could be reminded to pick up coffee or milk on my way home, so that I don't discover the next morning that I'm out and drive for my first cup of joe while half asleep. And how many times have you wasted time and fuel driving around looking for a place to eat?

But here's where they had me. GM said "Watson Retrieve and Rank will even let a driver know that their order is ready for pickup at a nearby retail store and one of the store's employees will load their purchases into the car." You mean I don't even have to set foot in a store? Sign me up.

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The Best Smartwatch/Fitness Tracker Hybrid is From Apple

PC MAGAZINE
EDITORS' CHOICE

The Apple Watch Series 2 is the closest we've come to a genuine smartwatch-fitness tracker hybrid. In addition to a faster processor and brighter screen than the original model, the Series 2 has a waterproof design for swimmers and built-in GPS so runners can leave their iPhones at home. It's a lot more expensive than a Pebble, and fitness features aren't quite as advanced as those of some dedicated trackers, but it's a solid choice for iOS users looking for the best of both worlds. That said, it still isn't a must-have device.

Apple Watch Series 2

Starts at $369

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PRICING AND MODELS

The Series 2 comes in the same sizes as the original Apple Watch. The 38mm model (starting at $369) measures 1.5 by 1.3 by 0.4 inches (HWD), and the 42mm version (starting at $399) is 1.7 by 1.4 by 0.4 inches. It looks the same as the original too, though Apple has added a ceramic-case option (starting at $1,249) in addition to aluminum or stainless steel; Apple says the ceramic is four times tougher than the steel. The ceramic watch is slightly different in size, at 1.5 by 1.3 by 0.5 inches and 1.6 by 1.4 by 0.4 inches for the 38mm and 42mm models, respectively.

Apple also released the Apple Watch Nike+, which starts at $369 for the 38mm model and $399 for the 42mm version. These are made of aluminum (no stainless steel or ceramic options) with sporty color combinations including Black/Volt, Black/Cool Gray, Flat Silver/White, and Flat Silver/Volt. The Nike+ strap is made of the same strong elastomer silicone as Apple's Sport band, but it's perforated for better ventilation as you sweat. The Nike model also includes exclusive watch faces and Siri commands, and the Nike Run Club app is built-in and accessible from the home screen.

Apple Watch Series 2

PROS Built-in GPS. Waterproof to 164 feet. Brighter screen and faster performance than original Apple Watch. Accurate fitness tracking. Plenty of third-party apps.

CONS Expensive. Battery life has not improved. Lacks integrated sleep tracking and continuous heart rate monitoring when not working out.

SPOILED FOR CHOICE
The Apple Watch 2 is available in a variety of bands, cases (including a new ceramic option), and faces.

There's one more new model, sort of: the Apple Watch Series 1. It replaces the original Apple Watch and is basically the same hardware as the Series 2 but without the brighter screen, built-in GPS, and waterproofing. It starts at $269.

We tested a $399 42mm Series 2 model with a black aluminum case and Sport band for this review.

DESIGN

Apple has once again opted for a square look with the Series 2, whereas a lot of the competition, including the Samsung Gear S3 and the Asus ZenWatch 3, go for the more traditional circular design. I find Apple's design attractive, and I like that it stands out a bit. It's also very comfortable—I could sleep with the Watch Series 2 on without it being a bother.

> **The Series 2 has a waterproof design for swimmers and built-in GPS so runners can leave their iPhones at home.**

You'll find the rotating Digital Crown on the right; pushing it in twice opens up the main app screen, and rotating it zooms in or out, scrolls, and inputs data, depending on the screen you're looking at. Next to the Digital Crown is the simply named Side Button. It wakes the watch up, powers it on and off when held down, pulls up the Dock (more on that in a bit), and

SHINING DISPLAY
The Series 2 has an OLED Retina touch display, just like the original, but it's twice as bright, at 1,000 nits compared with the original Apple Watch's 450.

sends an SOS alert. On the left side are two tiny slots for the speakers and two pinholes for the microphone. Underneath are metallic charging contacts and tiny buttons on either side that you push to slide off the swappable band.

Inside the box is the watch itself, a metallic charging cradle, a power adapter, and large and small bands.
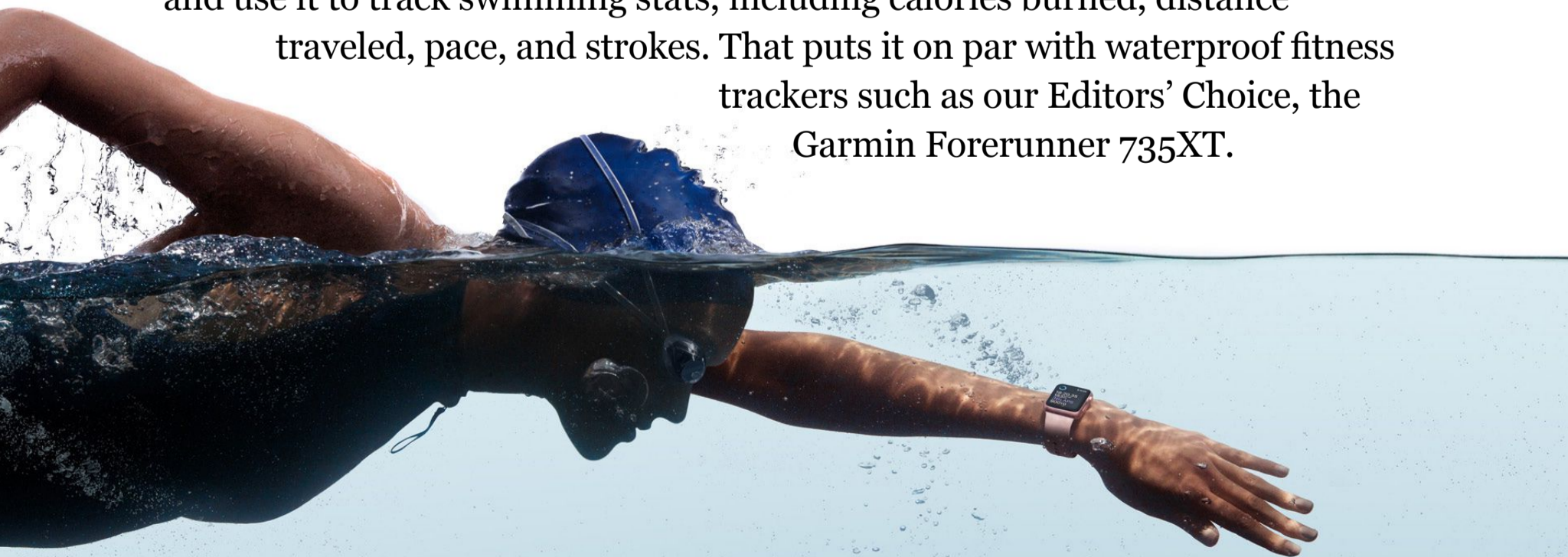
DISPLAY

The Series 2 has an OLED Retina touch display just like the original, but it's twice as bright, at 1,000 nits compared with the original's 450. That's bright enough to light your way in a dark room, and it's easily viewable in direct sunlight. The 38mm and 42mm models have a resolution of 272-by-340 and 312-by-390 pixels, respectively, just like the original. That works out to just over 300 pixels per inch (ppi) for the 42mm model. Images, text, and video all look nice and sharp. It's even better than the the 400-by-400-pixel, 286ppi display on the Huawei Watch.

Force Touch is back, which means you can push hard on the display to activate different functions depending on the app or screen that's open. If you're on the watch face, for example, you can press down and then cycle through the other faces available. In Twitter, Force Touching brings up the screen to compose a new Tweet.

The display isn't always on, which means it blinks off when you put your wrist down or when you're not doing anything on the watch for around 10 seconds. By contrast, the Pebble Time and the forthcoming Samsung Gear S3 are always on, which is convenient when you're glancing at your wrist for the time.

WATERPROOFING AND BATTERY LIFE

You can take the Series 2 down to 164 feet underwater. Apple cautions that it shouldn't be used for scuba diving or waterskiing. You can swim with it, though, and use it to track swimming stats, including calories burned, distance traveled, pace, and strokes. That puts it on par with waterproof fitness trackers such as our Editors' Choice, the Garmin Forerunner 735XT.

An impressive new mechanism in the watch's speaker ejects any water that finds its way inside. You'll know it's time to remove liquid when you see a water drop icon at the top of the display. When that happens, simply rotate the side dial, wait, and watch liquid sputter out of the speaker port, accompanied by a mechanical whirring sound. I wore the Series 2 in the pool and shower and submerged it under the faucet every chance I got, and I had to eject water only twice. To dry it, just give it a shake and wipe off the excess water.

You can't use the touch screen underwater, and it can be difficult to swipe through app screens with wet fingers. The Garmin Forerunner 735XT, by comparison, has buttons you can easily press to cycle through exercise data.

Battery life is the same as the original Apple Watch, at about 18 hours. That basically means you'll be recharging the watch every night. I managed to get through most days with just under 20 percent of battery life left. You need to use the included magnetic charging cable to juice up the Series 2's rechargeable lithium-ion battery.

That can be frustrating if you want to want to track your sleep at night and you have only a sliver of battery life left. By comparison, Fitbit devices like the Blaze last about five days on a full charge. With GPS enabled, the Series 2's battery life estimate drops to five hours, which is enough for a short marathon. The Fitbit Surge also lasts about five hours with GPS on, and the Garmin Forerunner 735XT lasts up to 14 hours.

WATCHOS 3 AND FEATURES

You need an iPhone 5 or later to pair with the Apple Watch Series 2—sorry about that, Android users. To pair, just download or locate the Apple Watch app to your iPhone, open it, and follow the simple instructions. I paired the Series 2 with an Apple iPhone 6 Plus for this review. It takes a few minutes for the pairing process to complete. Once connected, the watch syncs with your mobile device whenever it's in range.

The Series 2 ships with watchOS 3, which includes several upgrades, including a Dock screen for quick access to your favorite apps, the ability to handwrite messages on the screen, additional watch faces, and SOS functionality to alert emergency contacts to your location or dial 911. Original Apple Watch users can download and install the new software for free.
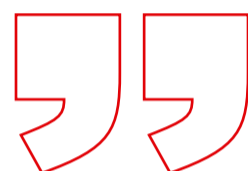
The Dock is accessed by pressing the Side Button. It's basically a screen where you can flip through apps you've already opened, which appear as little cards in a horizontal line. You can swipe through and open apps from there rather than using the tiny bubble interface on the home screen, which is convenient.

Apps can now run in the background. I kept BBC News, Twitter, and the heart-rate monitor open at the same time, which means you don't need to wait for them to load each time you switch from one to the other.

As far as handwriting messages goes, the actual process takes a while—you can scribble only one letter or symbol at a time—but it's a nice addition to have. Otherwise, you can speak into the microphone to compose your text, and access the usual array of emojis.

Watch faces are pretty standard. There are 14 to choose from, which you can customize with battery life, fitness, and weather widgets. For example, you can add a heart icon you can tap whenever you want to take your pulse. But there are only so many variations you can make before feeling like there should a more interesting selection of faces available. Pebble's store has numerous watch faces you can download, including some fun ones based on BB-8 and Metal Gear Solid V. You can't download additional faces for the Apple Watch.

Siri is always listening, so you only need to say "Hey Siri" to trigger voice control. For instance, you can say, "Hey Siri, set an alarm for 7:30," and the watch will open the alarm app with the set time. Siri also works with some HomeKit-enabled smart home devices, including Philips Hue lights, which you can turn on and off with your voice, or open the app to select lighting scenes.

Of course, the Series 2 can also display caller ID information, calendar reminders, social media notifications, and text messages, provided your phone is close by.

> An impressive new mechanism in the Apple Watch Series 2's speaker ejects any water that finds its way inside.
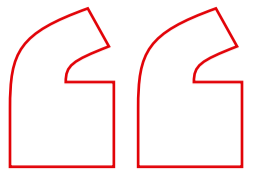
Apple's third-party app selection is still the one to beat. You can read headlines with the BBC News, CNN, and *New York Times* apps; order cabs with Uber; send, reply, like, and compose Tweets with Twitter; contact colleagues with Slack; and navigate with Google Maps. And don't forget about Pokemon Go, which will soon be available in Apple Watch form. As we've seen with the iPhone, many smartwatch apps tend to come to the Apple Watch first—and better—than they do for other platforms.

FITNESS TRACKING AND PERFORMANCE

The Series 2 uses a new dual-core S2 processor that Apple says is twice the speed of the original's S1 chip, with a GPU that can deliver 50 percent faster performance. It's difficult to benchmark a smartwatch, but as far as I can tell, performance is quite snappy. Apps open in less time that the original, and motions feel fast and fluid.

> **Many smartwatch apps tend to come to the Apple Watch first—and better—than they do for other platforms.**

WHAT LIES BENEATH
Underneath the Series 2 are metallic charging contacts and tiny buttons on either side that you push to slide off the swappable bands.

As far as sensors go, the watch has an accelerometer, a gyroscope, and a heart-rate monitor, just like the original. The addition of built-in GPS makes the Series 2 a good choice for athletes (particularly runners), and for the most part, it works very well.

The GPS locked onto a satellite instantly in testing, which is impressive considering most fitness trackers like the Fitbit Surge and TomTom Spark Cardio + Music can take a minute or two to dial in. Using GPS, you can leave your iPhone at home when you go for a run and still get accurate distance and pace stats, as well as maps of your route.

I wore the Garmin Forerunner 735XT at the same time that I wore the Series 2 for several jogs, and they both returned similar results, complete with the exact same map of my route. Distance, steps, and heart rate measurements were also comparable. The same goes for when I took the Fitbit Charge 2. All three devices were ever only five to 10 BPMs or steps higher or lower, which is an acceptable level of deviation.

The Apple Activity app is pretty helpful. It gives you a nice breakdown of active minutes, calories burned, distance traveled, steps, and progress made, depending on the activity, all on the same screen. But it's not as detailed as Garmin's app, which gives you more info, including average speed, cadence, maximum speed, and maximum heart rate. You won't see elevation in Apple's app either, which you can see apps from Garmin and Fitbit.

The Apple Watch doesn't continuously monitor your heart rate, as do the Fitbit Charge 2 and some other dedicated fitness trackers. As mentioned, you can choose a watch face with a shortcut widget to the heart rate screen, but then you have to stand or sit still and wait for it to take a measurement. The only way to continuously measure BPMs on the Series 2 is by starting a workout.

There's also no integrated sleep tracking. For that you need a third-party app, and as mentioned, the meager battery life means you'll probably be recharging it at night anyway.

As for a fitness community, Apple doesn't really have one. Fitbit has the largest number of users when it comes to fitness devices, so if it's camaraderie and challenges you're looking for, you'll probably want to consider a tracker like the Blaze or Charge 2.

WHERE ARE YOU?
The addition of built-in GPS makes the Series 2 a good choice for athletes (runners in particular), and for the most part it works very well.

COMPARISONS AND CONCLUSIONS

The Apple Watch Series 2 is the best smartwatch-fitness tracker hybrid we've seen, and better than the original watch thanks to a brighter screen, faster performance, a waterproof design.

If you're already sold on the Series 2 but want something even more runner-specific, wait for the Apple Watch Nike+, with its exclusive watch faces, Siri commands, and built-in Nike app. If you aren't interested in the fitness features, the Apple Watch Series 1 will save you $100 while still giving you access to Apple's excellent third-party app selection. And if you already own the original Apple Watch, I wouldn't recommend upgrading to the Series 2 unless you want to take it swimming.

Triathletes who need more than five hours of GPS-enabled tracking should look at the Garmin Forerunner 735XT. If tracking calories, heart rate, and steps is all you care about, the much less expensive Fitbit Charge 2 is the way to go, and it can also push phone notifications like caller ID and texts.

And if you want a smartwatch you can use with an Android phone, the Samsung Gear S2 Classic are PCMag favorites. The Gear S2 doesn't have nearly the app selection the Apple Watch does, but its unique rotating bezel and Tizen OS make it easier to navigate than any other smartwatch. The Pebble Time is less expensive, has a robust app selection, a week of battery life, and it's compatible with both Android and iOS devices.

Also worth considering, the recently released Pebble 2 + Heart Rate ($129.99) adds a lot of fitness functionality, such as sleep and step tracking. The Pebble Time 2 ($199.99), due in January, does the same, along with a brighter, sharper display. Both watches feature built-in heart rate monitors, but not GPS. For the price, they're definitely worth a look.

And you can't ignore price. For $369 (or more), the Apple Watch Series 2 still doesn't offer any must-have features or functionality. Sure, it's a fun gadget for iPhone users with big budgets, but if you forget to put it on in the morning, your day probably won't be much different. That's an issue with smartwatches in general, but for the price, it isn't unreasonable to expect a bit more. So while the Apple Watch Series 2 is definitely an improvement over the original, you don't need to rush out and buy one quite yet.

TIMOTHY TORRES

Top 5 Drones

Even if you have no good reason to justify buying one, you have to admit that drones are cool. And if you've ever thought about dropping money on a quadcopter but you've managed to wait this long, we have good news: The tech has come a long way in a very short time. Some models on the market now put last year's copters to shame in terms of video quality and stabilization.

And now the bad news: You get what you pay for, and if you want an aerial video platform that can capture stunning footage, be prepared to spend some serious cash. Because drones are such a pricey proposition, it pays to do your research before buying one.

The drones we review are ready-to-fly models, so you can use them right out of the box. In most cases, you'll need your own Android or iOS device to view the camera feed in real time, but we've reviewed a few models, including the Yuneec Typhoon Q500 4K, Typhoon G, and Blade Chroma, that have an Android tablet built into the remote control. We haven't delved into covering true pro models, which require you to get out a soldering iron and install flight control systems and custom gimbals that can accommodate an SLR or mirrorless camera.

SAFETY AND REGULATIONS

All of the models featured here have some safety features. When your control signal is interrupted or the battery gets down too low (most drones can only fly for about 20 minutes on a single battery charge), your drone will head back to its takeoff point and land. If you're really concerned about losing your copter to a flyaway, you can add a GPS tracker. The Flytrex Live 3G is available for a number of popular models and constantly sends location data to the cloud via a 3G cellular connection.

Those flying within the United States should read up on the current FAA guidelines—or be prepared to face potential fines or jail time. The FAA has set no-fly zones, so don't take off when you're near an airport without notifying the control tower first. And even when you're out in the middle of nowhere, don't take your drone above 400 feet. Most drones are set to obey these regulations out of the box, but controlling a quadcopter is just like driving a car—even though you missed seeing that speed-limit sign, you're still liable to pay the ticket. If your new drone weighs more than half a pound, you'll need to register with the FAA.

RACING AND TOY QUADCOPTERS

A number of products on the market are sold as drones that aren't actually drones. Remote-controlled aircraft have been around for ages, but with the new popularity of drones, quadcopters that would simply be sold as RC products are now being tagged as drones. These products don't include GPS stabilization, return-to-home functionality, and other automated flight modes that make a drone a drone.

ON YOUR MARK...
In drone racing, pilots fly quadcopter drones through three-dimensional courses at speeds up to 120mph.

We've reviewed a handful of these products and placed them in our Toys review category. If you're interested in something that you can use on the International Drone Racing Association circuit, such as the Horizon Hobby Blade Nano QX2 FPV BNF, or you just want to tool around with a tiny remote copter such as the Aerius, check our website for reviews.

BIG DRONES, SMALL DRONES

For a long time, the DJI Phantom series was as small as you could go to get a full-featured drone that maintained stability in the air and included strong safety features. That's changing. The first small drone we reviewed, the Xiro Xplorer V, was a little rough around the edges but showed the Phantom form factor could be sized down. Recent models, including the Vantage Robotics Snap, GoPro Karma, and DJI's tiny Mavic Pro, have taken things further. The Snap uses magnets to attach its main chassis to a set of folding propellers, so it's easy to break down and transport. The Karma and Mavic Pro have rotor arms that fold into the body.

THE COMPETITION

DJI models currently dominate our top picks: The company is simply a few steps ahead of its competition and has a product catalog with models at various price points, which take up a good number of the slots in our top ten.

Yuneec is DJI's major competition in the consumer market. Its Typhoon series, including the Q500 4K, has gained traction with many pilots. PowerVision, a new player in the U.S. market, announced two copters—the consumer-friendly PowerEgg and the pro-grade PowerEye. We haven't been able to test either as of yet.

Also making headway in the U.S. is Autel Robotics with its line of X-Star drones. We've not yet had the opportunity to review them, but they compare favorably with DJI models in terms of price. 3D Robotics, which took a swing with its Solo drone, has reportedly cut staff and is concentrating on the corporate market. That's a shame, as the Solo delivers a lot of innovative features and would be a stellar choice for GoPro action cam users if it weren't hampered by subpar battery life and a GPS that's slow to lock on to satellites.

JIM FISHER

DJI Phantom 4

$1,399.00

EDITORS' CHOICE

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The Phantom 4 is the best consumer drone that DJI has released to date. It takes everything we loved about the Phantom 3 Professional and improves upon it. You get smooth, stabilized 4K video capture, longer flight times, the ability to capture aerial footage at speeds that can touch 50mph, and 12-megapixel still capture in your choice of Raw or JPG format. Front-mounted cameras prevent the drone from crashing into obstacles in its path, and it can track moving subjects on its own. And the new flight mode that lets you take control of the drone simply by tapping your smartphone's display is a welcome addition. The streamlined chassis and ratcheting propellers allow for faster flight, the included carrying case is quite useful, and the gimbal is better integrated into the body to improve video stability and reduce propeller or landing gear intrusion into footage. Put it all together, and you have an aircraft that ousts its predecessor, the Phantom 3 Professional, as our Editors' Choice for consumer drones.

DJI Inspire 1

$2,899.00

EDITORS' CHOICE

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The DJI Inspire 1 is currently in a class of its own. No other drones ready to fly out of the box can match it in build quality or versatility. The Inspire flies fast but remains nimble and offers excellent operating range and dual-operator control. Its 4K footage is crisp and shows little distortion, and a removable, upgradeable camera means that you won't have to buy an entirely new aircraft as advances in technology improve video quality. Flight time is limited, so an extended capacity battery (or three) is a recommended purchase for videographers planning on using the Inspire professionally—and you'll likely want to work with a dedicated camera operator or use a software tool (such as the third-party Autopilot app) to really take advantage of the freely spinning camera gimbal. If you don't need that type of versatility, consider instead the DJI Phantom 3 Professional, which is a fine choice for enthusiasts and pros alike.

DJI Phantom 3 Professional

$1,259.00

EDITORS' CHOICE

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The Phantom 3 Professional takes the ease of use of the DJI Phantom 2 Vision+ and refines just about every aspect of operation. The video quality is a huge step up—you can record 4K footage to a memory card and stream 720p clips to YouTube. The remote control is better designed, with more physical controls, an integrated battery, and the ability to accommodate a full-size iPad as your flight monitor. The 720p Live View feed that streams to the monitor is crisp and smooth, so you can pilot the drone with confidence. Also, the Phantom 3 Professional is extremely stable in the air. If you want it to stay in one place, it will do so with ease. And the 3-axis camera gimbal does a fantastic job of keeping the video footage smooth when the Phantom is moving at speeds of up to 35 miles per hour. There's still room for DJI to improve functionality: I'd like to fly longer on a battery charge, but that's a complaint common to all consumer drones. If you're willing to invest in a couple of spare batteries and don't need a drone that can fly autonomous routes, the Phantom 3 Professional is the one to get.

DJI Phantom 3 Standard

$499.00

EDITORS' CHOICE

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You're not going to find a better drone for $500 than the Phantom 3 Standard. It delivers the stability, reliability, and safety features that you expect from a Phantom and all of the same automated flight modes as its more expensive siblings. Some tradeoffs are made, considering the price. It doesn't support 4K—the Phantom 3 4K is the least expensive model with that recording option—and it doesn't have the Vision Positioning System and Lightbridge transmission system for long-distance operation that you get with the pricier Phantom 3 Advanced or Phantom 3 Professional. If you can afford them, you should look at the Phantom 3 Professional or Phantom 4. But if those are beyond your budget, rest assured that the Phantom 3 Standard is a very solid aircraft and certainly the best you'll find for $500.

DJI Mavic Pro

$999.00

EDITORS' CHOICE

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The DJI Mavic Pro is a prime example of just how quickly the drone market is evolving. A few months ago, a small drone—even one with GPS stabilization, such as the Parrot Bebop—was underpowered and less than capable when compared with larger models. The Mavic Pro changes that. When folded, it stows easily in a smaller bag, and though it's not quite as quick or as powerful as the larger Phantom 4, it can fly high, move through the air at a solid pace, and capture 4K video that's just as detailed. I'm not naming the Mavic Pro our Editors' Choice, as that honor remains with the superb Phantom 4, which can now be had for around the same price as the Mavic. But it's a strong option for the right pilot—one who doesn't mind spending a good amount of money on a drone and places a high value on a portable design. If you've coveted the Phantom 4 but think it's just too big to carry with you to exotic locales to capture stunning aerial footage, the Mavic is the way to go.

Google Home

$129.00

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'OK Google' Wireless Speaker Is Just OK

Google Home, the search giant's new connected wireless speaker, is more attractive and sounds better than the Alexa-powered Amazon Echo, but the Google Assistant cloud service that backs it still needs a lot of work. It's not yet up to Amazon's standards, including basic functions such as playing music as well as the hundreds of third-party skills now integrated in Amazon's cloud assistant.

There's plenty of potential and room for growth in the future, but this is Alexa's world right now. If all you want is a voice-controlled Google Play Music and Spotify speaker, Google Home looks and sounds better than the Echo for $50 less. Otherwise, hold off on buying it until at least after the holidays, when it will become clear if the voice assistant is going to get the upgrades and third-party support it needs to be competitive.

DESIGN AND SETUP

Google Home is an attractive gourd-shaped speaker with a removable woven base that comes in seven different colors. It's 3.79 inches in diameter and 5.62 inches tall, and it weighs about a pound. Google Home looks like an ornamental candle, and thanks to the fabric base and various color options, it'll fit much more easily into a range of home decor than Amazon's somewhat utilitarian-looking black or white Echo speakers (even the smaller Echo Dot and Amazon Tap at Amazon aren't particularly attractive). Google Home has only has one physical button, which toggles the always-on microphone. Otherwise, the top is a touch surface you can tap to pause music or stroke to turn volume up or down.

You set up the speaker by loading the Google Home app on your Android or iOS phone. It'll connect the speaker to your home Wi-Fi and let you define your home's location (for weather and traffic). From then on, you can "cast" music from your phone to the speaker, or you can just say "OK Google" to activate the speaker's voice assistant and get things going.

The speaker can be heard—and it can hear you—from a 50-foot distance. But it's quieter than the Amazon Echo. Turned to maximum volume, I got 3-dB to 4dB more volume at a 1-foot distance from the Echo than from Google Home, although I'd argue that Home has richer, more well-rounded sound, especially in the sub-bass realm. It won't blow you away with low end, but it's pleasant, room-filling, and never harsh.

Compared with other Bluetooth speakers, Google Home's performance aligns perfectly with competitors in its price range. Playing our standard bass-heavy test track, The Knife's "Silent Shout," it produces a well-balanced sound that is definitely fuller than a smaller Bluetooth speaker such as the JBL Clip 2, but it doesn't come anywhere near the dance-party boom of a big cylinder such as the UE Megaboom.

The Home has weaker Wi-Fi connectivity than the Amazon Echo, however. In testing, I could successfully use the Echo in areas where Google Home dropped its Wi-Fi connection.

Another thing to note: Google Home doesn't work as a standard Bluetooth speaker. You need to send music to it from a Google Cast–compatible application, such as Google Play Music or YouTube. Like with the Amazon speakers, you're really supposed to use the voice-activated service to summon music from the cloud, but you can pair a phone with an Echo speaker to stream like any Bluetooth speaker would.

OK GOOGLE, PLAY ME A SONG

Google Home plays music from Google Play, Pandora, Spotify, and YouTube; the only one that works well without a premium account is Pandora, so the speaker includes a six-month trial of YouTube Red to suck you in. (Google Play Music Unlimited and YouTube Red are are $9.99 per month together; if you sign up for one, you get the other.)

I used Google Home with Google Play and YouTube, and it's missing some key features. On YouTube, you can't ask for a specific artist, only for radio mixes based on the artist. On Google Play, you can ask for an artist or an album, but you can't shuffle an album (only a playlist or an artist), and you can't do anything with your own purchased library. If you haven't arranged your library into playlists, Google Home doesn't even recognize that you have a library.
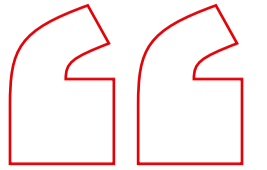
> **There's plenty of potential and room for growth in the future, but this is Alexa's world right now.**
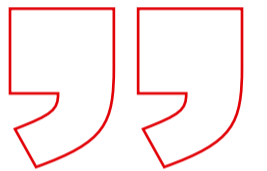
Alexa, meanwhile, has easy access to Amazon, iHeartRadio, Pandora, Spotify, and TuneIn music services, not to mention anything stored locally on your device via Bluetooth.

Multiple Google Home speakers can play multi-room audio together, though, which Amazon speakers can't do. And Google promises that only the nearest Google Home will answer your "OK Google" query, a feature Amazon says it's bringing soon as an update. We didn't have access to multiple Google Home speakers to test this feature.

Google's ability to control TVs via Chromecast is a little more natural than with Amazon's Fire TV Stick. You have to press a button on the Fire TV remote to access Alexa. With Google Home, you can simply holler out "OK Google, play

GOOGLE ASSISTANT VS. ALEXA

Google Assistant is very good at answering, well, Google queries. It can tell you the location of the nearest store that sells beer and its hours. It can give you the phone number of the Whole Foods on Houston Street. It can translate a phrase into Spanish, tell you how many teaspoons are in a tablespoon, read you a somewhat random recipe for cornbread, and tell you how much it costs to fly to Seoul. More apropos for your home, Google Assistant can set timers, read you news from NPR and more than a dozen other news services, and tell you what's in your Google Calendar for the day.

But Google Assistant lacks any third-party API, which means outsiders can't write new hooks into it. That will change in December, with the launch of Actions on Google, the company has said. Google will really have to hustle to catch up with Alexa's 3,000 skills, which include ordering a ride with Lyft or a pizza with Domino's, getting recipes from specific providers, and locking the doors on your BMW.

WHAT'S YOUR FAVORITE COLOR? Interior decorators will be happy: Google Home's base comes in seven different hues, so you can match your tech to your home decor.

Google Home is especially weak in controlling smart-home devices. It integrates only with Nest, Philips, and Samsung home devices (although it can connect to IFTTT systems as well). Alexa, on the other hand, can directly drive Blink, Carrier, DigitalStrom, Frigidaire, Harmony, Honeywell, Iris, Netatmo, WeMo, and many other kinds of devices.

There are also some outright bugs. For some reason, Google Assistant's directions engine is locked to Pacific time. So if I ask how long it will take to get home to my apartment in New York at 1:15, it will answer, "If you leave at 10:15, it will take 36 minutes." Also, at several seemingly random times during my testing, the Home just gave up and said, "There was a glitch. Try again in a few seconds."

I'm also disappointed that Google Home doesn't connect to other Google services. It can't add events to your Google Calendar, which is something Alexa can do. It also can't read emails or Google Docs, and can't connect to Google Trips for travel updates. Alexa has a third-party skill called Email Assistant that can extract travel details from your Gmail mailbox, which is similar to Google Trips functionality. All of those things are coming eventually, but they aren't here now. Once more, Alexa's superior third-party ecosystem comes through.

COMPARISONS AND CONCLUSIONS

Alexa is currently the queen of voice assistants. Although Google Assistant can answer some Web-related queries that Alexa can't, Amazon's massive library of third-party skills and content providers opens up much more of the Web to conversation than Google currently does.
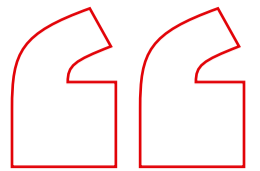
> " **Google promises that only the nearest Google Home will answer your "OK Google" query.** "

SET IT UP
Load the Google Home app on your Android or iOS phone. It'll connect the speaker to your home Wi-Fi and let you define your home's location.
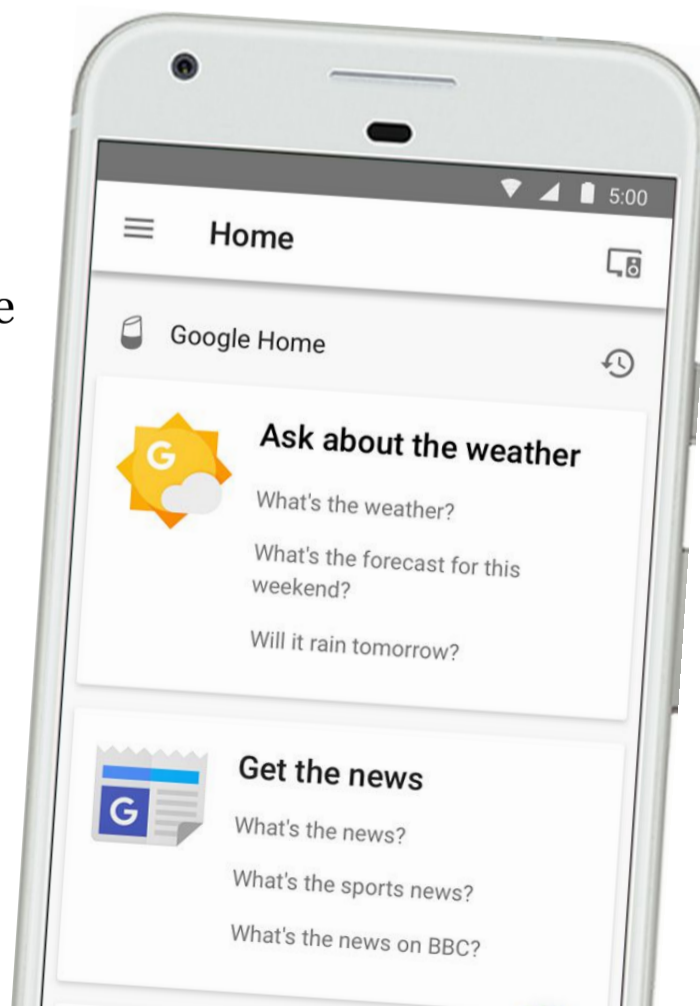
The big question is how quickly Google Assistant will learn. The Google Home speaker itself is prettier than any of Amazon's speakers and sounds better as well. If you buy it now, you're placing money on a bet that Google Assistant will get many dynamic updates and third-party services, especially after the Actions on Google API launches in December.

For now, though, I'd say hold off unless you're already a Google Play Music or YouTube Red subscriber or a Chromecast owner. Amazon's setup delivers a lot more, especially if you're an Amazon Prime subscriber. The three different Echo models range in price from $50 to $180, work with multiple accounts, and have a thriving third-party ecosystem constantly adding new features. Echos work better with Google accounts than Google's own product does, at the moment. So until Google works that out, the Amazon Echo and Echo Dot remain our Editors' Choice voice assistants.

SASCHA SEGAN

A Beefed-Up Followup to the Original Surface Book

PC MAGAZINE EDITORS' CHOICE

The second-generation Surface Book is a beefed-up followup to Microsoft's inaugural Editors' Choice–winning flagship 2-in-1, with a more powerful Intel Core i7 processor, discrete graphics, plentiful storage and RAM, longer battery life, and increased performance. The Surface Book is a capable, versatile system that can be used as either a laptop or a Windows tablet. Although it's a pricey incremental upgrade to last year's model, the Surface Book remains our Editors' Choice for high-end detachable-hybrid tablets. It's easily among the best laptops, tablets, and hybrids you can buy for business or personal use, given its sheer power and graphics prowess.

Microsoft Surface Book
(2016, Intel Core i7)

Starts at $2,399; $3,299 as tested

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DESIGN AND FEATURES

Given that its upgrades are component-focused, you'd be hard pressed to distinguish the new version of the Surface Book from the original. When you examine the two side by side, however, you'll notice some slight differences. The new version is 0.9 inch tall at its thickest point, tapering down to 0.51 inch at the front, and it's 12.3 inches wide and 9.14 inches deep. These dimensions are identical to the original's, but the new Surface Book is slightly heavier thanks to additional batteries: 3.63 pounds with the included Performance Base keyboard attached, compared with 3.34 pounds. On the original Surface Book, the angular design leaves a gap between the lid and cover when closed. The gap is still there because of the shape, but the lip where the keyboard meets the hinge is raised, minimizing much of the open space. The keyboard itself is comfortable, with good key travel and bright-white backlighting.

Last year's Performance Base had a flat design. This year's is curved at the edges, a change that adds a minuscule lift (just a few millimeters) to the edges of the keyboard, but that doesn't alter how the device closes or performs. Another plus of this Performance Base is that it's completely interchangeable with last year's, so if you purchased Surface Books for your business last year, you're covered.

Microsoft Surface Book
(2016, Intel Core i7)

PROS Segment-leading performance. Almost 20 hours of battery life. Discrete GeForce GTX 965M graphics. Same slim, versatile design as the original. Multiple configuration options. Last year's Performance Base is compatible with this year's Surface Book.

CONS Pricey. Angular shape when closed.

A WORTHY SECOND-GEN DEVICE
The Microsoft Surface Book remains our Editors' Choice for high-end detachable-hybrid tablets.

The Performance Base has two USB 3.0 ports and an SD slot on the left, with a Mini DisplayPort connector on the right alongside the slot-shaped power connection, which attaches magnetically. Because it has no Ethernet or HDMI ports, you'll need to purchase adapters if you need or want them.

The innovative hinge remains the same, letting you detach the tablet from the base with a button press. The connectors sometimes take a second to line up when you're snapping it back on, but you can fold the system down into a clipboard or reverse the display orientation with ease. The hinge is so sturdy that you can write on the screen with the included Surface Pen in standard laptop mode without causing the hinge to bend; this gives you the option to mark up webpages in the Edge browser or add notations to images and slide decks without having to adjust the orientation.

You'll hardly notice the added weight, either: The Surface Book is still very mobile, despite bringing a lot more power than most convertible-hybrids or tablets. The Spectre x360 13, for example, measures 0.5 by 12.0 by 8.6 inches (HWD), and weighs 2.8 pounds—smaller but not significantly so. It's also close to high-end

TAKE PEN TO SCREEN
The eraser-like button on the top of the Surface Pen brings up OneNote on the Surface Book with a single click.

TWO MACHINES IN ONE
The Surface Book it not strictly a laptop. Rather, it's a powerful detachable-hybrid Windows tablet that gives you the best qualities of a laptop PC, with the ability to detach the screen for use as a tablet.

ultraportable laptops such as the XPS 13 Touch (0.6 by 12 by 8 inches, 2.9 pounds) and the 2016 13-inch Apple MacBook Pro (0.59 by 11.97 by 8.36 inches, 2.99 pounds). But the Surface Book has the bonus of being able to detach into a thin and light (1.56-pound) tablet. Everything useful about that functionality remains, with powerful discrete graphics added to the mix when the Performance Base is attached.

The 13.5-inch screen, with its 3,000-by-2,000 resolution and 3:2 aspect ratio, also remains unchanged. The picture is incredibly sharp, and the display gets very bright at maximum. Responsive 10-point touch technology is still here and is essential for using the Surface Book as a Windows 10 tablet. It's not 4K, but that resolution isn't necessary at this screen size, and it's superior to the 2,560-by-1,600 resolution of the new 13-inch MacBook Pro and the full HD resolution of the super-thin Asus ZenBook 3 (UX390UA). The bezels are modestly sized—not quite the Infinity Edge design Dell uses in the XPS 13 or the Precision 15 5000 Series (5510) but not too thick. They leave plenty of screen real estate for work or media playback.

Microsoft offers three different storage capacities (all solid-state drives, or SSDs) for the new Surface Book: 256GB, 512GB, and 1TB. Our review unit had the largest, providing plenty of room for storing movies and photos, documents, and other work or entertainment projects. Games might eat storage up a bit faster, but 1TB is more than enough to hold several big titles. The storage is located in the tablet portion, so when you detach from the base, it still has the full capacity.

PERFORMANCE

All three models of the new Surface Book come with a speedy Intel Core i7 processor and an Nvidia GeForce GTX 965M graphics card. Our review unit combined a Core i7-6600U CPU with 16GB of memory along with the 1TB of storage. The 512GB unit also has 16GB of RAM; the 256GB version has just 8GB. Like the storage, the processor and memory are located in the tablet.

The new Surface Book earned fast results across the board in our performance tests. It scored 2,735 points on the PCMark 8 Work Conventional test, an improvement from the original Surface Book's 2,583 and the Rose Gold XPS 13's 2,769. The Asus ZenBook 3 and HP Spectre x360 13, helped by their less demanding 1080p displays, were toward the top of the pack with scores of 3,228 and 3,286, respectively. Multimedia test scores were similarly quick, in line with or faster than those from the new 13-inch MacBook Pro, the first Surface Book, and the Rose Gold XPS 13 on the HandBrake, CineBench, and Photoshop tests.

Despite its business focus, the new Surface Book unequivocally beats other ultraportable systems and tablets at 3D performance and gaming, scoring 8,980 on our 3DMark Cloud Gate test and 2,290 on Fire Strike Extreme. This crushes

TERRIFIC TYPING
The backlit, chiclet-sytle keyboard is more comfortable to use than any keyboard cover on a slate tablet.

the Rose Gold XPS 13, for example, which has integrated graphics and scored only 6,761 on Cloud Gate and 425 on Fire Strike. On the Heaven and Valley gaming tests at 720p resolution and graphics details set to Medium, the Surface Book reached high average frame rates of 79 frames per second (fps) and 85fps, respectively. With the resolution at 1080p and the graphics quality set to Ultra, the Surface Book scored playable rates of 27fps on Heaven and 31fps on Valley.

This means you'll probably need to tune a few visual effects down in modern games, though that's to be expected—the GTX 965M is an above-average but not top-of-the-line mobile card. The Surface Book's native resolution is also too much for the card, as it couldn't achieve more than 12fps on the more demanding version of either test while set to 3,000 by 2,000. Still, playing simpler games is a breeze, moderately demanding games will run at more than 30fps, and with some setting tweaks, you should be able to achieve smooth frame rates on even visually advanced contemporary titles.

Battery life is another area in which the new Surface Book crushes the competition. The original model lasted 15 hours 41 minutes on our rundown test. Microsoft promised and delivered better results this time around: The Surface book lasted an incredible 19:16 on the same media playback test with the Performance Base attached.

CONCLUSIONS

The Microsoft Surface Book's powerful hardware means illustrators and designers can render graphics quickly, and its detachable design makes it excellent for business collaboration, especially with visual- and interactive-based applications such as Microsoft SharePoint and Microsoft Power BI. It's also excellent for groups marking up PowerPoint presentations. And if your company has a Microsoft Surface Hub, you can pop the Surface Book off of the Performance Base and start a group meeting in just seconds via Miracast.

> " With setting tweaks, you should be able to achieve smooth frame rates on even visually advanced titles. "

Because of this version's hefty price, though, and the relative lack of big changes, it probably doesn't make sense for owners of last year's device to upgrade or for businesses to deploy Surface Books in large numbers—although your money gets you significant returns, should you need the extra power. Also, the Surface Book's lack of Ethernet and HDMI ports will likely give IT buyers some pause. And unlike most mobile workstations and high-end business-focused laptops, the Surface Book doesn't come with a fingerprint reader. Instead, users have to settle for Windows Hello.

Less expensive convertible tablets, such as the HP Spectre x360 13-w023dx, or speedy ultraportables, such as the Dell XPS 13 Touch, can get the job done for many users even without the power and storage of the Surface Book. If you want to stick with the Surface line, the Surface Pro 4 is another viable, more tablet-focused option, but it lacks some of the Surface Book's power and 3D capabilities. For those of you who prefer desktops, you may want to hold off making a purchase until the designer-friendly Microsoft Surface Studio makes its debut later in the year.

JUAN MARTINEZ, MATTHEW BUZZI

This 3D Printer Improves on Excellence

PC MAGAZINE EDITORS' CHOICE

You could think of the MakerBot Replicator+ desktop 3D printer as a souped-up version of the already excellent original Replicator, with considerable improvements in speed, build volume, and design. The Replicator+ also adds workflow features that are useful for the professional audience for which it's primarily intended, and it's quieter than the previous version. A very worthy successor, it's our Editors' Choice for high-end, general-purpose 3D printers.

MakerBot Replicator+

$2,499.00

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DESIGN AND FEATURES

The all-black Replicator+ is large, measuring 16.2 by 17.4 by 20.8 inches (HWD) and weighing in at 35 pounds, 6 ounces, so it's best kept on a table or bench of its own. With a rigid yet open frame, the 3D printer is open at the front, on the sides, and on top, permitting easy access to the print bed and easy viewing of prints in progress. Its build volume is 6.5 by 11.6 by 7.6 inches, 25 percent larger than its predecessor's. According to MakerBot, it's also 30 percent faster. The Ultimaker 2+ has symmetrical dimensions of 8.1 by 8.8 by 8.8 inches.

FILAMENT & EXTRUDER

The Replicator+ uses 1.75mm polylactic acid (PLA) filament, which MakerBot sells in 2-pound spools for $48 for standard colors and $65 for specialty colors, including neon and translucent. This is near the high end of the price scale for PLA, though similar in price to what you get from Ultimaker, which uses thicker (3mm) filament. The Replicator+ also supports MakerBot's new Tough PLA filament, a PLA composite that's sold in a bundle (three spools plus the required Tough PLA Smart Extruder+ for $379). Tough PLA is strong but flexible, a good choice for engineers and other professionals who need durability and consistency.

MakerBot Replicator+

PROS Easy to use. Very good print quality. User-friendly yet powerful software. Prints via USB, Ethernet, and Wi-Fi, and from a USB thumb drive. Safe design for an open-frame printer. Relatively quiet.

CONS Printer setup through MakerBot Mobile app can be tricky. Somewhat pricey.

FILAMENT DRAWER
The filament spool fits handily into the retractable drawer in back of the printer.

Loading filament is easy enough. Press Load Filament on the control panel, and when the extruder is hot enough, you are instructed to insert the end of the filament into the top of the extruder. When it's far enough in, gears will grab the filament and pull it further. Unloading it is just as easy.

The Smart Extruder+ is a cinch to install and remove by snapping or unsnapping it, as it's held in place by magnets. What makes the Smart Extrude+ smart? For one thing, it detects when you're out of filament and pauses the print; otherwise, you would have to scrap the print. It also sends notifications to the MakerBot Desktop software and to the MakerBot Mobile iOS or Android app.
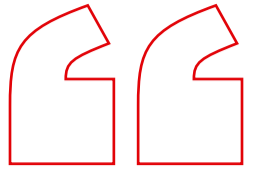
> **The Smart Extruder+ is a cinch to install and remove by snapping or unsnapping it, as it's held in place by magnets.**
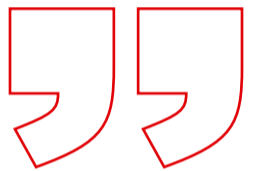
CONNECTIVITY & SOFTWARE

The Replicator+ has a range of connectivity choices. You can print from a computer over USB, Ethernet, or Wi-Fi, as well as over Wi-Fi from a phone or tablet via the MakerBot Mobile app. You can also print files from a USB thumb drive, which fits into a port to the right of the LCD. This is the most connection choices we've seen on a 3D printer.

STAY COOL
The Smart Extruder+ is strategically placed within the printer to minimize the possibility of someone being burned by it.

The new MakerBot Print app is as simple or powerful as you need it to be. You can easily open a file and launch a print job, but you can also store and manage multi-component projects, and export files to USB keys or other drives for printing out. Standard resolution is 200 microns; you can switch to High (100 microns), although Standard gives good quality.

MakerBot Mobile lets you control print jobs from a smartphone or tablet and now has built-in CAD support. You need the app to set up the Replicator+; it links via a peer-to-peer connection to the printer. I found it tricky to get it connected and set up.

PRINTING

I printed about 10 test objects with the Replicator, and print quality was good to excellent throughout. It did better than average in printing our geometric test object, the only minor flaw a slight bowing at the base. It did have a problem printing the upper lip on a jack-o'lantern, but not having tested the pumpkin with any other printer, it's hard to say how significant the misstep was.

3D OUTPUT
You can print from a computer over USB, Ethernet, or Wi-Fi, as well as over Wi-Fi from a phone or tablet with the MakerBot Mobile app installed.

I did get two misprints when trying to print the same file from a USB thumb drive, but considering that I had no such trouble printing the file (twice) when I sent it to the printer over a wired connection, I suspect that the file on the thumb drive may have been corrupted. All the other test objects printed without any problem.

SAFETY AND NOISE

With open-frame printers, there is always a risk that you or an onlooker could get burned by touching the hot extruder. But this is practically a non-issue with the MakerBot Replicator+. The extruder nozzle is set in back of the extruder assembly and is hard to reach from the front or sides, and from the top, it's blocked by the carriage that holds and moves the extruder assembly. This design should keep both adults and children about as safe as is possible with any open-frame printer.

Like most other 3D printers, the Replicator+ makes a range of sounds, from revving motors to weirdly electronic melodies. The printer is considerably quieter than the previous-generation Replicator, which I described as "louder than most" when I tested it.

CONCLUSION

The MakerBot Replicator+ is a very worthy successor to the Replicator Desktop, with improved speed, a larger build area, quieter operation, and a powerful software solution that lets you manage projects as well as individual files. The Replicator+ supports MakerBot's new Tough PLA filament, which is both strong and flexible. It inherits the Replicator's Editors' Choice as a high-end general-purpose 3D printer. (Although MakerBot has geared it to professionals, it's still simple enough for hobbyists or individuals.)

For professionals who want to print magnificently detailed high-resolution objects, the Formlabs Form 2 remains our Editors' Choice professional printer. Along with a higher price tag, the stereolithography-based Form 2 requires the use of sticky resins and nasty chemicals, and it falls well short of the Replicator+ in the convenience area.

TONY HOFFMAN

A Very Large Monitor That's Also Affordable

PC MAGAZINE EDITORS' CHOICE

Designed for everyday use, the HP Pavilion 32 Display is a massive 32-inch monitor priced for budget-minded consumers. It uses a Vertical Alignment (VA) panel to provide strong shadow detail, rich colors, and wide viewing angles. You don't get speakers or an adjustable stand with this model, but it does offer solid image quality and a generous selection of ports for $400, making it our Editors' Choice for affordable extra-large-screen monitors.

HP Pavilion 32 Display

$399.99

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DESIGN AND FEATURES

The Pavilion 32 features a 32-inch WQHD (2,560-by-1,440) panel with a non-reflective coating and a peak brightness of 300 cd/m2. It has a 60Hz refresh rate, a 7-millisecond (gray-to-gray) pixel response, a 3,000:1 native contrast ratio, and a 16:9 aspect ratio. The panel is framed by thin (half-inch), black bezels and is housed in a matte-black cabinet that weighs 18 pounds. It is supported by a rectangular stand that offers 26 degrees of tilt, but does not have height, swivel, or pivot adjustments, nor does it have integrated speakers. However, it does have a tray where you can stash your keyboard, and it comes with a VESA mounting plate that allows you to use an optional wall-mounting kit.

There's a wide assortment of I/O ports for such an affordable monitor. At the rear of the cabinet, facing outward, are two HDMI inputs, a DisplayPort input, a USB upstream port, and two USB downstream ports, one of which is a charging port. These are USB 2.0 ports rather than the faster USB 3.0 ports that you get with the slightly larger and significantly more expensive Philips Brilliance Curved UltraWide (BDM3490UC/27), but they are more than adequate for connecting peripherals like keyboards and mice.

Four buttons on the back of the cabinet's right side are used to turn the Pavilion 32 on and off and to navigate the on-screen settings menus. Picture presets include HP Enhance + (a noise-reduction feature with low, medium, and high settings), Text, Movie, Gaming, and Photo. There's also a Custom setting that lets you set your own Red, Green, and Blue intensity levels. In addition to Brightness, Contrast, and Sharpness settings, you can adjust Color Temperature settings, enable Dynamic Contrast, and choose one of three Black Stretch settings to enhance black levels.

As with the Envy 34c Media Display, HP covers the Pavilion 32 with only a one-year warranty on parts, labor, and backlight, whereas most manufacturers give you three years of coverage. You'll have to pony up an extra $44.99 for a three-year plan that includes next-day product replacement. Included in the box are HDMI, DisplayPort, and USB (upstream) cables.

PERFORMANCE

The VA panel displayed a nicely detailed WQHD picture in testing, but its green color accuracy was a little off kilter. As shown on the chromaticity chart below, red and blue colors (represented by the colored dots) are closely aligned with their ideal CIE coordinates (represented by the boxes), but green is slightly askew. Regardless, the panel delivered rich, evenly saturated colors in my tests and while displaying scenes from Marvel's Captain America: Civil War on Blu-ray. Tinting was not an issue, and the panel's ability to display dark blacks helped punch up colors.

In the DisplayMate 64-Step Grayscale test, the Pavilion 32 was able to display all shades of gray and provided good highlight and shadow detail in my test images. Viewing-angle performance was very good, with no color shifting or loss of luminance when viewed from a top, bottom, or side angle. This monitor's gaming performance will likely disappoint discerning gamers; noticeable motion blur appeared in my Crysis 3 (PC) and Grand Theft Auto V (Sony PlayStation 4) tests, and the

panel's 40.6-millisecond input lag (the time it takes for the monitor to react to a controller command) is relatively long compared with our fastest gaming monitor, the BenQ XL2430T (9.5 milliseconds). That said, most users will likely find the Pavilion 32 more than adequate for light gaming duty.

The monitor consumed 38 watts of power in my testing while set to Text mode and 34 watts while set to Movie mode (it doesn't offer an ECO mode). The BenQ PV3200PT used 57 watts (Standard mode), and the Acer Predator XB321HK used 58 watts. Both are 32-inch monitors, and both use In-Plane Switching (IPS) panels.
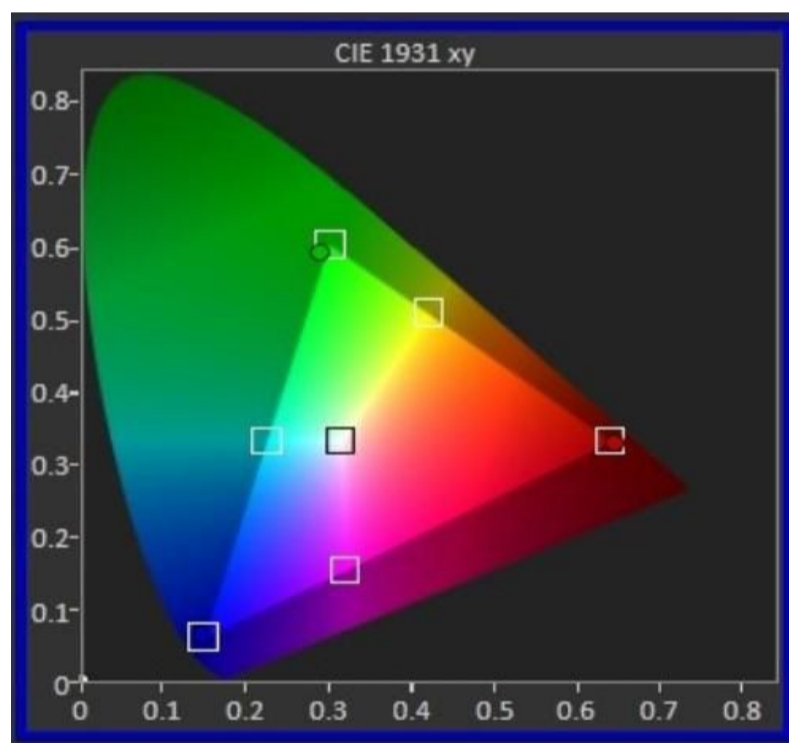
CONCLUSION

The HP Pavilion 32 Display is an outstanding deal as an extra-large-screen monitor that's affordable. Granted, $400 isn't exactly cheap, but compared with other extra-large-screen models that we've reviewed, such as the HP Envy 34c Media Display ($849.99) and Philips Brilliance Curved UltraWide ($899.99), it's a relative bargain. Just don't expect features like anti-screen-tearing technology or a curved display at this price.

The VA panel does a good job of displaying highlight and shadow detail, and although its green color accuracy is a bit off, it doesn't affect overall color and image quality. Wide viewing angles let you share the monitor without worrying about color shifting or a darkened picture. A three-year warranty would be nice, as would a more ergonomic stand, but neither gripe prevents the HP Pavilion 32 from earning our Editors' Choice for affordable extra-large-screen monitors.
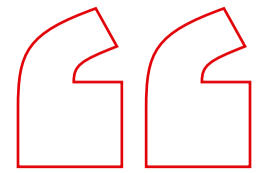
JOHN R. DELANEY

> **You don't get speakers or an adjustable stand, but it does offer solid image quality and a generous selection of ports for $400.**
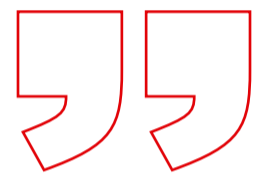
Apple MacBook Pro 13-Inch
(2016)

$1,499.00

● ● ● ● ○

A Worthy Upgrade for Multimedia Work

The new 13-inch Apple MacBook Pro is the least expensive model in Apple's high-end laptop line. The redesigned ultraportable resembles the 12-inch MacBook and features a 6th Generation Intel Core i5 processor with Intel Iris graphics and a Retina display with more lifelike colors. But what's really notable is the new chassis with a wider trackpad, two USB-C/Thunderbolt 3 ports, and a keyboard with butterfly switches similar to the MacBook's. The $1,799 version of the 13-inch MacBook Pro and the 15-inch model come with the line's most innovative feature—an auxiliary touch screen called the Touch Bar—but this entry-level model has traditional function keys. In any case, the base model is a worthy replacement for a five-year-old MacBook Pro or Air, but be prepared to buy a docking station or dongles to connect your peripherals. This is the way professional-class MacBooks will look and feel for the next few years, and longtime Mac users will have to adapt, like it or not.

DESIGN AND FEATURES

The new MacBook Pro line is available in two finishes: traditional matte silver and Space Gray (like our review unit). The all-aluminum body feels sturdy, as though it's carved out of a single block of metal. The Apple logo on the top lid of the Pro is now opaque and reflective silver, the same as it is on the MacBook. No longer will keynote speakers and professors have to stare into a sea of glowing Apple logos.

The 13-incher measures 0.59 by 11.97 by 8.36 inches (HWD) and weighs 2.99 pounds. If you have a laptop bag or a sleeve that fits the 13-inch MacBook Air, this one will fit inside too, as it's even thinner. Previous iterations of the thicker Apple MacBook Pro along with the MacBook Air continue on in their less-expensive, 2015-refreshed configurations on Apple's site for the time being, but if you want the new improved screen and faster processors, you'll need to embrace the new chassis design.

SOLID BUILD
The all-aluminum body of the new MacBook Pro feels sturdy, as though it were carved out of a single block of metal.

This MacBook Pro, as with the previous model, has a 13.3-inch, 2,560-by-1,600-resolution Retina display. It

has no matte-screen option, useful for quelling reflections in bright rooms. The display is rated at 500 nits, which is brighter than the 250- to 350-nit displays on competing laptops (for example, the HP Spectre 13 is rated at 300 nits, but the top dog Dell XPS 13 Touch is rated at 400 nits), so it could theoretically overpower those reflections with internal light. The MacBook Pro does look brighter than rivals, especially when the screen backlighting is cranked all the way up.

The laptop's screen has a DCI-P3 color gamut, which displays truer-to-life colors than the last MacBook Pro's display, which is closer to the sRGB color space. What this means is that you'll be able to see more colors on the screen, which is, of course, important to animators, illustrators, photographers, and videographers. For example, reds and greens look brighter and more vibrant on the updated Retina display. You'll have to jump up to pricier laptops such as the Dell XPS 15 Touch to find DCI-P3 color fidelity in a Windows-based competitor.

The display scales the user interface and icons to 1,440-by-900 resolution and uses the extra pixels to smooth text so letters and numbers look sharp.
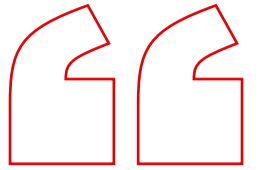
> **This is the way professional-class MacBooks will look and feel for the next few years, and longtime Mac users will have to adapt.**
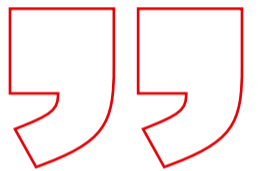
ALL IN THE FAMILY
The new Apple MacBook Pro has a familial resemblance to the 12-inch Retina display MacBook.

Competitors have higher-resolution screens; the Dell XPS 13 Touch's, for example, is 3,200 by 1,800, and the display on the New Razer Blade Stealth is 3,840 by 2,160 (4K). In any case, the MacBook Pro is ready to display and edit scaled 4K video captured with the Apple iPhone 7 or D-SLRs compatible with the DCI-P3 color gamut. To edit 4K video in native resolution, the MacBook Pro drives one 5K monitor or two 4K displays simultaneously. Unfortunately, you can't use the 27-inch iMac as an external 5K display, because the iMac doesn't support Target Display mode the way non-Retina-display iMacs do.

Perforated speaker grilles flank the keyboard. Last year's MacBook Pro hid the speakers in the side cooling vents. The MacBook Pro has excellent audio separation, with the left and right channels projecting distinct sound that make the stereo speakers seem like they are a few feet apart. There isn't a whole lot of bass, but there is some low end, and the speakers can fill a medium-size room with distortion-free music or movie sound. The previous model was no slouch, but the directional speakers work better in environments where you don't have a flat surface to bounce the sound back to your ears (such as when using the MacBook Pro on your lap).

As mentioned above, more expensive MacBook Pro models (starting at $1,799) come with Apple's new Touch Bar, which replaces the function keys with a wide touch screen with an integrated Touch ID sensor. The Touch Bar adapts to different functions in each app you use, but on this lower-priced model, you get a regular version of the keyboard with traditional function keys. We'll test the Touch Bar feature extensively when we review the 15-inch MacBook Pro.

Speaking of the keyboard, it uses second-generation butterfly switches. They are similar to those on the 12-inch MacBook, but they feel as if they have a little more travel. The keystroke is still very shallow compared with that of most laptops' keyboards, so heavy typists will want to give it a test drive before committing.

KEY TRAVEL
The keyboard has a very shallow keystroke compared with a traditional laptop keyboard's. Heavy typists will want to give it a test drive first.

The keys are admittedly better at detecting off-center key presses than those on a traditional keyboard. You can definitely feel the difference, but I got used to it fairly quickly. When I switched back to a five-year-old MacBook Pro after typing this review on the new laptop, the older keyboard felt like its keystrokes were too long. Backlighting helps you find your way around the keyboard in a darkened room, and an ambient light sensor adjusts the brightness to match the environment.

The trackpad is 46 percent larger than the previous model's. It's almost large enough to be a drawing surface, but unfortunately, it's not designed to be used with the Apple Pencil for the iPad Pro. Like the MacBook and the previous generation MacBook Pro, this system uses Force Touch technology for haptic feedback, so it feels like you're clicking physical mouse keys under the trackpad. It responds quickly to multitouch gestures, and you can also add a little more pressure to your finger presses to Force click for additional contextual functions in many apps. In Google Chrome, for example, a Force click brings up standard dictionary and Wikipedia lookup, but the same gesture doesn't do anything in, say, Microsoft Word.

If you opt to use an external wired keyboard or mouse, you may need to consider a docking solution, as the MacBook Pro now uses USB-C/Thunderbolt 3 ports exclusively. There are two USB-C/Thunderbolt 3 ports on the left side of the laptop and a 3.5mm headset jack on the right side. That level of connectivity is similar to what you'll find on the HP Spectre 13, which has two USB-C/Thunderbolt 3 ports and one USB-C—only port. Both USB-C/Thunderbolt 3 ports work with the included AC adapter to charge the laptop. It's not as klutz-friendly as the older MagSafe charging port, but it's an industry standard that's being adopted by PC makers like Acer and HP.

Apple says that the USB-C/Thunderbolt 3 ports can pass signals though adapters to DisplayPort, Gigabit Ethernet, HDMI, Thunderbolt 1 or 2, PCIe, USB, and VGA, but that would mean a lot of dongles (or a fat travel dock) if you regularly connect to a lot of different peripherals. On the plus side, if you have a third-party USB-C/Thunderbolt 3 monitor or desktop dock, you can just use one cord to connect to the rest of your peripherals. Speaking of Thunderbolt, you can purchase a Thunderbolt 2–to–Thunderbolt 3 adapter from Apple for $49 to use older peripherals such as the Apple Thunderbolt Display or hard drives.

I'd rather have at least one USB 3.0 Type-A port. The New Razer Blade Stealth, which is thinner than the MacBook Pro (0.51 inch), includes one, as well as an HDMI port, and the Dell XPS 13 Touch is only barely thicker (0.6 inch), but has one USB-C/Thunderbolt 3 port and two USB 3.0 ports. Be ready to buy plenty of new adapters if you have a lot of legacy peripherals like drawing tablets, wired printers, displays, other input devices, and external storage.

The MacBook Pro comes with 8GB of RAM and a 256GB solid-state drive (SSD), though you can opt for up to 16GB of RAM and up to 1TB of SSD space at purchase. RAM can't be upgraded in the future, so choose wisely. As on all Macs, several apps come preinstalled, including iTunes, iBooks, Keynote, Numbers, Pages, and Photos. The system comes with a one-year warranty with 90 days of phone technical support, though you can purchase AppleCare+ ($249) for three years of extended warranty coverage. You can also receive Genius Bar support at an Apple Store for free after the warranty ends, but you'll likely have to pay for repairs.

PERFORMANCE

Because of its Intel Core i5-6360U processor with integrated Intel Iris 540 graphics, the MacBook Pro showed strong performance on our multimedia tests, including HandBrake (2 minutes, 10 seconds), Photoshop (4:23), and CineBench (306 points). It placed a close second to the New Razer Blade Stealth on the Handbrake test (2:03), and was in competitive company on CineBench and Photoshop.

Its Iris graphics helped the MacBook Pro achieve top frame rates on our gaming tests, both Heaven (33 frames per second, or fps, at 1,366 by 768 with the graphics quality set to Medium, and 14fps on Ultra at native resolution) and Valley (35fps on Medium, 14fps on Ultra). Those translate into playable frame rates at the lower resolution, and at least 10fps faster than any other competitor on all four 3D tests. This means that after you've spent all day working on the MacBook Pro, you'll be able to play 3D games at moderate quality settings.

The MacBook Pro easily beat Apple's claims of 10 hours of battery life, lasting almost 12 hours on our rundown test (11:53). That's longer than the MacBook (11:37) or the 2015 version of the MacBook Pro (11:10), but the all-time leader is still the MacBook Air (17:36). Some Windows laptops are longer lasting, too, like the Asus ZenBook 3 (12:07) and the Microsoft Surface Book (15:41), but most have less stamina, like the the Dell XPS 13 Touch (7:07), the HP Spectre 13 (8:36), and the New Razer Blade Stealth (9:20).

CONCLUSION

The MacBook Pro 13-inch is impressive, with improved screen quality and battery life over the previous model, and its use of 6th Generation Intel processors helps boost performance as well. Troubling, though, is the move to USB-C/Thunderbolt 3 and the removal of onboard ports for Thunderbolt 2 and USB 2.0/3.0 (Type-A) devices. On the bright side, other PC makers are adopting USB-C and Thunderbolt 3, so many more compatible peripherals will be available soon. But should you buy one?

If you're looking for a new laptop for multimedia work, it should be on your short list. But if you have a lot of legacy peripherals, you're probably better off with a system with more versatile connectivity, like the Dell XPS 13 Touch, our Editors' Choice for high-end ultraportable laptops. If you don't want to make the move to Windows, however, last year's 13-inch MacBook Air and MacBook Pro are still available at 2015 prices.

The 12-inch MacBook will continue to be updated and will eventually become the base Apple ultraportable, though at $1,299, it qualifies as a high-end ultraportable in our eyes. If you need a larger screen with discrete graphics and a faster processor, see our review of the 15-inch MacBook Pro with the new Touch Bar at PCMag.com.

JOEL SANTO DOMINGO

Doxo Is Your Free Digital Filing Cabinet

Doxo is a bill payment center and digital filing cabinet for all your important household paperwork. It's a very good online app for anyone trying to go paperless, because it imports and saves bank statements, credit card statements, and other paperwork from connected accounts. It also serves as a bill payment hub, letting you manage payments to a wide variety of service providers, including household utilities. (Don't confuse Doxo with online family organizers, however, which also help you manage day-to-day occurrences such as events and to-do lists.) As a personal finance app with digital filing cabinet built-in, Doxo performs well, is reliable, and is worth checking out.

Doxo

Free

● ● ● ◐ ○

GETTING STARTED

Signing up for a Doxo account involves giving an email address, setting a password, and providing your ZIP code. The ZIP code helps Doxo find relevant service providers that you'll be able to pay. You don't have to give your name or other identifying information.

Doxo takes several measures to help keep your documents protected. Every login consists of not only a username and password entry but also a security question and image. Each stage of the login process appears on a new screen, too, which is tough for hackers to crack. The site uses bank-level security: RSA 2048 encryption with an AES-256 symmetric key. Doxo's security policy outlines additional details.

Once you've created an account, you can customize it. For example, you can create folders for housing
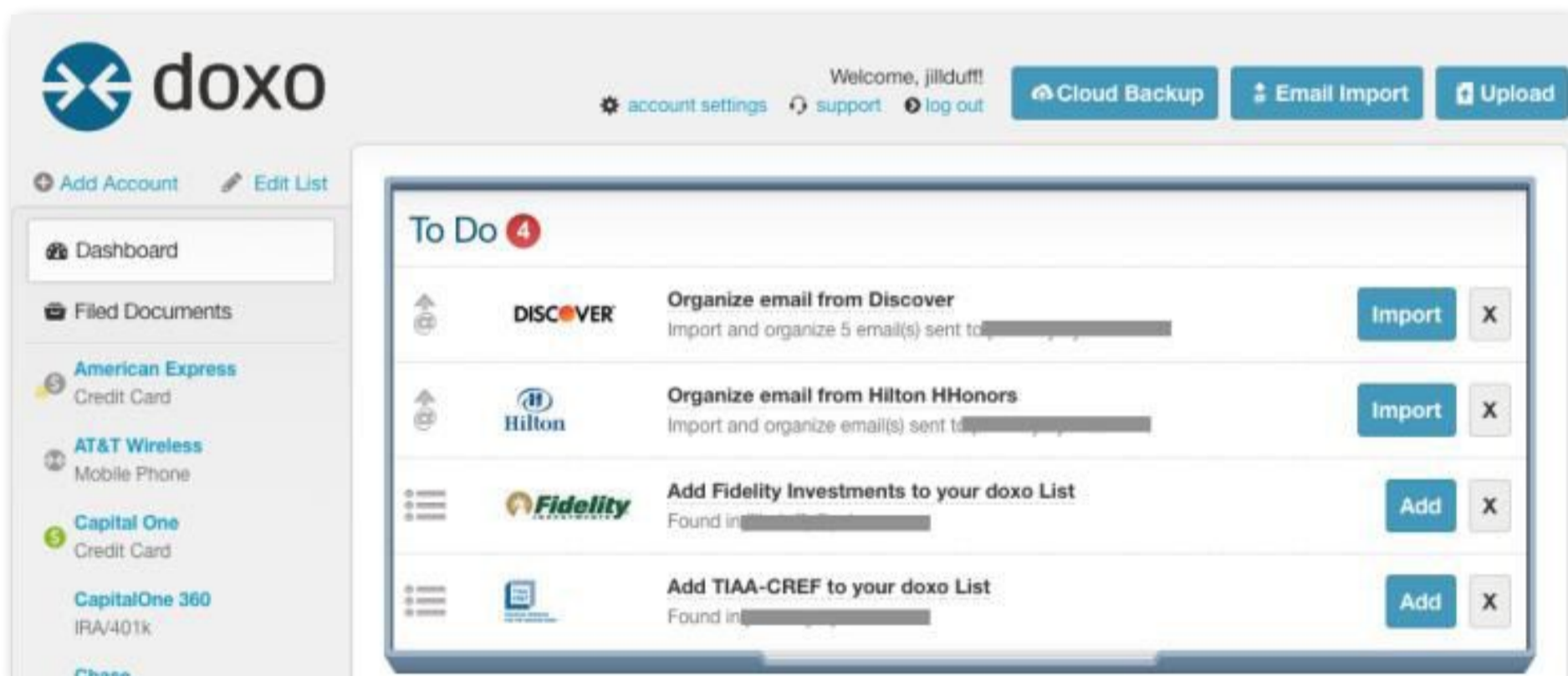
different kinds of documents. Some documents you might want to scan and upload yourself, such as deeds to property, warranties, and birth certificates. Other documents can be imported automatically when you connect Doxo to supported accounts.

The types of accounts that are supported are vast. They include financial institutions, frequent flyer

programs, phone service providers, and email accounts. For example, if you connect to your AT&T account, Doxo pulls and saves statements for you each month. If you connect to an email account that often receives bills sent by providers, those can get filed into Doxo as well.

It's a great service, especially for those accounts that don't save a history of your paperwork. PayPalFree at iTunes Store is one such offender—only Business and Premier PayPal members get a history of their statements in their accounts. Everyone else gets a monthly statement emailed to them but no saved history. Connect Doxo to your email account, and you can import and save all those statements.

When you add a provider to your Doxo account, you see the company's name, address, website, support phone number, support email address, Twitter handle, and even its stock ticker symbol. That information comes in handy when you spot something wrong with your accounts and want to get in touch with the company quickly.

I like that Doxo lets you create folders and sections (groups of folders) for whatever you want to store. For example, you might want to upload copies of your
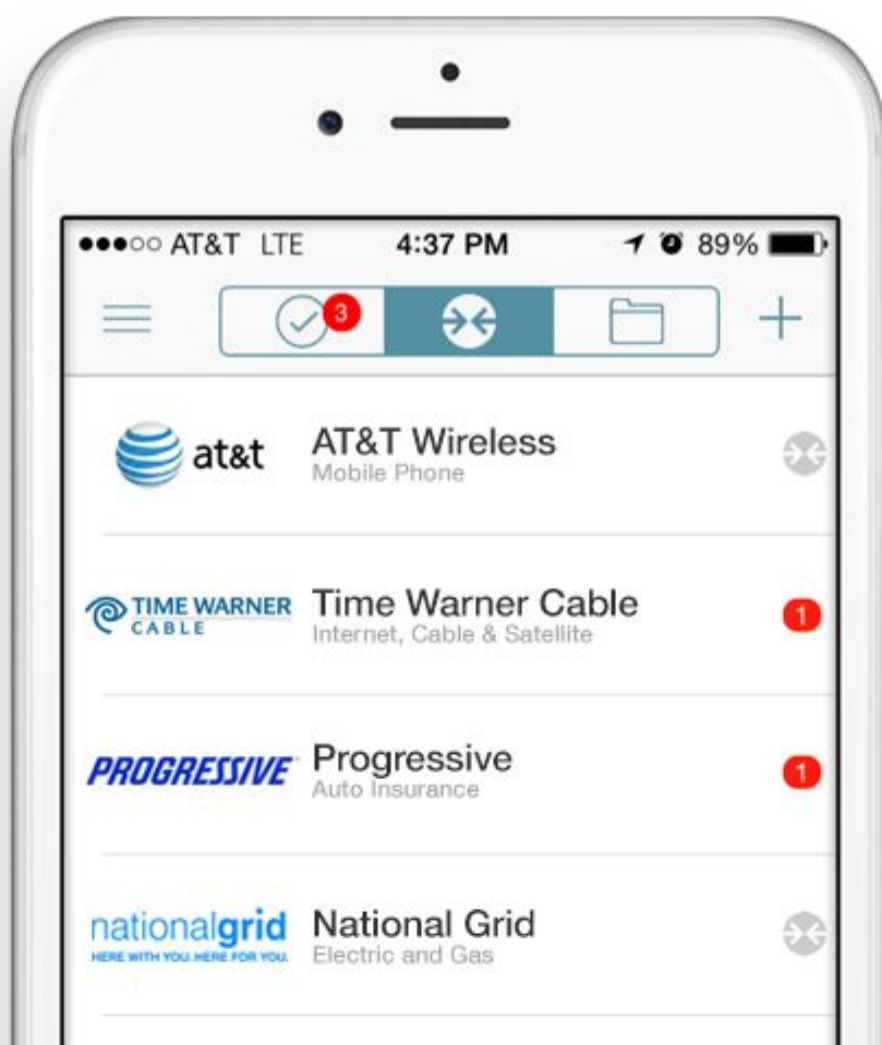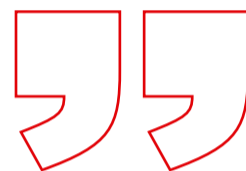
PAYING BILLS
Add providers who bill you to Doxo, and it will import and save your statements—no paperwork needed.

medical history, your last will and testament, or paperwork related to your job.

I expected Doxo to have the expediency of the personal finance tool Mint (also free), but it doesn't. Mint gets read-only information almost instantly when you connect to an account. Doxo doesn't work nearly as fast.

BILL PAYMENT AND FREE VS. FEE

Bill payment has become a central component of Doxo, and for some, a leading reason to use it, because you can pay or manage multiple bills from one place. Often it's free. If the provider is in Doxo's network, and you've connected to that provider, and you use your bank account to pay (rather than a credit card), there's no extra charge. But sometimes the payment comes with a small fee, usually around $2.99 or about 3.5 percent of the payment amount if you use a credit card or if the provider is not in Doxo's network.

Another online bill payment hub, Mint Bills, has a similar payment structure, although its fees are a little lower. When you use your bank account to pay a supported provider, it's free. Use a credit or debit card, however, and the transaction fee is 2.49 percent with a minimum of $2.49.

In Doxo, you don't know until the final verification screen whether your bill payment will incur a charge or how much, and whether you can get around it or reduce it by paying through a different method. That final verification screen shows the breakdown of the payment, any service fees attached, and the date the bill will be paid. When there is a service fee, there will be a note about why it's there and when such fees are charged.

When I tried to pay my American Express bill, I couldn't even authenticate the service. Doxo asked for the credit card number and kept telling me it was invalid (it definitely wasn't). So I tried making a payment to a different credit card, and that one went smoothly. Doxo asked me how much I wanted to pay, and sure enough, on the payment page, I saw the amount, fee, explanation of the fee, and total.

The account I paid was not connected to Doxo, meaning I hadn't authenticated the account directly. Because of that, the payment process wasn't at all convenient. I couldn't see any information about my account, such as the total balance, minimum payment due, or when payment was due.

If the account is connected, however, you do see more information. Due date and amount due are visible, as is an option to set up auto-payment or auto-schedule of payments (subject to a maximum dollar threshold). Alongside the
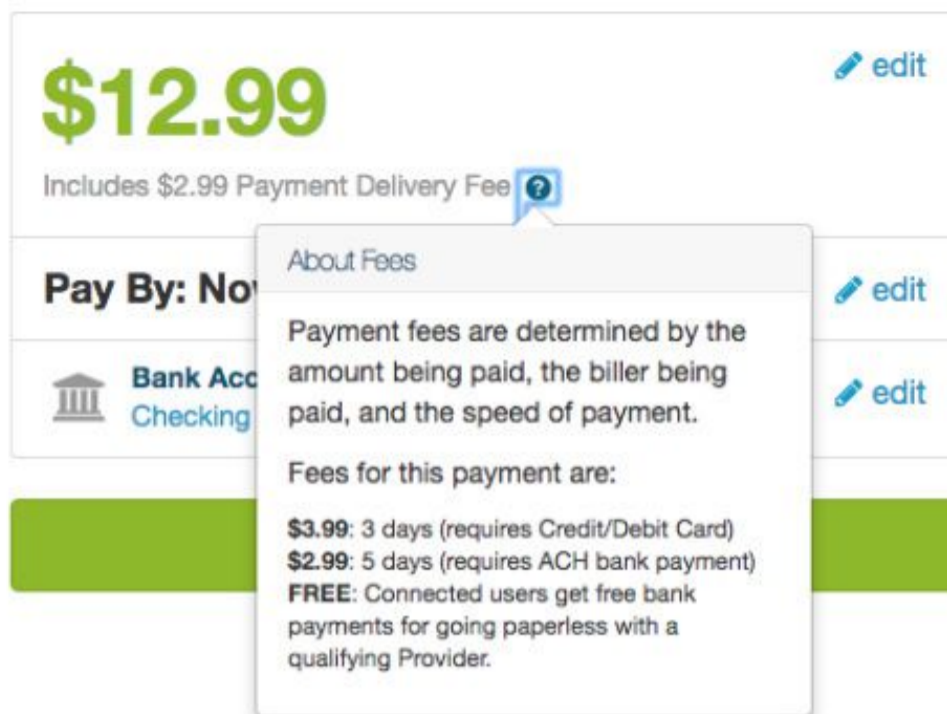
$12.99 ✏ edit

Includes $2.99 Payment Delivery Fee ❓

About Fees

Payment fees are determined by the amount being paid, the biller being paid, and the speed of payment.

Fees for this payment are:

$3.99: 3 days (requires Credit/Debit Card)
$2.99: 5 days (requires ACH bank payment)
FREE: Connected users get free bank payments for going paperless with a qualifying Provider.

Pay By: No ✏ edit

Bank Acc ✏ edit
Checking

payment information is a preview image of your statement, which you can open for additional information.

I mentioned that Doxo is not an online family management tool, although such websites do exist. Cozi is my favorite among them, and AboutOne is another example. Neither Cozi nor AboutOne supports bill payment or bill management. Rather, they're focused on other aspects of family and household management.

PAYMENT HUB WITH A PAPERLESS PUSH

Doxo has a unique position in the realm of personal finance management, letting you pay many bills from one central location as well as store all the statements associated with those accounts. The addition of a filing cabinet service, where you can upload other important family documents, truly makes it different from any other app out there. It's worth trying if you have a need for both a central bill payment system and electronic paperwork storage.

While Doxo doesn't compare neatly and directly to Mint, our Editors' Choice among personal finances apps, the related Mint Bills (which has not been reviewed yet) offers a similar payment hub to Doxo's but with slightly lower fees on average. Mint Bills doesn't have any additional tools to help you go paperless, though. If becoming paperless is a goal in addition to managing bills, give Doxo a try.

JILL DUFFY

This Episodic Batman Video Game Tells a Great Story

PC MAGAZINE EDITORS' CHOICE

The point-and-click adventure-game genre has seen a resurgence in popularity since Telltale Games began combining its excellent storytelling chops with popular comic-book properties. 2012's The Walking Dead game, the tale of a surrogate father protecting a child from zombie hordes, tugged on heartstrings, while 2013's The Wolf Among Us, a title based on the classic Fables comics, engrossed gamers with its hard-boiled theatrics set in a fairy-tale ghetto. But Telltale's newest comic-based title, Batman: The Telltale Series, really shows what the developer can do when it merges an action-focused license with its successful story-driven formula.

Batman: The Telltale Series (for PC)

$24.99

●●●●○

The PC game delivers the fisticuffs, gadgetry, and detective work you'd expect from Bruce Wayne's masked persona, while once again giving you the option to shape the narrative in both large and subtle ways.

WELCOME TO GOTHAM CITY

Like The Walking Dead and The Wolf Among Us, Batman: The Telltale Series has an unfolding story that plays out over the course of five episodes. The entries are being released over several months' time, so think of the $24.99 season pass as a preorder for everything other than the introductory episode, "Realm of Shadows." Now, I'm usually adamant about not preordering anything related to video games, as the industry is rife with anti-consumer ridiculousness, but Telltale Games has a history of delivering high-quality products—though sometimes a bit later than expected.

Should you plunk down some bills on the game, you'll find that Batman: The Telltale Series is the best Batman-related property to come along in some time. Unlike Batman: Arkham Knight, a broken mess of a PC game, and "Batman v. Superman: Dawn of Justice," a film that portrayed the Dark Knight as a snarling madman, Batman: The Telltale Series dives into the familiar lore, shakes things up, and emerges as a title that dissects the ideas of compromise and hero worship.

It's a novel approach, as most Batman video games

HAVING A DIALOGUE Depending on the situation, you can reply to non-player characters with aggression, with tact, or not at all.

SoftGozar.com

focus on punching Gotham's mooks as hard as possible. Sure, Batman: The Telltale Series gives you ample opportunity to do that via Quick Time Events, but it also serves up copious amounts of Bruce Wayne, as he helps his good friend, District Attorney Harvey Dent, become Gotham's mayor and to defend the Wayne family name when nasty revelations surface.

At times, the narrative leans a bit too heavily on existing Batman tales—Christopher Nolan's "Batman Begins" and Grant Morrison's "Batman" spring to mind—but the rising tensions between characters override any sense of familiarity. The investigation, and the twists and turns that come with it, make Batman: The Telltale Series one of the best Telltale Games titles to come along since The Wolf Among Us. I won't spoil anything here for the sake of preserving the surprises, but the script builds and builds, overcoming the opening episode's uneven first half.

THE CHOICE IS YOURS

As with TellTale Games' other adventure video-game titles, Batman: The Telltale Series lets you alter the narrative through the dialogue- and scenario-based choices you make. Depending on the situation, you can reply to non-player characters (NPCs) with aggression, with tact, or not at all.

For example, if you react with extreme violence, you may initiate a fight that could've been avoided or damage a blossoming relationship. The genius of the game is that NPCs remember your approach, which determines how they interact with you in the future. Actions have impact and consequences.

Only three episodes have been released so far, but the "choose your own adventure"–style narrative structure reaches its apex in the series' second entry, Children of Arkham. The story's climax gives you the option to save one of two people who are important to the story and Bruce Wayne. Apparently, your choice determines which new Gotham threat arises.
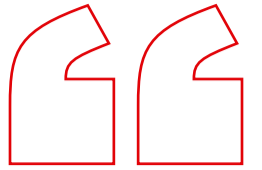
> **You'll find that Batman: The Telltale Series is the best Batman-related property to come along in some time.**
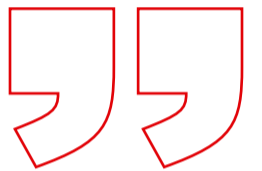
Telltale Games once again incorporates puzzles into its gameplay, but this time the brain-teasers are better integrated into the story. That's due to the license; Batman is the World's Greatest Detective, so you fully expect him to analyze crime scenes. The Walking Dead's puzzles, on the other hand, feel as though they exist simply because they're genre staples.

Batman: The Telltale Series' puzzles aren't particularly difficult, but successfully completing them by linking the correct pieces of evidence gives you insight into how a grisly murder took place without a character awkwardly spouting two minute's worth of exposition. And it's just cool to watch the events visually play out in Batman's mind.

Batman's analytical mind also comes into play when approaching certain brawls. Telltale Games doesn't give you direct control over the action, but the developers sometime lets you plot attacks before engaging the enemy. The armed thug who's standing in the corner? You could take him out by attacking from a ventilation shaft, or sneaking by up from behind him to execute a knockout move. These options simultaneously add to the action, characterization, and strategy.

COMPUTER HACKING

Batman: The telltale Series isn't a very demanding title—you can get by with a 64-bit Windows 7 PC that has a 2.4GHz Intel Core 2 Duo CPU, Nvidia GTS 450 GPU, and 3GB of RAM—but it occasionally stuttered on my gaming rig that possesses specs that far surpass those numbers. Oddly enough, the graphics hitching didn't occur during action sequences; it appeared during quieter, character-centric moments.

SOME THINKING, SOME FIGHTING
Batman: The Telltale Series is a point-and-click adventure game, but Telltale Games uses Quick Time Events to deliver the action.

Likewise, the character models could use improvement. While they are drawn in an attractive, comic-book style, they often walk with a slow, awkward gait. On one occasion, I spotted a secondary character speaking without moving her lips. These visual gaffes pulled me out of the otherwise well-constructed universe.

On the upside, Batman: The Telltale Series introduces a new multiplayer experience to the developer's choice-driven games: Crowd Play. It lets multiple local players vote on decisions using their smartphones or tablets. Considering the game's cinematic nature, it's a much welcome—and incredibly fun—feature that lets the participants step into The Dark Knight's reinforced boots.

BAT TO BLACK

At the time of this writing, Batman: The Telltale Series' third episode, "New World Order," had just dropped. It reveals a huge twist that dramatically alters a relationship, and it delivers a hell of a cliffhanger that makes me yearn for episodes four and five. Telltale Games has stated that the remaining story will arrive before the end of the year, which would be a true holiday miracle.

Should Telltale Games continue its strong storytelling in these upcoming episodes, the wait will be well worth it. Batman: The Telltale Series gives Bat-fans a version of the character, and of Gotham City, that haven't been previously explored in video game form. As a result, Batman: The Telltale Series feels fresh, despite cherrypicking familiar elements from decades of Batman history. Telltale Games has crafted one of my favorite Batman incarnations since Nolan's "The Dark Knight," and I'm eager to see where the creative team takes Bruce Wayne in the final episodes.

JEFFREY L. WILSON
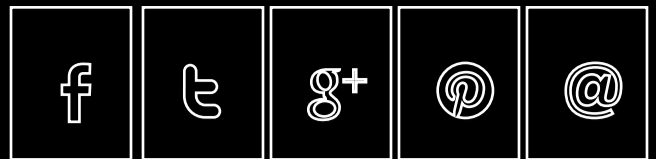
BEST
PRODUCTS OF 2016

It's been a pretty typical year for PCMag's dedicated staff of analysts and reviewers, testing and rating a veritable mountain of products. As you'd expect, the vast majority of those products are just okay, and we always come across a few that are truly the pits. Thankfully, the tech industry also provides us with some genuinely fantastic specimens to rave about.

Once again, we're narrowing down those best-of-breed products to one list—the top 100 laptops, tablets, phones, gadgets, apps, games, and more. You might think that's easy, but sometimes a couple great devices conquer a category. Rather than settling for a tie, we put the thumbscrews to the staff until they pick the one and only, the very best contender in that arena, the gladiator that stands above all the rest.

For 2016, we've got 100 devices and services across 16 categories. 84 of them have earned our coveted Editors' Choice Award. To be included, the product's review had to have been published by PCMag between November 1, 2015 and November 14, 2016. Scores on the majority of products are 4 or 4.5, but eight standouts managed to snag a perfect 5—a true rarity in PC Labs.

So prepare your holiday shopping list with a look at the best products we've reviewed this year.

BY PCMAG STAFF

STORAGE

LAPTOPS
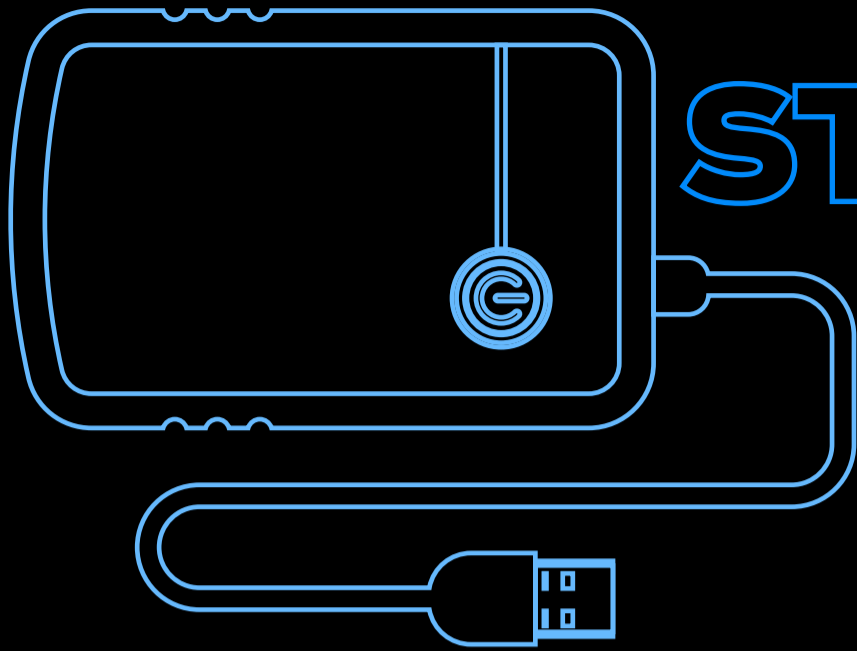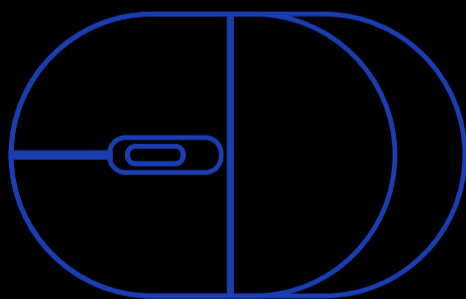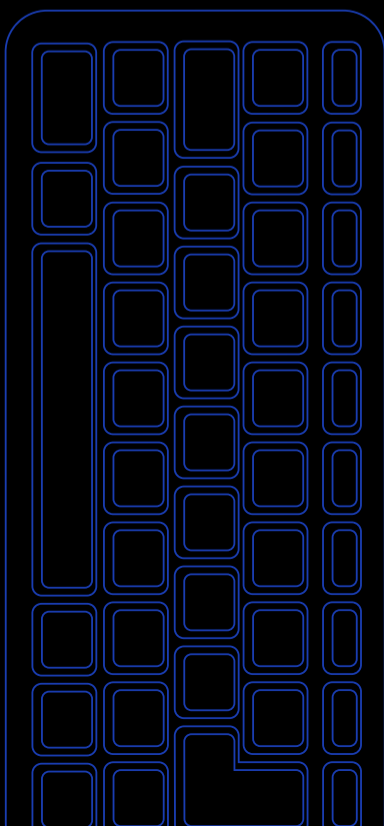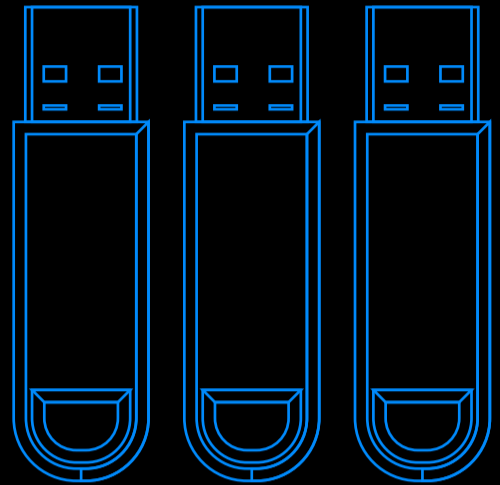
DESKTOPS

PC PERIPHERALS

DESKTOPS

MIDRANGE /
VELOCITY MICRO VECTOR Z35

An ideal midrange desktop with a well-made, easy-access case and the power and versatility to serve as a home office PC, media center, or gaming rig. Without going overboard on price, you get a good everyday computer that has more-than-sufficient gaming performance, too.

EC
●●●●○
$1,079

EC
●●●●○
$1,999

BUDGET /
SHUTTLE XPC NANO

An inexpensive and highly appealing choice if you want to connect a PC to an HDTV, have a desire to tinker, or both. This hard-to-beat combination of size, price, and feature set is your best bet for a super space-saver.

ALL-IN-ONE/
TOUCH-SCREEN /
DIGITAL STORM AURA

A pricey but innovative all-in-one gaming PC that delivers excellent performance, many customization options, and full upgradability. Its huge curved screen and fast internal components should appeal to those who don't want to build their own system but want to be able to tinker.

EC
●●●●○
$279

SoftGozar.com

DESKTOPS

BUSINESS/WORKSTATION /
DELL PRECISION TOWER 3000 SERIES (3620)

The MSI GT72 Dominator Pro G-1438 is a 17-inch system with plenty of power to push intense visuals to its 1080p display. With a top-end Nvidia video card, Intel Core i7 processor, and room for upgrades, this system performs like a high-end laptop, but it comes at a midrange price.

EC
●●●●○
$629

GAMING /
FALCON NORTHWEST TALON (2016)

Though more conservatively designed than other top-tier gaming desktops, this PC has impressive hardware at the highest configurations that helps it drive VR and 4K gaming smoother and faster than the competition. It looks and feels high-end without appearing gaudy or aesthetically loud, and it has performance to match.

EC
●●●●○
$1,771

STICK PC / INTEL COMPUTESTICK (CORE M3)

Powered by a Core m3 processor, this tiny computer excels as a fully functional Windows PC that fits in your pocket and uses a TV as a display. It can be used nearly anywhere and is perfect for a low-powered setup you might need to tear down and move quickly.

EC
●●●●○
$129

LAPTOPS

ULTRAPORTABLE /
NEW RAZER BLADE STEALTH (LATE 2016)

Super sleek, delivering top-notch performance and battery life, and loaded with useful extras, this Kaby Lake CPU–equipped ultraportable laptop is even better than its highly rated predecessor. A plus: You can hook it up to the Razer Core external graphics processor.

EC
●●●●◐
$999.99

EC
●●●●○
$179.99

DESKTOP-REPLACEMENT /
DELL INSPIRON 15 3000 SERIES (3558)

A capable desktop-replacement laptop with solid specs, plenty of storage, and long battery life—all for less than $350. It's priced like a no-frills laptop, but it still has a touch screen, a 1TB hard drive, and almost 9 hours of battery life.

BUDGET / DELL INSPIRON 11 3000 SERIES (3162)

A competent performer with all the basic features and functionality you want in a budget ultraportable laptop, plus 64-bit Windows 10, long battery life, and a sturdy build. It's our top choice for basic Windows PCs.

EC
●●●●○
$229.99

LAPTOPS

GAMING / HP OMEN 17

The Omen 17 brings Nvidia's Pascal graphics, a 4K display, plenty of storage, excellent performance, and even a slim and appealing design to the midrange price tier, making it a good large-screen gaming laptop that is also a good value.

EC
●●●●○
$1,299

EC
●●●●○
$1,394.10

BUSINESS /
LENOVO THINKPAD X1 YOGA

This laptop draws from the best aspects of our favorite Lenovo business laptops, offering a slim convertible design, a comfortable keyboard, long battery life, and enough ports and features to help you stay productive at the office or on the road.

LAPTOPS

CONVERTIBLE-HYBRID /
HP SPECTRE X360 13-W023DX

Thanks to its 7th Generation Intel Core processor, this is a powerful, high-end convertible-hybrid laptop that delivers strong performance and outstanding battery life for its price.

EC
$1,049

EC
$279.99

CHROMEBOOK /
ACER CHROMEBOOK 14

This chromebook gives you most of the features and quality you need from a basic laptop, plus extra niceties, including a metal body and almost 12 hours of battery life. It's an excellent choice if all your data and apps exist in the cloud.

PC PERIPHERALS

MONITOR /
DELL ULTRA-SHARP 24 INFINITYEDGE MONITOR U2417H

Dell's feature-loaded UltraSharp 24 InfinityEdge Monitor U2417H delivers accurate colors, crisp grayscale reproduction, and wide viewing angles. It's a sleek and stylish mainstream monitor that won't stress your utility bill or your bank account.
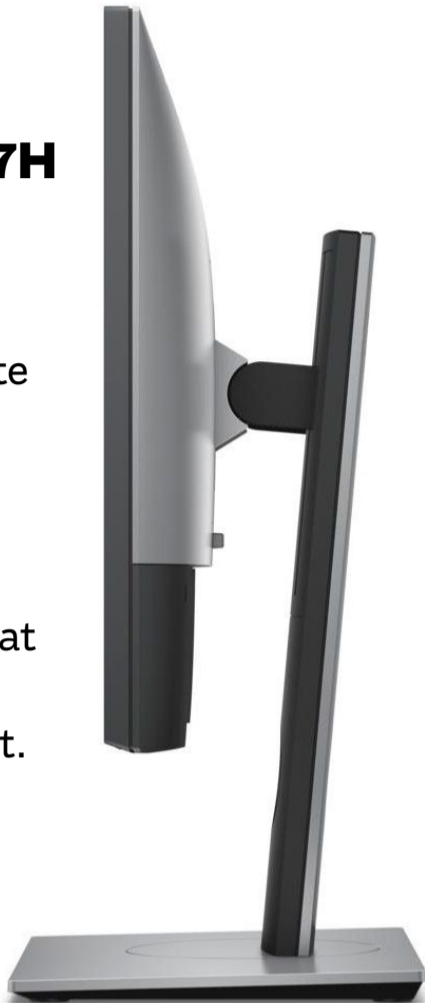
EC
●●●●○
$349.99

KEYBOARD / LOGITECH G610 ORION BROWN

Although it packs few fancy features, the G610 Orion Brown delivers simple, reliable performance that mechanical keyboard enthusiasts will appreciate.

EC
●●●●○
$119.99

STORAGE

EC
●●●●◑
$89.95

MOUSE / EVOLUENT VERTICALMOUSE C RIGHT WIRED

The C Right Wired is a stylish update to a comfortable and highly customizable ergonomic mouse. It might even make you a vertical-mouse convert.

EXTERNAL HARD DRIVE / SEAGATE BACKUP PLUS PORTABLE DRIVE

This drive gives you 4 terabytes of speedy storage you can take with you, as well as a personal cloud, all for a very reasonable price.

EC
●●●●○
$149.99
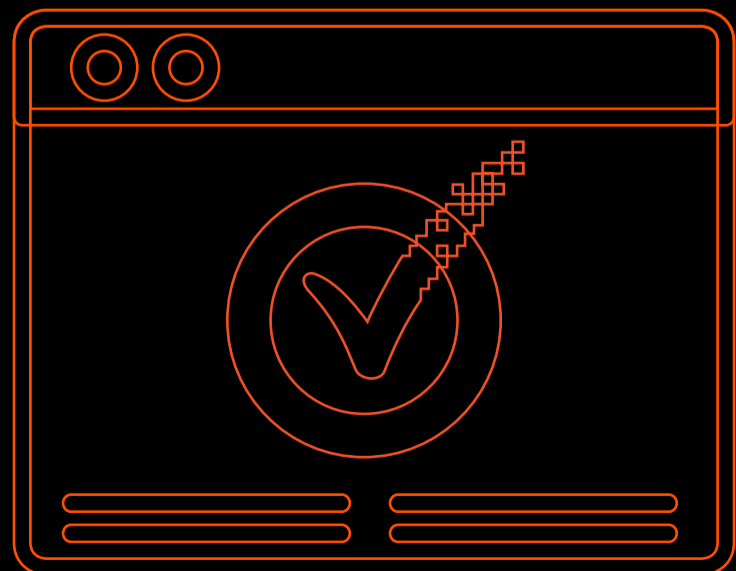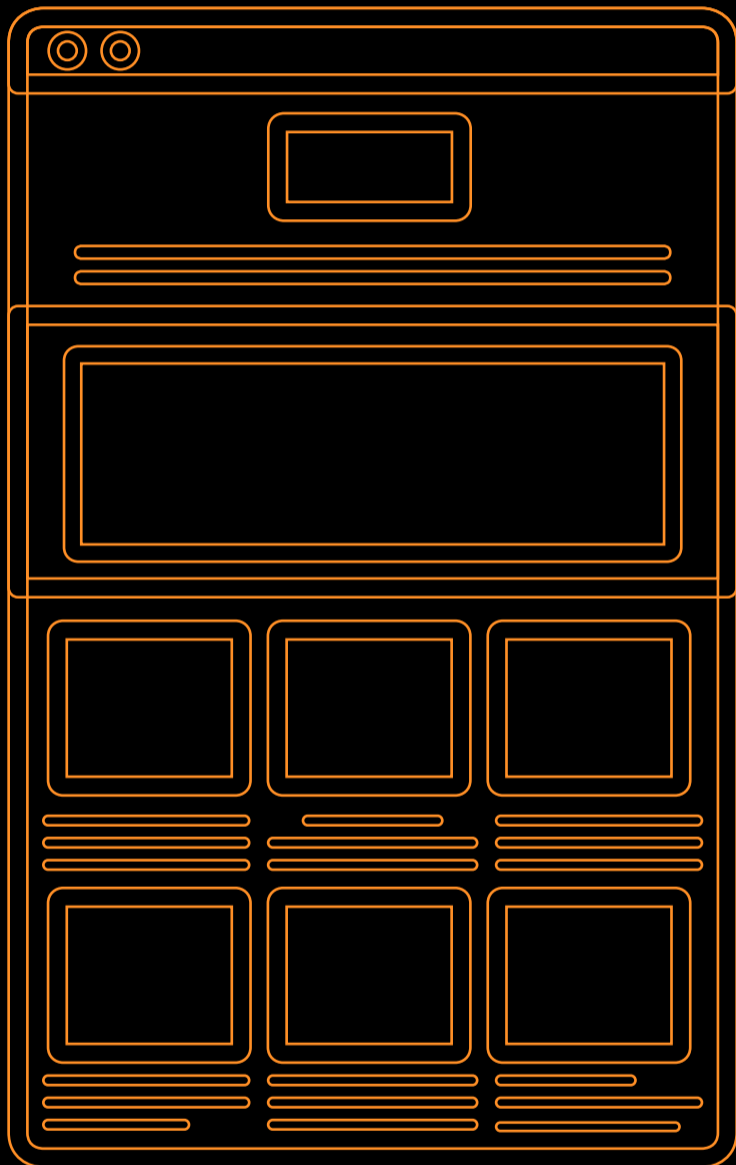
SOFTWARE & INTERNET SECURITY

MOBILE APPS
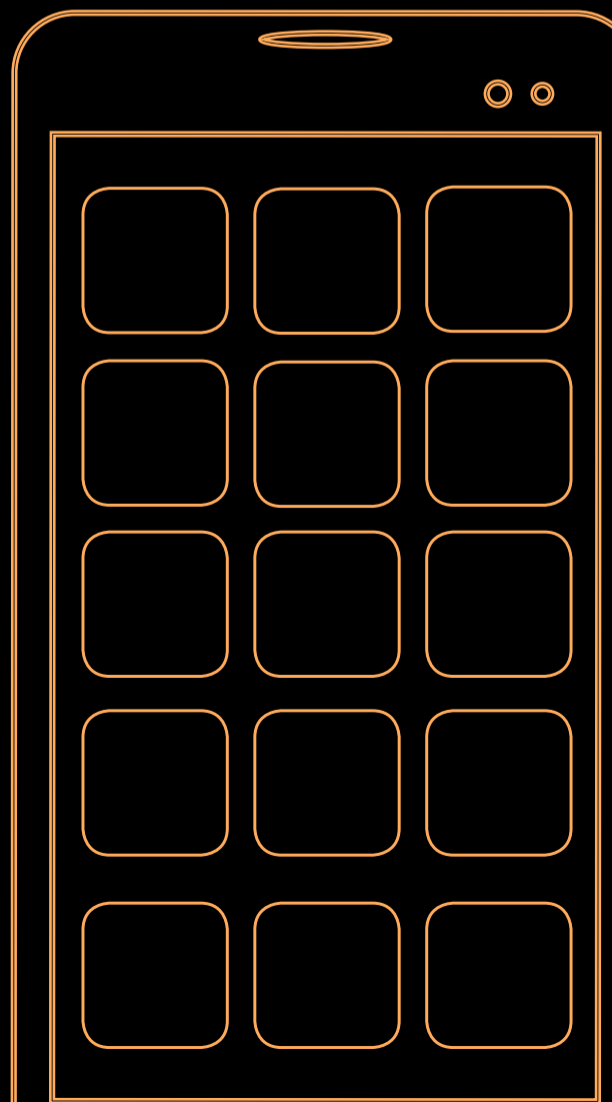
SOFTWARE & INTERNET

OPERATING SYSTEM /
WINDOWS 10

Microsoft has taken the clear lead in desktop operating systems with Windows 10. It's the first with full-touch and pen support, a voice-enabled digital assistant in the form of Cortana, biometric face and fingerprint sign-on with Hello, and Continuum support that lets the OS morph between desktop, tablet, and smartphone form factors. Even without real innovations, the operating system is smoother than it's ever been, with little conveniences everywhere (as in the File Explorer's Quick Access section) and includes a robust notification panel called Action Center.

EC
●●●●◐
$119.99

EC
●●●●◐
FREE

WEB BROWSER /
MOZILLA FIREFOX

The Web is a bigger and more complex place than many realize, and browsers are more than just windows into it. Firefox offers a fast, compatible browser with the best set of tools for consuming today's Web: Its Reader View strips away all the ads and clutter so you can focus on a Web article. Its Private Browsing mode with Tracking Protection is the only one that hides your Internet session not only from others with access to the computer but also from websites that track everything you do. Sharing pages to social networks takes but a click of a button, and extensions make it far more customizable than the rest.

MOBILE OPERATING SYSTEM
/ iOS 10

The latest version of Apple's mobile operating system is a smart refinement of an already mature platform to keep it relevant. iOS 10 introduces style and usability tweaks to key parts of Apple's mobile operating system and relaunches the Messages app as a platform and ecosystem for stickers and integrated apps. Best of all, the OS and its updates are available without meddling from manufacturers or carriers.

EC
●●●●◐
FREE

UTILITY /
IOLO SYSTEM MECHANIC

If your PC isn't booting or loading applications at the same pace as when you first unboxed it, download Iolo System Mechanic. This excellent tune-up utility dramatically improves your PC's performance by defragging the hard drive, repairing Windows's troublesome Registry, and tweaking CPU and RAM usage in real time. With Version 15, Iolo System Mechanic includes Windows 10—specific privacy tools to safeguard personal information.

EC
$49.95

EC
$7 per month

PRODUCTIVITY / SANEBOX

SaneBox is the best thing that's happened to email. It turns your inbox back into the inbox it was meant to be by weeding out unimportant messages. The service provides additional features that let you snooze emails, track when people don't reply, and more. It's easy to use, highly customizable, and indispensable for anyone suffering email overload.

ONLINE BACKUP /
IDRIVE

IDrive is the Swiss Army Knife of online backup services: It provides not only automatic uploading of files to its secure servers for offsite protection of your precious data but also syncing, archiving, and file sharing. The generous annual plan that costs $69.50 gets you a whopping 1TB of online storage space for an unlimited number of computers and devices.

EC
Free to $69.50 a year

SOFTWARE & INTERNET

CLOUD STORAGE & SYNC /
GOOGLE DRIVE

The tech trinity of Apple, Google, and Microsoft now offer robust cloud storage and syncing services that include online productivity apps for word processing, spreadsheets, and presentations. But Google has been at the game longest and has the most capable co-editing and sharing capabilities. What's more, it's the cheapest: You get 15GB of storage free, and documents you create it its Web apps don't count against that.

EC
●●●●●
FREE

PERSONAL FINANCE SERVICE /
MINT.COM

Mint is the best personal finance software available. It's free and ad-supported, but even the ads bring value to this fantastic tool for keeping an eye on your money. It offers highly automated personal-finance tracking and works with all major (and some minor) U.S. and Canadian banks. If you finally have decided to get your personal finances in order and create a viable budget, you owe it to yourself to sign up for a Mint.com account.

EC
●●●●●
FREE
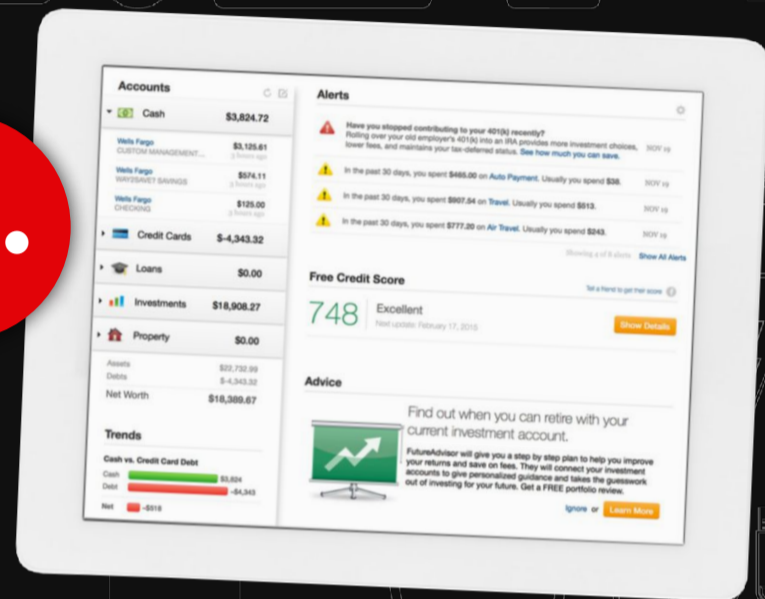
EDUCATION/LEARNING /
DUOLINGO (FOR iPHONE)

Among mobile language apps, Duolingo can't be beat. This free service uses a stylish and colorful interface to put language learners at ease and offers a variety of bite-size lessons to work on daily. New in-app chat functionality lets you try your hand at short, casual conversations with a bot.

EC
●●●●●
FREE

SOFTWARE & INTERNET

PHOTO EDITING /
ADOBE PHOTOSHOP LIGHTROOM CC

Those who are serious about digital photography turn to one application to import, organize, fix, and share their work: Lightroom. Although it lacks Photoshop's more illustration-focused features and complicated layer editing, it offers everything in Photoshop that photographers need. It's best-in-class keyword tagging is now joined by face-recognition to organize photos by persons included.

EC
●●●●●
$9.99 per month

VIDEO EDITING /
COREL VIDEOSTUDIO ULTIMATE X9

Corel often plays second fiddle to Adobe when it comes to media-editing software, but for consumer hobbyists who want to do the most with their video footage, VideoStudio Pro is unparalleled. Motion-tracking, multi-cam, stop-motion, and freeze-frame effects are a cinch in the program. It's extensible with plug-ins from industry-leading firms like NewBlue. Audio options are also rich, and as a bonus, you get a capable screen recorder.

EC
●●●●◐
$79.99

NETFLIX

EC
●●●●◐
$7.99 per month

VIDEO STREAMING SERVICE / NETFLIX

If your goal is to cut the cord, a Netflix account is a great place to start, thanks to its reasonable price, large collection of TV and movies, and growing stable of critically acclaimed original content. It is the most flexible and content-rich streaming provider in an increasingly competitive market. Whatever services you decide to use, always subscribe to them in addition to a Netflix account.

SOFTWARE & INTERNET

MUSIC STREAMING SERVICE /
SLACKER RADIO

Slacker Radio began life as the human-curated alternative to the pioneering Pandora, but the service has expanded to include news and weather updates, live ESPN radio, entertaining lifestyles channels, and well-conceived themed stations sure to delight music fans. The desktop streaming version lacks the lyrics found in its mobile apps and has some mildly annoying social-media integration, but apart from that, it's a top-notch, well-rounded service.

Slacker RADIO

EC
Free, options starting at $3.99/mo

WEBSITE BUILDER / WIX

Among the scads of site-builder DIY services out there, Wix offers the best combination of ease and customizability. Choose from over 500 great-looking templates to start, or have the service use Wix Artificial Design Intelligence to whip-up a custom site based on your assets and needs. Plans range from a free, ad-supported option to full-blown commerce sites with custom domains and Web stores.

WiX

EC
Free to $25 per month

WEB HOSTING SERVICE /
HOSTGATOR

Every business needs a website, and for that, you need a Web-hosting service. The feature-packed HostGator has wallet-friendly prices and plenty of tools for both novice and advanced Webmasters. HostGator has quality dedicated and virtual private server (VPS) server packages, but its shared plans help it stands out from the very crowded Web-hosting pack.
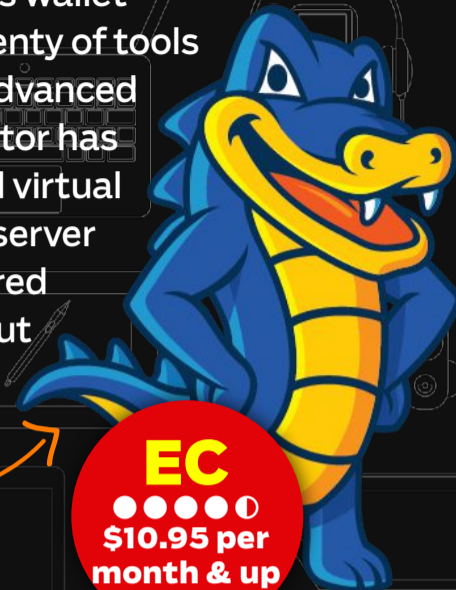
EC
$10.95 per month & up

ANDROID APP /
FACEBOOK MESSENGER (FOR ANDROID)

Messenger is an excellent mobile chat client that connects you to the billion-plus Facebook users from your smartphone or the PC. It's a complete package, offering text, voice, video, payments, and now secure, secret messaging. On Android, it offers special features such as the unfairly maligned Chat Heads and the ability to function as a complete replacement for your stock SMS app.

EC
FREE

IPHONE APP /
MICROSOFT OUTLOOK (FOR IPHONE)

Combining multiple email account capability, customizable swipe actions, and a nuisance-saving Focused inbox view, Outlook for iPhone has become the best email option on Apple's smartphone. The app is not just for email: Buttons in Outlook easily switch you among calendar, contact, and document views as well.

EC
FREE

SECURITY

ANTIVIRUS SOFTWARE /
KASPERSKY ANTI-VIRUS (2017)

The independent antivirus testing labs routinely give Kaspersky Anti-Virus their highest scores across the board, and our own testing shows that it's among the best at detecting phishing sites. Its many bonus features include an onscreen keyboard to foil keyloggers and a vulnerability scanner to fix security holes.
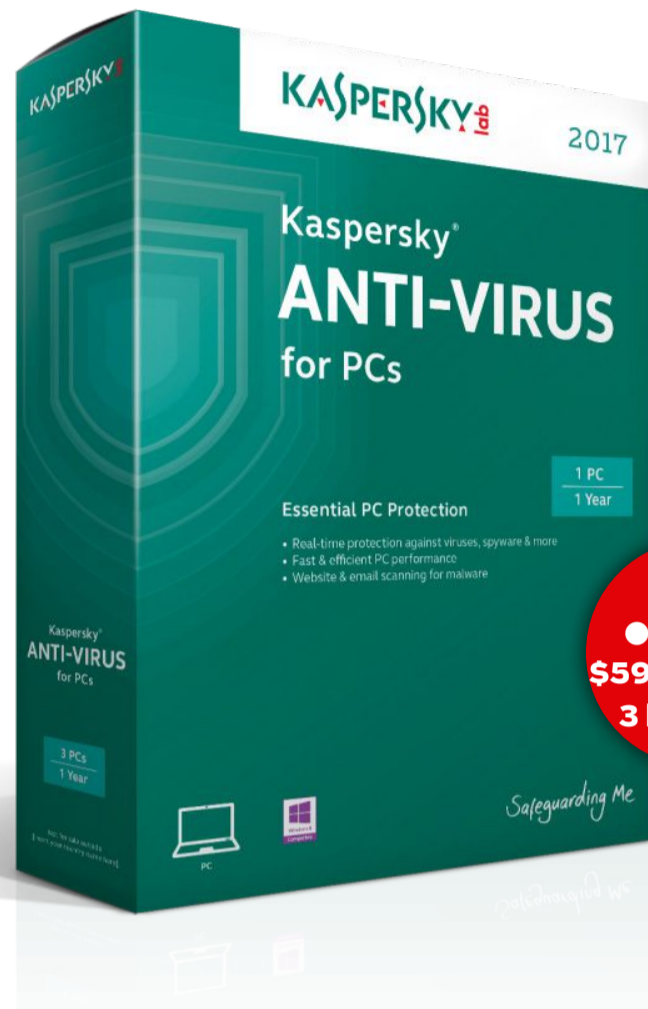
$59.99/yr for 3 licenses
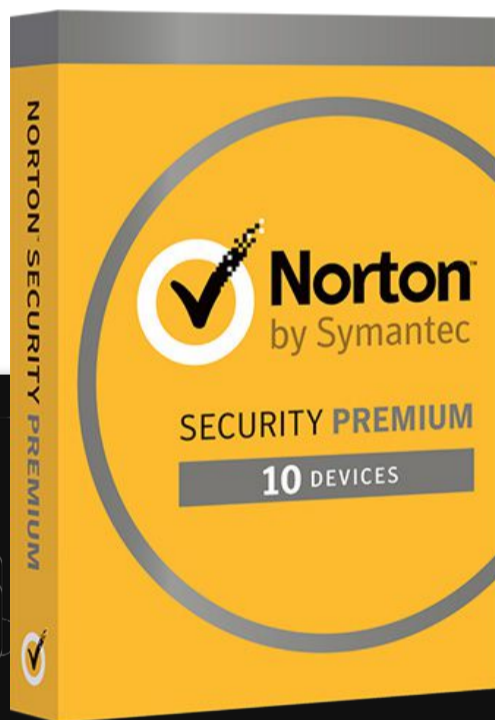
EC
$89.99/yr for 10 licenses

SECURITY SUITE /
SYMANTEC NORTON SECURITY PREMIUM (2017)

A Symantec Norton Security Premium subscription lets you install protection on up to 10 Windows, macOS, Android, or iOS devices. In addition to an excellent antivirus and a broad collection of top-notch security features, it comes with an advanced backup system and 25GB of hosted online storage for your backups.

PASSWORD MANAGER /
LASTPASS 4.0 PREMIUM

Despite its low price, LastPass 4.0 Premium goes above and beyond the basics of password management. Advanced two-factor authentication, automatic password changing, secure password sharing with individuals or groups, and the ability to designate an inheritor for your passwords are among its many outstanding features.

EC
$12 per year

SECURITY

PARENTAL CONTROL & MONITORING /
KASPERSKY SAFE KIDS

Safe Kids lets parents configure parental control rules for each child online and apply those rules to every device the child uses, with no limit on the number of children or devices. The iOS edition is more capable than most competitors. It's our current Editors' Choice for iOS parental control.

EC
●●●●○
$14.99 per year

VPN SERVICE / NORDVPN

NordVPN is a powerful yet non-intimidating VPN service that can easily secure your online activities. With a friendly interface, NordVPN easily provides a variety of advanced features such as specialized servers for BitTorrent, high-speed video streaming, and accessing the Tor anonymization network. It also offers a robust collection of servers across the globe, ensuring a trusted connection is always close by. The NordVPN app is also our EC winner for mobile VPN.

EC
●●●●◑
$8.00 per month
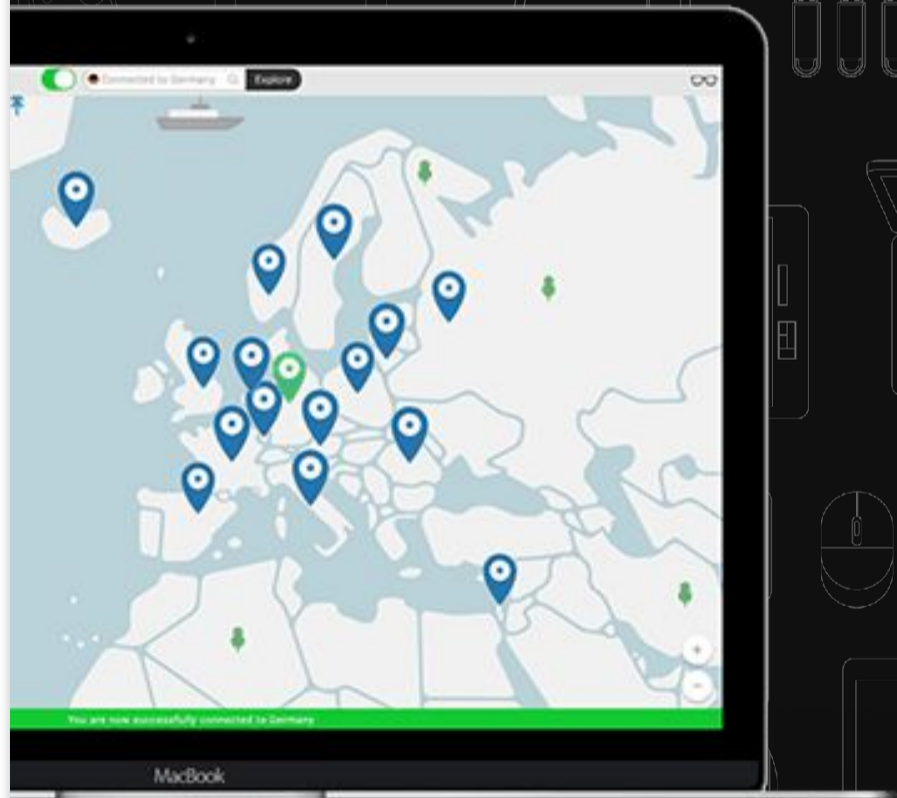
PRINTERS

PROJECTORS
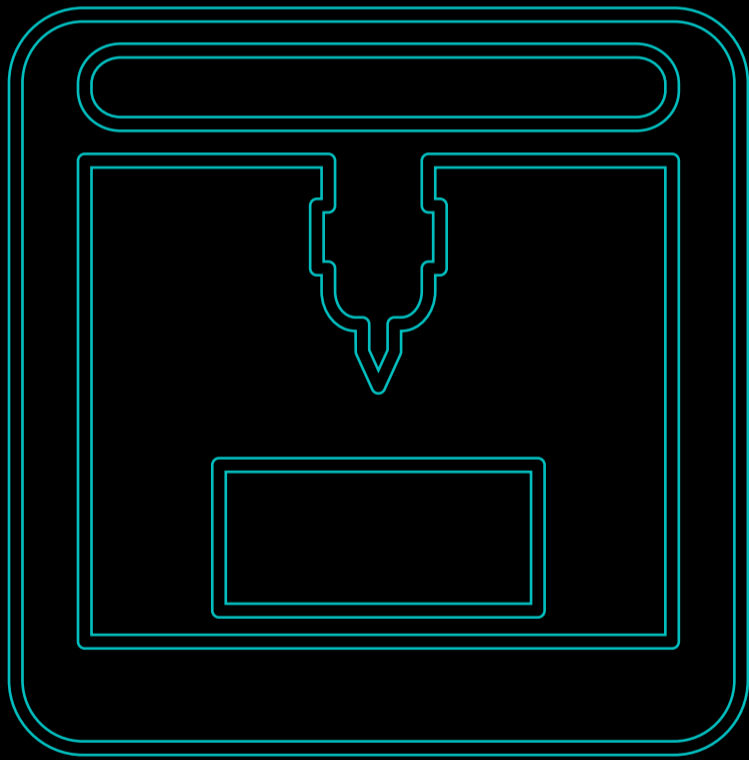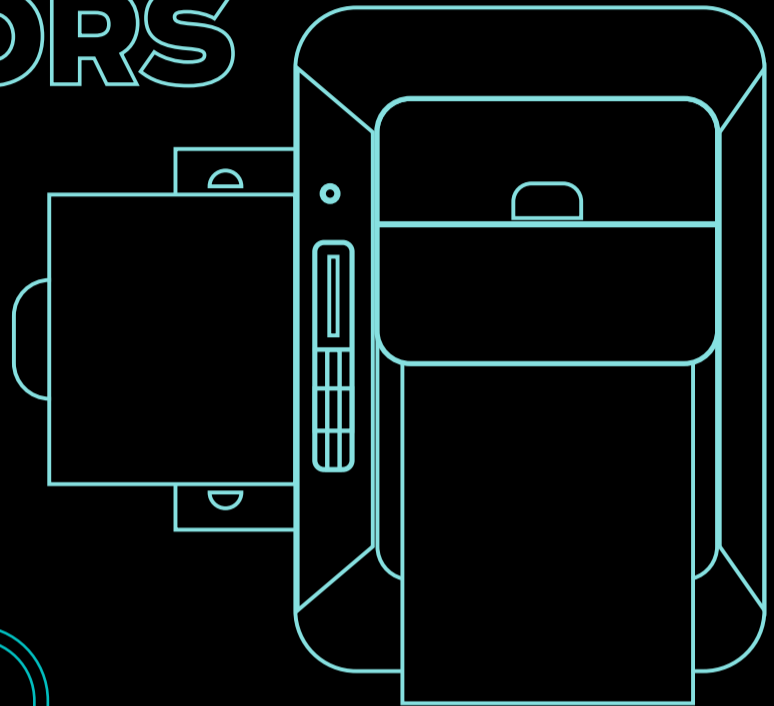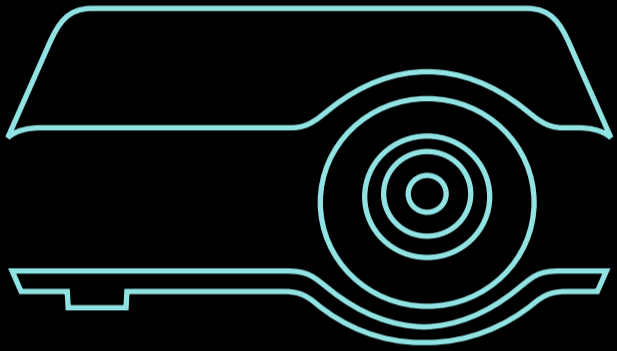
SCANNERS

NETWORKING

PRINTERS

INKJET / HP PAGEWIDE PRO 552DW PRINTER

A formidable color inkjet printer for heavy-duty use in a small office. Thanks to the company's PageWide technology, which features a print head that spans the full width of a page, it's extraordinarily speedy and delivers laser-class text and graphics.

EC
●●●●○
$699

ALL-IN-ONE /
EPSON WORKFORCE PRO WF-6590

Epson's flagship color inkjet all-in-one printer. With blazing speed, solid output quality, low running costs, wide range of connectivity choices, and paper capacity, it can go head to head with color lasers and beat them at their own game.

EC
●●●●○
$549.99

LASER /
HP LASERJET PRO M501DN

A fine choice as a mono laser printer to anchor a small office, this laser printer provides a winning combination of good speed, high-quality output, humongous standard paper capacity, competitive running costs, PostScript and other printer drivers, and password-protected printing.

EC
●●●●○
$549.98

PRINTERS

PHOTO /
CANON SELPHY CP1200 WIRELESS COMPACT PHOTO PRINTER

This is the printer to take to events requiring snapshots on the spot. It can't print larger than 4 by 6 inches, but it has a range of connection choices, low price and printing costs, and support for an optional battery.

EC
●●●●○
$109.99

3D PRINTER / MAKER-BOT REPLICATOR+

This 3D printer improves on its predecessor with a larger build volume, an increase in speed, and a redesigned frame. It supports MakerBot's new Tough PLA filament, and its software includes workflow solutions for businesses.

EC
●●●●○
$2,499

SCANNER

SCANNER /
EPSON FASTFOTO FF-640

The FF-640 is tweaked to scan photos at high speed and resolution without damaging the originals. It's best for archiving large quantities of old photos; it can even scan text from the back of a print.

● ● ● ◐ ○ ○
$649.99

PROJECTOR

PROJECTOR / EPSON POWERLITE 580 XGA 3LCD PROJECTOR

As an ultra-short-throw projector, this XGA (1,024-by-768) business projector can sit just a few inches from the screen and still give you a large, bright image. It has excellent data-image quality and passable video, as well as loud, decent-quality audio.

EC
● ● ● ● ○
$1,299

NETWORKING /

EC
●●●●○
$59.99

HIGH-END ROUTER / D-LINK AC5300 ULTRA WI-FI ROUTER (DIR-895L/R)

This is a slick-looking tri-band router that delivers some of the fastest scores we've seen in throughput and file transfer tests. It's fully loaded with all the latest 802.11ac features, including beamforming, band switching, and 4×4 data streaming.

EC
●●●●◐
$379.99

BUDGET ROUTER / D-LINK AC1200 WI-FI ROUTER (DIR-842)

With this router, you don't have to spend a lot to cover your home with effective dual-band wireless networking. It delivers solid throughput, has four wired LAN ports and plenty of management settings, and is a breeze to install.

NETWORKING

HOME WI-FI SYSTEM / NETGEAR ORBI HIGH-PERFORMANCE AC3000 TRI-BAND WI-FI SYSTEM (RBK50)

Meant for larger spaces, the Orbi RBK50 is a capable Wi-Fi system that delivers speedy wireless networking to all areas of your home. It's a snap to install, it offers plenty of wired LAN ports, and it's MU-MIMO ready.

EC
●●●●○
$400

EC
●●●●○
$298.99

NETWORK ATTACHED STORAGE /
NETGEAR READYNAS 202

The ReadyNAS 202 is a speedy consumer/SOHO network-attached storage (NAS) device that gives you access to your documents, music, photos, and videos at home or away. It's a simple way to get a personal cloud setup.
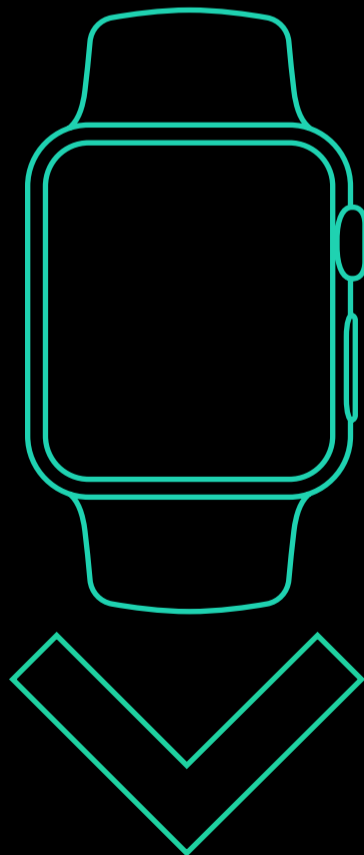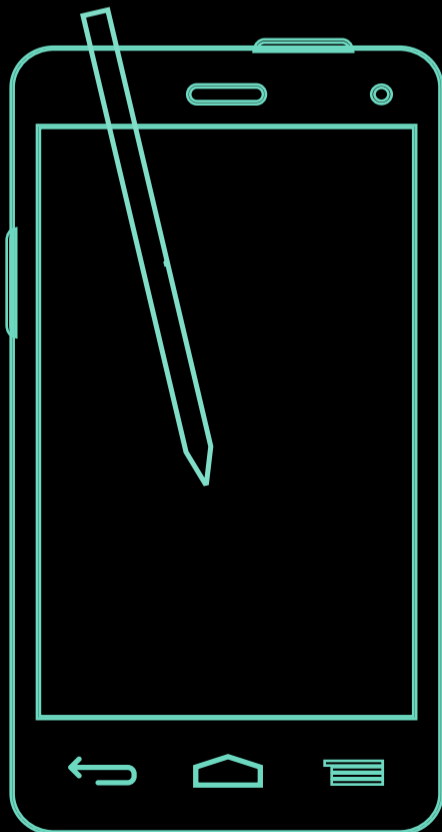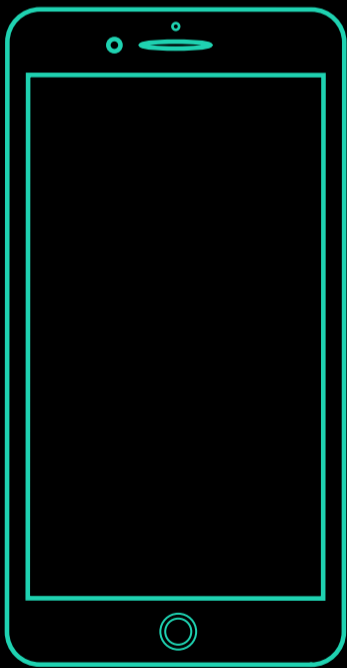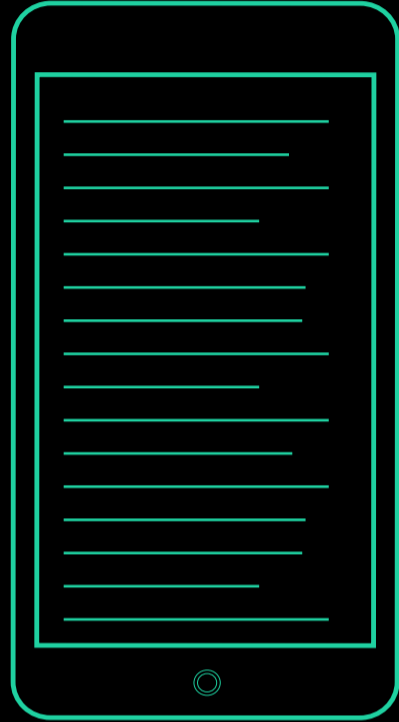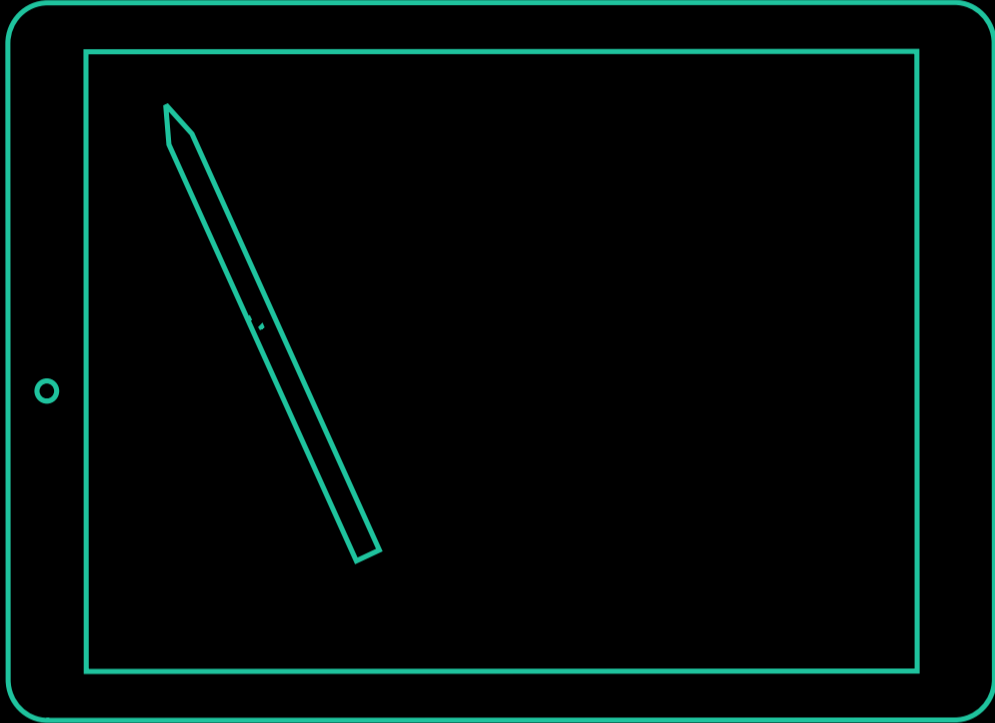
TABLETS EBOOK READERS

MOBILE DEVICES

TABLETS & EBOOK READERS

EC
●●●●○
$199.99

BUDGET TABLET / AMAZON FIRE HD 8

The under-$100 tablet market is full of shaved edges and cut corners. Amazon's media tablet keeps things durable, clear, and simple, with the company's now well-known interface, offering easy access to a range of Amazon content and apps. Dual-band Wi-Fi ensures you can stay connected for watching, reading, or surfing the Webs.

MIDRANGE TABLET/ NVIDIA SHIELD TABLET K1

The Shield K1 offered the best Android value we saw this year, thanks to its screaming-fast (and sadly, rare) Nvidia processor. With long battery life and a surprisingly low price, Nvidia's tablet outpaced this year's competition not only on gaming but also on productivity per dollar.

●●●◐○
$89.99

HIGH-END TABLET / APPLE IPAD PRO 9.7 INCH

The iPad Pro, when paired with Apple's Pencil accessory, is a creator's dream. The sharp screen has a wide color gamut, loud speakers deliver rich sound, the fast processor offers responsive performance, and iOS offers plenty of painting, drawing, and note-taking apps. It doesn't close the "pro" app gap with Windows, but it's the best high-end tablet this year.

●●●●○
$79.99

EBOOK READER / AMAZON KINDLE

Amazon's leastexpensive ebook reader improves performance at an entry-level price. The design is more rounded than last year's model, and Bluetooth support lets you listen to audiobooks on wireless headphones. While we prefer the Kindle Paperwhite (which wasn't updated this year), this entry-level Kindle has far wider appeal than the more exotic, expensive readers released in 2016.

●●●●○
$599.99
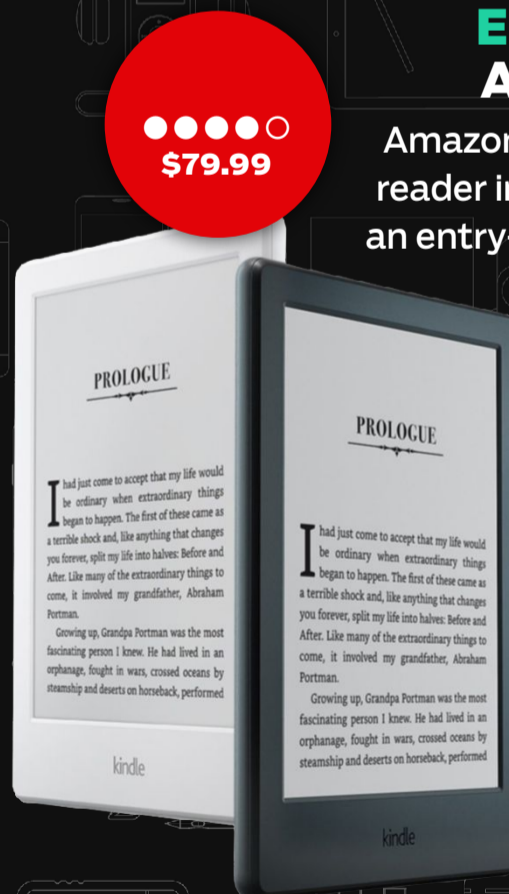
MOBILE
DEVICES & NETWORKS

SMARTPHONE /
SAMSUNG GALAXY S7 EDGE

This phone set the agenda for 2016, and it's still a stunner almost a year after its launch. Its dual-edge design fits a 5.5-inch, super-high-res screen into the smallest body possible; it backed up that design with a fast processor and an industry-leading camera. The S7 Edge was the best-performing, best-looking phone and the star of the year.

EC
●●●●◑
$792

WI-FI HOTSPOT / AT&T
UNITE EXPLORE

The Unite Explore shows why you want a hotspot rather than just using the hotspot on your phone. It has the latest modem, a huge battery, external antenna ports, and a rugged, waterproof body. It will keep you connected anywhere your phone won't typically work. That's what more hotspots should be doing.

EC
●●●●◑
$199.99

CELLULAR NETWORK /
VERIZON WIRELESS 4G LTE

Verizon won our Fastest Mobile Network award this year for combining speedy performance with excellent nationwide coverage. T-Mobile is catching up swiftly, but Verizon keeps pushing the envelope by adding new technologies, including 3x carrier aggregation and 4x4 MIMO, across its broad-ranging network. Verizon is also racing to be the first to 5G next year, with plans to offer a wireless home broadband service.

verizon√

MOBILE
DEVICES & NETWORKS

BLUETOOTH HEADSET /
PLANTRONICS VOYAGER 5200

The Plantronics Voyager series has long been the choice for people serious about their Bluetooth headsets. The latest model pairs to phones via NFC or Bluetooth, pairs to multiple devices, takes voice dictation, has terrific range, and delivers great noise cancellation. It's by far the best choice for mission-critical mobile calls.

EC
●●●●○
$119.99

●●●●○
$369
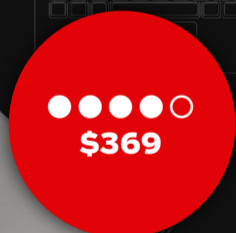
SMARTWATCH /
APPLE WATCH SERIES 2

Apple's hugely ambitious smartwatch is the closest we've come to a true smartwatch–fitness tracker hybrid yet. It's waterproof and has built-in GPS for swim and run tracking, but it also has an unusually fast processor and rich OS that links to a wide range of iPhone apps. With Android Wear looking lost this year, Apple leads on the full-featured smartwatch front.

SoftGozar.com
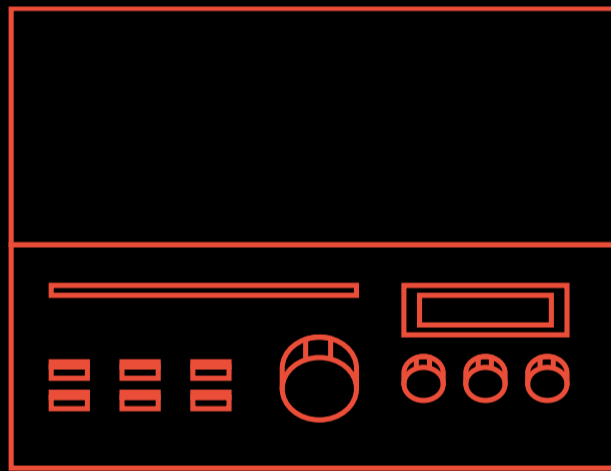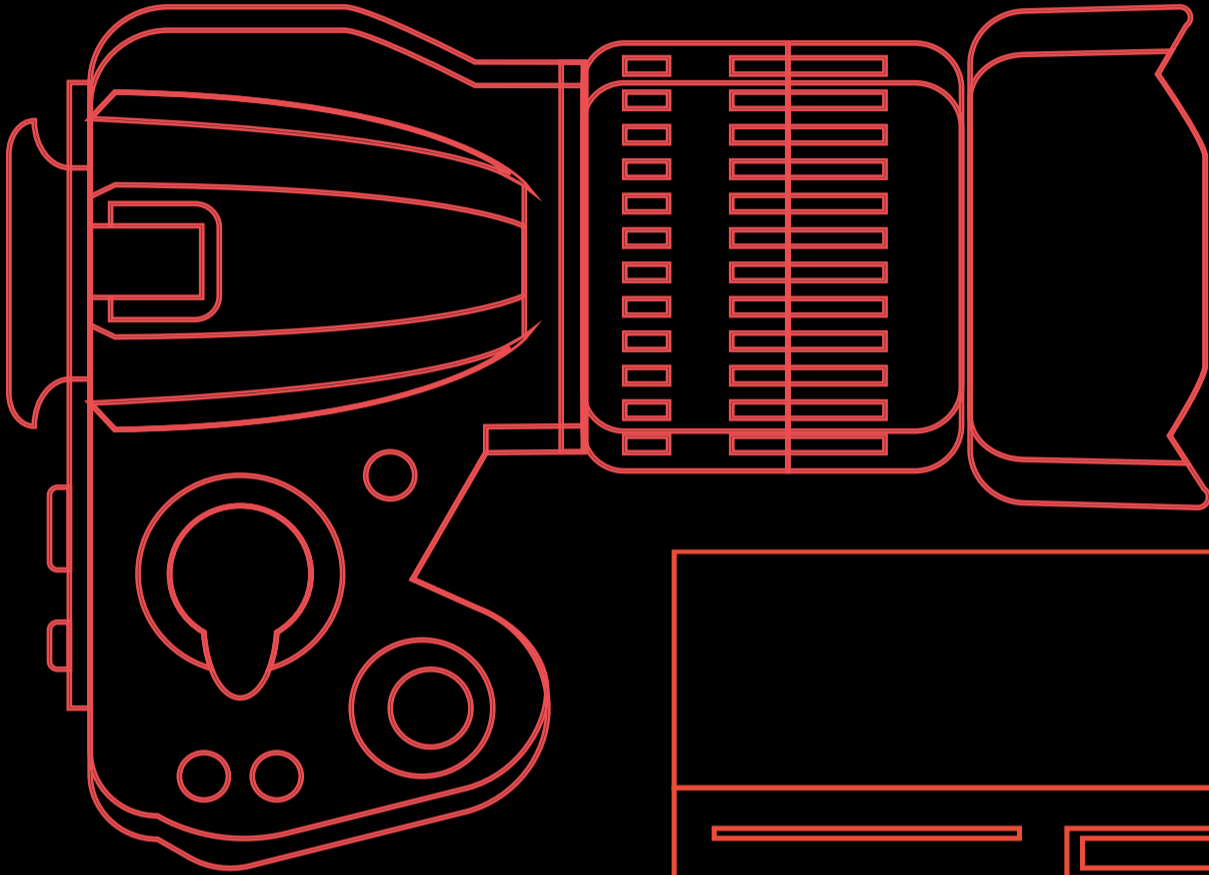
CAMERAS

AUDIO

HOME THEATER
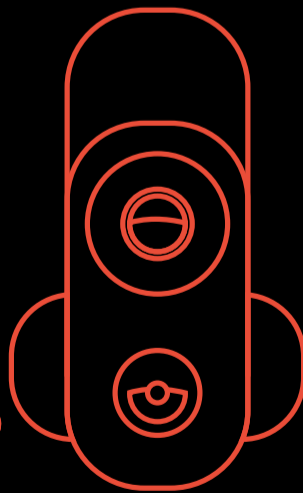
HDTVS

CAMERAS & CAMCORDERS

COMPACT CAMERA /
CANON POWERSHOT G7 MARK II

Canon made some tweaks to its first 1-inch sensor camera, making the G7 Mark II a stronger option than its predecessor. It's by no means a budget option, but it will run circles around any phone thanks to its large 20MP image sensor, wide-aperture 24-100mm zoom lens, and fast autofocus system. You can still Instagram with it—built-in Wi-Fi beams photos to your phone with ease.

●●●●○
$699.99

MIRRORLESS CAMERA /
SONY ALPHA 6300

Many shoppers still associate SLR with top quality, but mirrorless cameras have become better and better, surpassing more traditional cameras in many ways. The Sony Alpha 6300 shoots 24MP images at 11.1fps while keeping moving targets in focus, has a crisp built-in EVF, and can record video at 4K quality. It's also priced aggressively, costing less than other cameras that offer similar features.

*Price is for body only.

EC
●●●●◑
$999.99*

CAMERAS & CAMCORDERS

BRIDGE CAMERA /
SONY CYBER-SHOT DSC-RX10 III

A $1,600 fixed-lens camera is, on paper, a tough sell. But when it's as good and versatile as the Sony Cyber-shot DSC-RX10 III, it's a purchase you won't regret. Built around the versatile 1-inch-sensor format, the 20MP RX10 III has a fixed zoom lens that is impeccably sharp and covers an extreme 24mm-600mm range. It's a perfect travel camera, good enough to tackle almost any shot, and supports 4K video capture and extreme slow motion at 1080p.

EC
$1,599.99

EC
$2,499.99

D-SLR /
NIKON D500

The D500 is our hands-down favorite camera of 2016. It's the first true pro-grade Advanced Photo System type-C (APS-C) SLR from Nikon since the D300S. It shoots and tracks subjects at 10fps, is built tough with an all-weather design, records 4K video with clean HDMI output, has one of the best viewfinders in its class, and offers a focus system that covers almost the entire width of the frame.

*Price is for body only

EC
$1,999.95*

LENS / OLYMPUS M.ZUIKO ED 300MM F4.0 IS PRO

Sports and wildlife photographers go to the Micro Four Thirds system for its compact size and long effective reach. This Olympus camera covers the same field of view as a 600mm lens matched to a full-frame system but is notably smaller and lighter than any 600mm prime on the market. It's also incredibly sharp, sealed against dust and moisture, and offers a stabilization system that keeps handheld shots as crisp as possible.

CAMERAS & CAMCORDERS

CAMCORDER /
GOPRO HERO5 BLACK

The GoPro Hero5 Black isn't that much different from last year's Hero4 Black when it comes to video features—it still records footage at up to 4K quality at 30fps with faster frame rates available when you're shooting 1080p and 720p. But it's now waterproof without an external case, offers an on-board touch-enabled viewfinder, and sells for $100 less.

EC
●●●●◐
$399.99

DRONE /
DJI PHANTOM 4

The DJI Phantom series has long been the favorite consumer drone series. This year's model takes everything that got it there and makes it better. It's sleeker and faster, and it includes forward-facing obstacle detection sensors to stop your quadcopter from running into a tree or wall. It's also easy to fly, with an intuitive remote control and a companion smartphone app that allows navigation to a location simply by tapping on the screen. The Phantom 4 is the best that we've ever tested.

EC
●●●●●
$1,399

HDTV & HOME THEATER

BUDGET TV / TCL 55UP130

If you want to jump into 4K but don't want to break the bank, TCL's UP130 series offers a pretty good picture at a low price. It's powered by Roku TV, so it's got plenty of connected apps and services, too.

EC ●●●●○ **$649.99**

HIGH-END HDTV / LG OLED65B6P

AOrganic light-emitting diode (OLED) technology continues to produce the best possible picture in flat-panel TVs, and LG's OLEDB6P series is the most affordable HDR 4K OLED of the bunch.

EC ●●●●◐ **$2,999.99**

MEDIA HUB / AMAZON FIRE TV STICK WITH ALEXA REMOTE

Amazon's new Fire TV Stick has a lower price than before and comes with a microphone-equipped voice remote out of the box, so you can use Alexa on your TV. It's one of the best deals out there in streaming media hubs.

EC ●●●●◐ **$39.99**

SOUNDBAR / SONY HT-NT5

The Sony HT-NT5 soundbar puts out powerful audio thanks to its wireless subwoofer, and its HDMI ports can pass 4K video straight through to your TV. It's also equipped with Google Cast, so you can stream music to it.

EC ●●●●○ **$799.99**

AUDIO/

HEADPHONES /
BOWERS & WILKINS P9 SIGNATURE

The price is steep, but Bowers & Wilkins' P9 Signature headphones offer some of the best sound you can get for under four digits. It also has an appropriately luxurious feel and comes with some very useful accessories.

EC
$899.99

BUDGET HEADPHONES /
COLOUD NO. 16

EC
$39.95

You don't need to break the bank to get great sound. The Coloud No.16 is a set of on-ear headphones with a balanced, high-quality sound that belies its low price, and it has a comfortable fit to boot.

EARPHONES /
1MORE TRIPLE DRIVER IN-EAR HEADPHONES

These in-canal earphones come with a load of eartips to ensure a comfortable fit, and they sound better than many earphones that cost twice the price.
(photo: 1More)

EC
$99.99

AUDIO/

WIRELESS HEADPHONES EARPHONES /
PLANTRONICS BACKBEAT PRO 2

Plantronics packs balanced sound and active noise cancellation into a comfortable wireless set of over-ear headphones. If you want better noise canceling, be prepared to pay twice as much.

EC
●●●●◐
$199.99

BUDGET EARPHONES /
808 AUDIO EAR CANZ

Powerful, bass-filled sound in a waterproof design makes the exercise-oriented 808 Audio Ear Canz a very appealing set of earphones even before you look at the low price tag. The Canz comes with plenty of eartip and fin options to make sure they fit perfectly.

EC
●●●●○
$39.99

EC
●●●●○
$549

WIRELESS SPEAKER /
VIFA OSLO

This big Bluetooth speaker comes straight from Denmark and has an attractive design and a powerful sound. It's Scandinavian audio engineering at its best.

BUDGET WIRELESS SPEAKER /
JBL CLIP 2

This little speaker is small and waterproof, and it puts out an impressive amount of sound for its size. Why is it called the Clip 2? Because it has a handy clip on it, and it's JBL's second take on an award-winning formula.

EC
●●●●○
$59.99
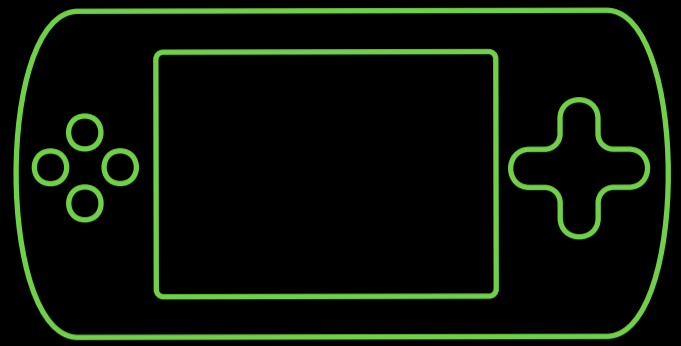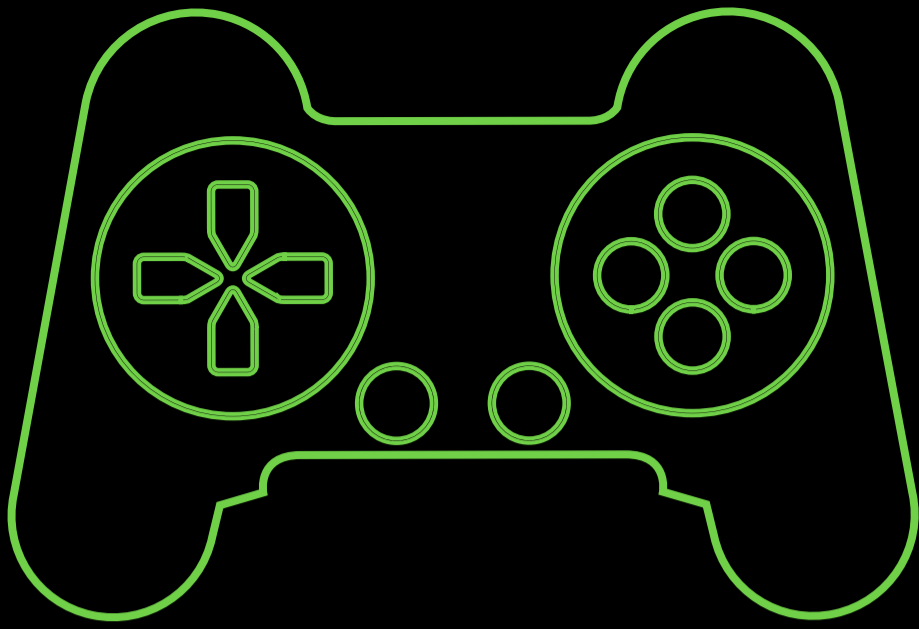
GAMING

SMART HOME
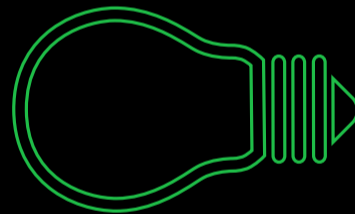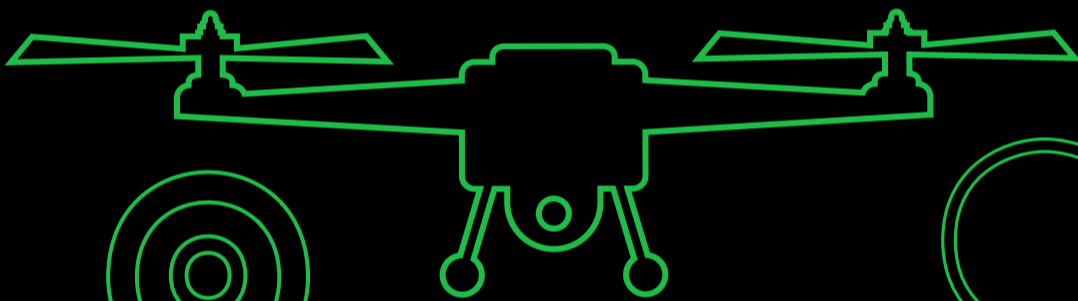
CARS

HEALTH & FITNESS
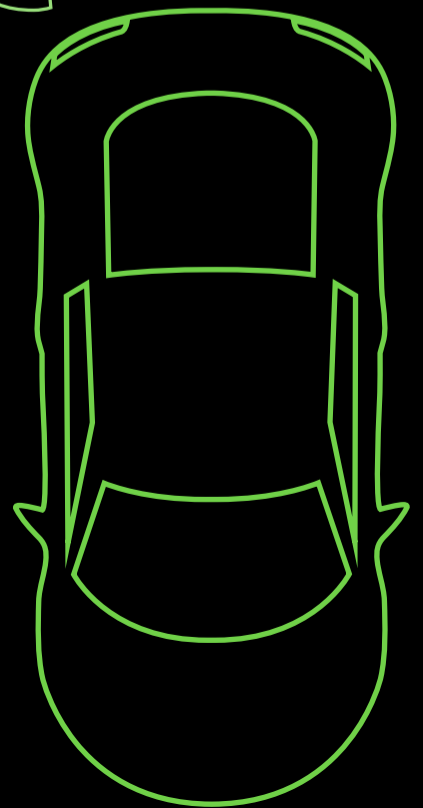
SMART HOME

VOICE ASSISTANT /
AMAZON ECHO DOT

The Echo Dot is the easiest way to add Alexa, Amazon's handy, always-listening voice assistant, to your home. A compact Bluetooth speaker, it works fine on its own, but you can connect it to your own favorite speaker if you really want to pump up the jams. It replaces the original model from earlier this year, and it sounds better, picks up voice commands more easily, and costs much less.

CONNECTED HUB /
WINK HUB 2

The Wink Hub 2 offers not only more memory, better network support, and a sleeker design than its predecessor—it also adds Bluetooth support, enhanced security, and a simplified guided setup and pairing procedure. Moreover, it supports more wireless protocols than any other hub. It's the best home automation hub we've tested.

LIGHTING / PHILIPS
HUE WHITE

If you want to check out connected lighting at an affordable price, the Philips Hue White offers the best balance of features, support, and versatility. It requires a hub such as the Philips Hue Bridge, but for $14.95, you get soft white light that dims, complements pre-set lighting scenarios, and integrate with If This Then That (IFTTT). Simply, Hue White is the best way to upgrade your home to smart lighting on a budget.

SMART HOME

THERMOSTAT / ECOBEE3 SMART WIFI THERMOSTAT

You usually don't think of Wi-Fi thermostats as stylish, but that's what the Ecobee3 is, with a sleek and attractive design. You can control temperatures of multiple rooms in your home from anywhere with your iOS or Android phone (and from your PC via the Web), without ruining the décor.

EC
$229

APPLIANCE / CHAR-BROIL DIGITAL ELECTRIC SMOKER WITH SMARTCHEF TECHNOLOGY

With the Char-Broil Digital Electric Smoker, you won't need to babysit a grill. Simply program the smoker from a mobile app on your smartphone, hit a button, and sit back until your food's ready. The price is a bit high, but it produces perfectly smoked fish, meat, nuts, and more while freeing up your time.

EC
$399.99

SECURITY CAMERA / NEST CAM OUTDOOR

For a security camera with sharp 1080p video, crisp night vision, and a motion detection system wrapped in stylish weatherproof design, go for the Nest Cam Outdoor. It comes bundled with an extra-long ruggedized power cord and a magnetic mounting plate, so it's easy to install. You also get push notifications, two-way audio, and an excellent app. It's the best outdoor surveillance system you can buy now.

EC
$199

DOOR LOCK / AUGUST SMART LOCK HOMEKIT ENABLED

The Apple HomeKit—enabled August Smart Lock watches anyone entering and leaving your home via your smartphone. It's a cinch to install, and it offers all the latest technologies, including voice activation, geofencing, and an IFTTT channel that allows it to trigger other devices.

EC
$229

CAR TECH

ANDROID AUTO

When it comes to phones, Apple has long held an advantage over Google in the app department. For cars, however, the tables are turned. Android Auto, Google's phone-based infotainment system, has more than three times as many apps as Apple's CarPlay. Not only that, Android Auto has a major advantage in the form of Google Maps. It's better than almost any built-in infotainment system we've tested, and a no-brainer for Android users with a compatible vehicle.
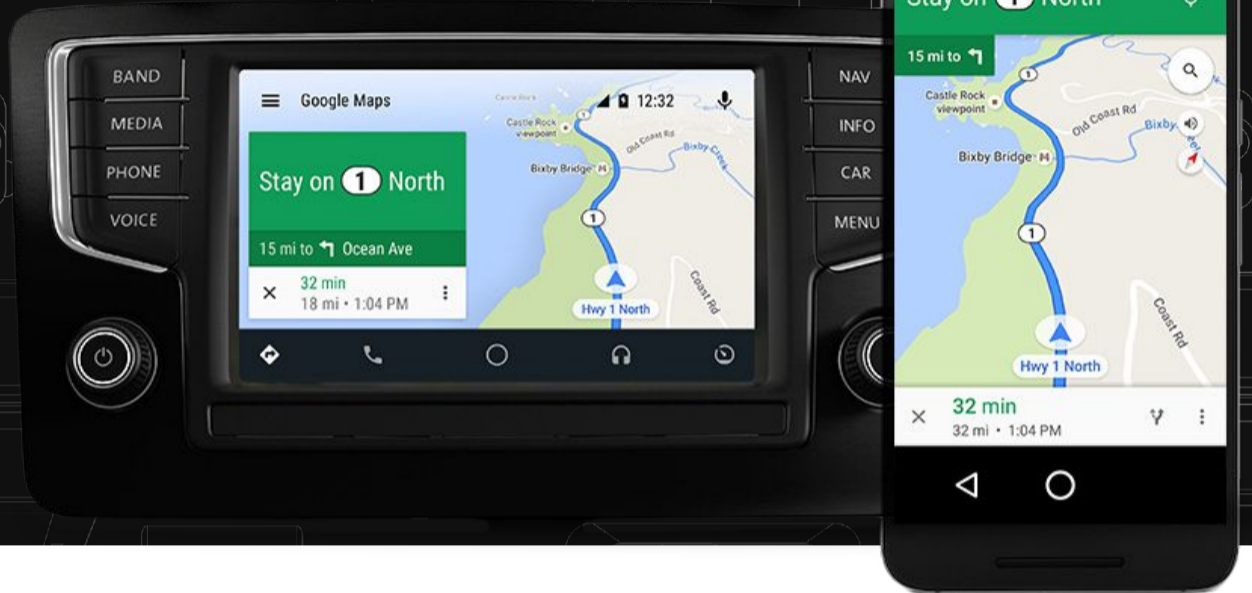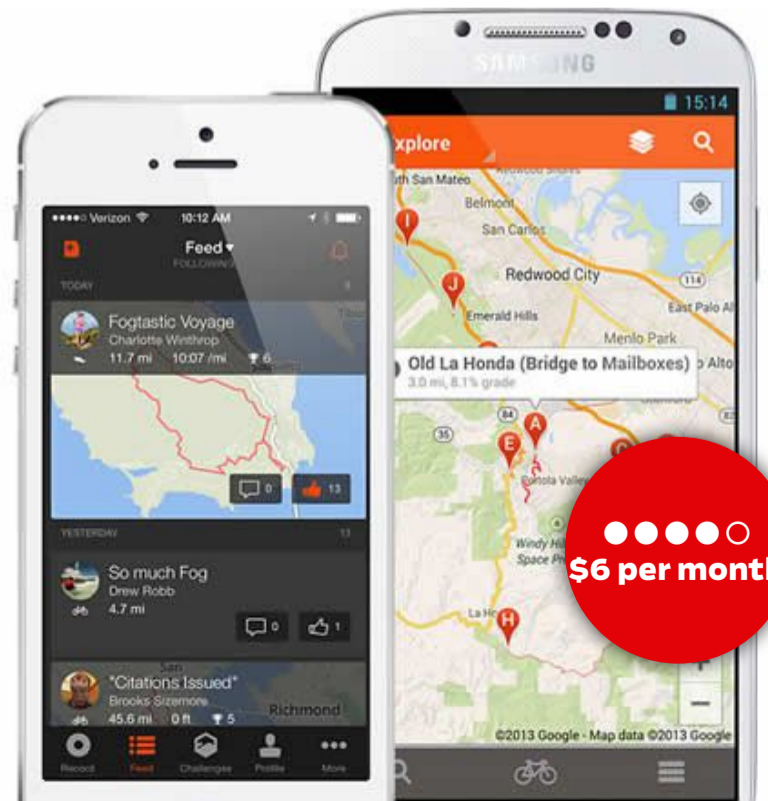
DIGITAL HEALTH & FITNESS

FITNESS TRACKER / FITBIT CHARGE 2

The Fitbit Charge 2 counts your steps, tracks your sleep, and alerts you to incoming phone calls and text messages. It also continuously monitors your heart rate, and with a phone, uses GPS to track outdoor activity. It even helps you get up out of your chair and breathe easier. Runners and workout fiends can tap into the biggest fitness tracking community around thanks to the reliable, robust Fitbit app.
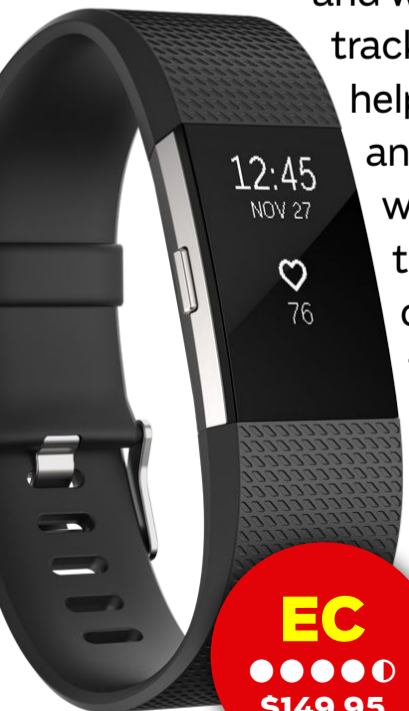
FITNESS APP / STRAVA (FOR iPHONE)

Runners and cyclists who thrive on competition love Strava: It pits you against other users who've run and biked the same routes. Finding competition is easy thanks to the huge user base, and the app works well with a variety of Bluetooth and ANT+ devices. It's a strong tracking app for non-competitors too, with accurate GPS mapping and records for distance, time, speed, and even manual tracking for swimmers.

DIGITAL HEALTH & FITNESS

GAMING

SMART SCALE / QARDIOBASE SMART SCALE

One of the best-looking bathroom scales you can get for your home, the QardioBase Smart Scale is also one of the smartest and easiest to use. It tracks your weight, body fat, body mass index, muscle mass, and water and bone composition—even your weight throughout a pregnancy. For the health conscious, it's a fantastic choice.
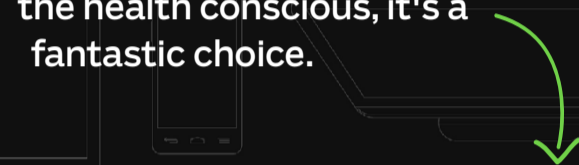
EC
●●●●◐
$149.99

VR HEADSET / SONY PLAYSTATION VR

The PS VR is the most affordable and comfortable of the tethered virtual reality headsets we've tested. Just as important, it already has a strong collection of interesting games and VR experiences. It offers the best combination of accessibility, content, and power you'll find.

EC
●●●●○
$399.99

GAME CONSOLE / MICROSOFT XBOX ONE S

The newer, smaller Xbox One S features a lower price tag (or a bigger hard drive, for a bit more) and a streamlined, power brick-less design. It also plays Ultra HD Blu-ray discs, so you can watch your favorite 4K HDR films without buying a separate player.

EC
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$399.99
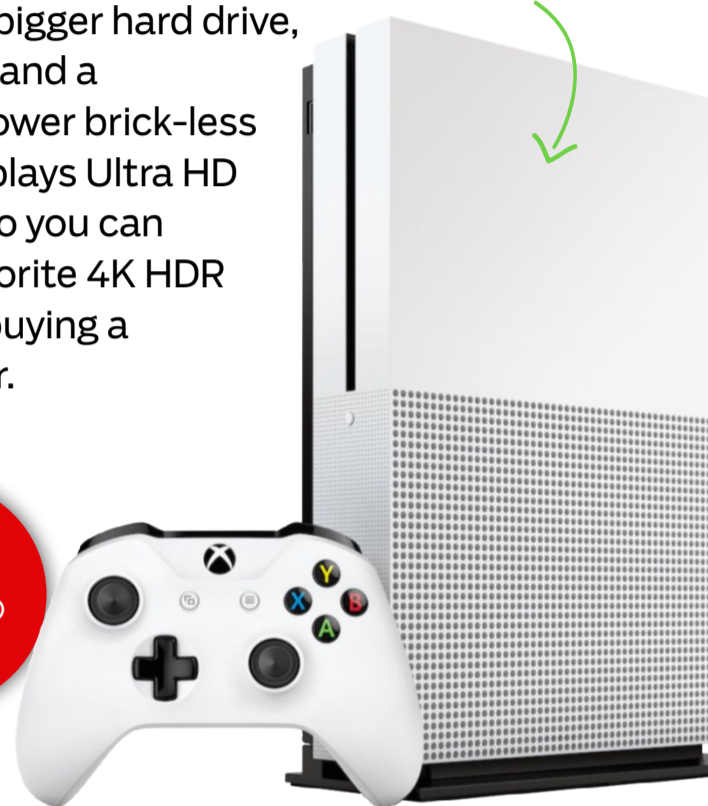
PORTABLE GAMING DEVICE / NEW NINTENDO 3DS

Nintendo has reigned as the king of handheld gaming systems for decades, and the New Nintendo 3DS continues the trend. It features vastly improved 3D over the original 3DS, an analog control nub, and additional shoulder buttons for even more gameplay options. It supports the huge library of 3DS, DS, and Virtual Console games.

EC
●●●●○
$199.99

GAMING

GAMING MONITOR /
VIEWSONIC XG2700-4K

The well-equipped ViewSonic XG2700-4K is a 27-inch gaming monitor that uses AMD's FreeSync anti-tearing technology and an In-Plane Switching (IPS) panel to deliver ultra-smooth gaming performance and rich, accurate colors.

EC
●●●●○
$619.99

PC GAME /
STARCRAFT II: LEGACY OF THE VOID

Boasting brilliant, real-time strategy gameplay, a noob-friendly co-op mode, and a varied single-player campaign, StarCraft II is a fantastic conclusion to Blizzard's five-year saga and a great entry point into one of the most complex but satisfying strategy games ever made. It's a towering achievement.

EC
●●●●●
$39.99

GAMING HEADSET /
TURTLE BEACH ELITE PRO TOURNAMENT HEADSET

While it's pricey, the Turtle Beach Elite Pro Tournament offers some of the best sound quality and comfort we've experienced in a wired gaming headset. It's an excellent headset that justifies its premium price.

EC
●●●●◐
$199.99

EC
●●●●○
$59.99

MICROSOFT XBOX ONE GAME / FORZA HORIZON 3

Crafting a racing game that deftly rides the line between pure arcade action and hardcore simulation is an extremely difficult task, as a developer risks alienating fans of both play styles. Playground Games managed to pull it off once again with Forza Horizon 3. The Australian setting gives the development team a cool box of toys to play with, as Oz's climate and beautifully rugged landscape mix well with the series' trademark open-world exploration and reckless driving.

GAMING

NINTENDO WII U GAME /
XENOBLADE CHRONICLES X

Xenoblade Chronicles came to the Nintendo Wii years ago and didn't hit particularly hard. Now, we have Xenoblade Chronicles X. It plays a lot like the original, but it feels bigger and looks better. The extensive number of systems in the game is intimidating, and it's very much a classic JRPG-style time sink, but it offers an epic adventure.

EC
●●●●◐
59.99

EC
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$59.99
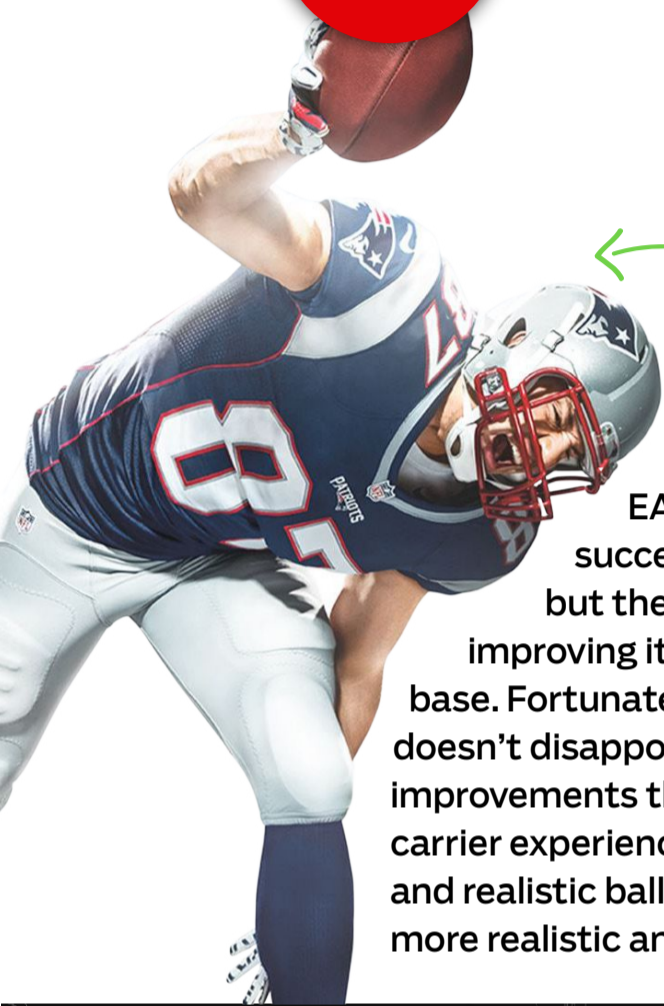
SONY PLAYSTATION GAME /
MADDEN NFL 17

EA Sports has a multi-year success story in Madden NFL, but the company needs to keep improving it or risk losing the loyal fan base. Fortunately, Madden NFL 17 doesn't disappoint. It boasts gameplay improvements that enhance the ball-carrier experience, excellent presentation, and realistic ball physics that makes play more realistic and exciting.

IPHONE GAME / REIGNS (FOR IPHONE)

Like an unholy spawn of high fantasy, retro-gaming, and Tinder, Reigns is the autocrat simulator you've been awaiting. If you like swiping left or right to find a mate, you'll love ruling a nation in this medieval adventure game. Its simple premise hides a complicated storyline and surprisingly deep play

●●●●○
$6.99

ANDROID GAME / SMALL WORLD 2 (FOR ANDROID)

Board-game fans have tolerated the tyranny of Risk for far too long. Thankfully, a wave of new games for mobile platforms have changed the hobby. Small World 2 is a stunning mobile adaptation of a fun and fast-paced game of fantasy conquest that pits you against your opponents in a game of whimsical warfare.

●●●●○
$2.99
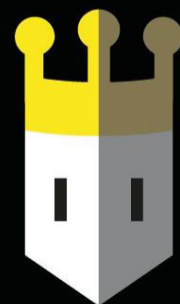
Using Gantt Charts to Get Things Done BY JILL DUFFY
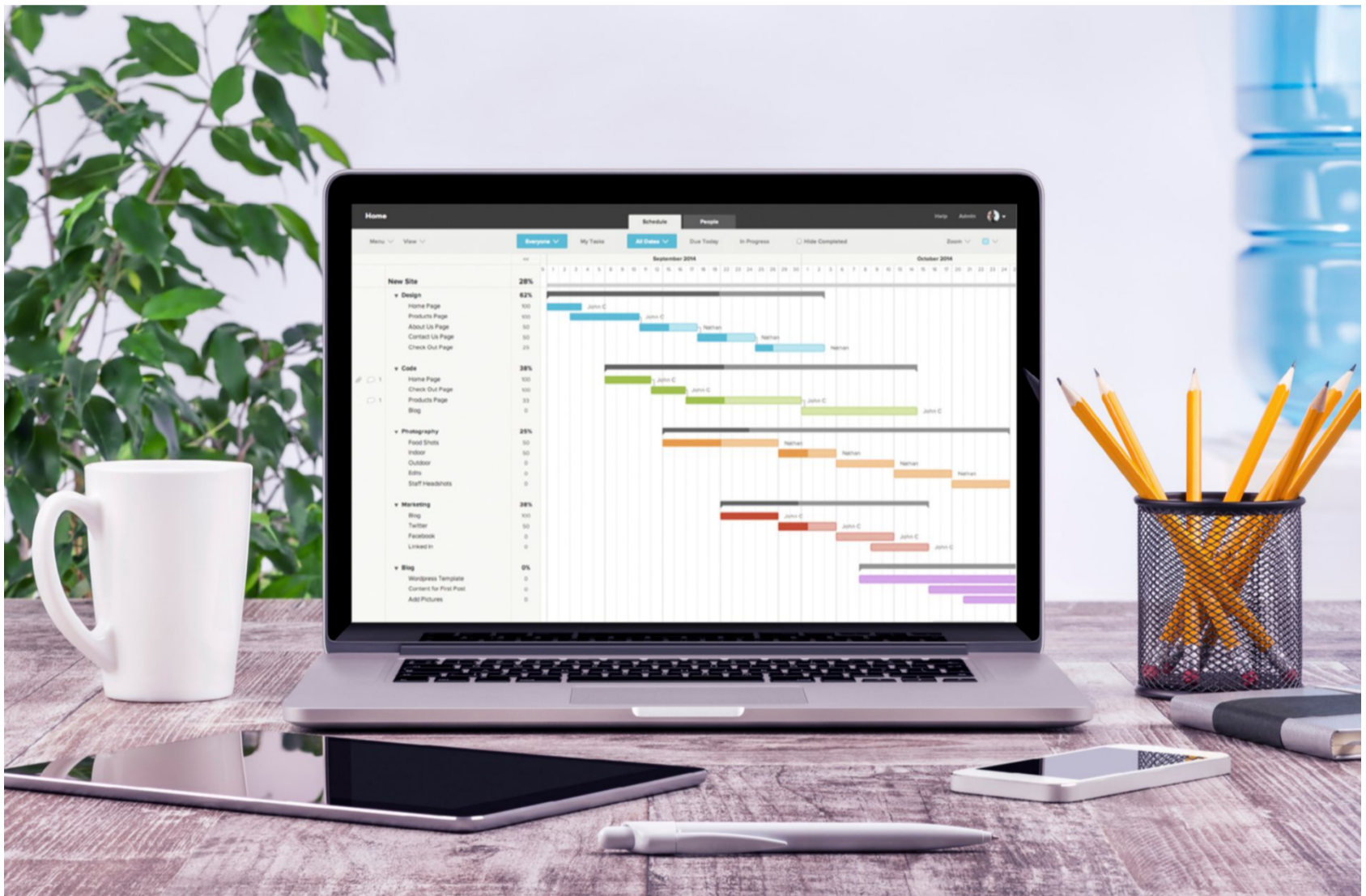
Before you start a new project, it helps to have a roadmap, some kind of clear overview of all the necessary steps and the order in which those steps need to occur. That's essentially what a Gantt chart is. It doesn't matter if the project is a personal one, such as adding a deck to the back of your house, or a business one: say, building a new website. You need to know

- when and where you're starting,
- all the steps along the way and how long they will take,
- who is responsible for each step,
- the order in which the steps need to occur, and
- when the project will be completed.

Gantt charts, named for the engineer and consultant Henry Gantt, who developed and used them in the 1910s, are a visualization of a project from start to finish. They are a common type of productivity tool, and they're a key part of many project management services. In fact, the excellent TeamGantt service even takes its name from the charts. Read on to find out what Gantt charts are, what they do, how people use them, and five steps for getting started with them.

WHAT IS A GANTT CHART?

"A Gantt chart is a visualization of the steps it takes for your project to be completed," explained Kayvon Ghaffari, lead program manager at LiquidPlanner, when I recently asked him to share some insight about getting started with Gantt charts. LiquidPlanner is an Editors Choice–winning project management and workplace collaboration app that emphasizes, of course, Gantt charts.

Ghaffari reminded me that a project is different from other types of work. "A project is a set of work that has a beginning and an end, and the fulfillment of creating that project is a set of tasks," he said. Gantt charts work for projects specifically, not for ongoing work. They're about helping you get from the beginning to the end, so it's important that there is an end.

> **They are a common type of productivity tool, and they're a key part of many project management services.**

A ROADMAP FOR PROJECTS
Gantt charts read from left to right, top to bottom. (Image courtesy of TeamGantt)
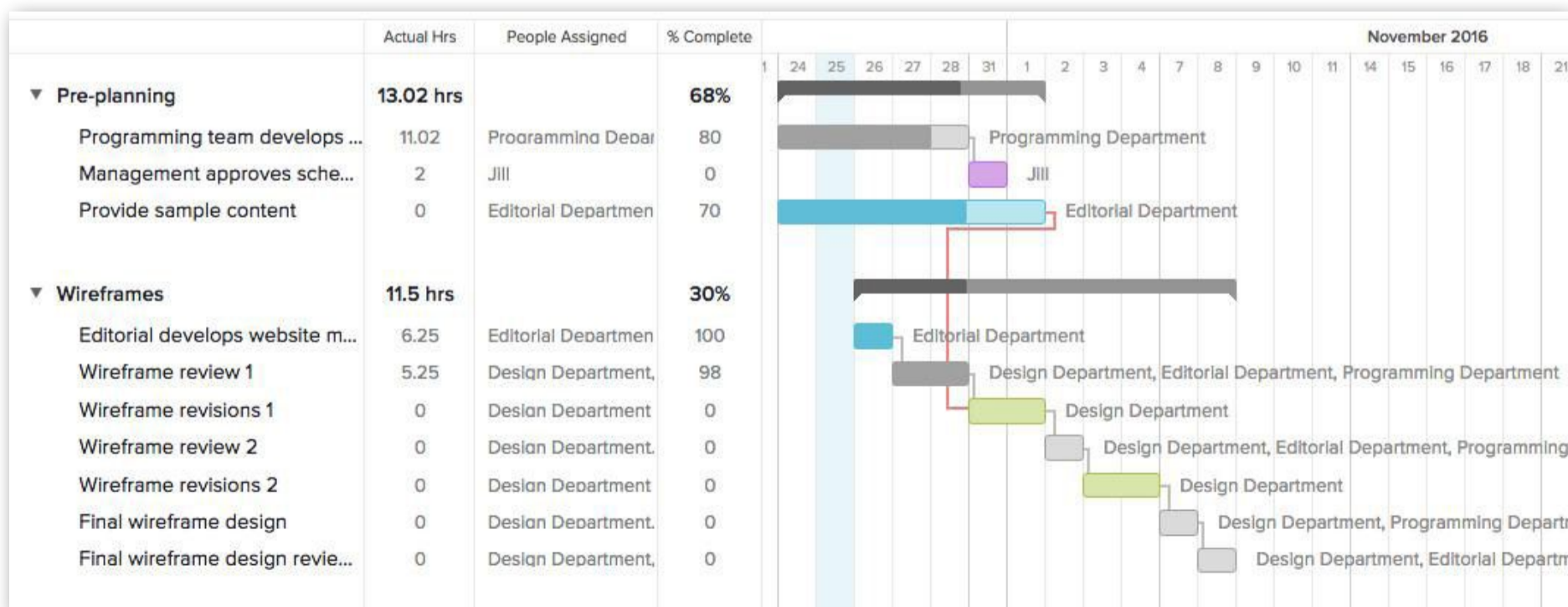
Gantt charts read from left to right, top to bottom. The x-axis is time. The chart starts when the project kicks off and ends when the project is delivered. Running the length of the y-axis are tasks, although they're merely in a list. Their exact placement on the y-axis is irrelevant, although they tend to fall in chronological order.

"A task has three components: what it is, how long it's going to take, and who's going to do it," Ghaffari said. On a Gantt chart, each task is represented with a bar. The length of the bar shows how much time the task will take. Often task bars are color-coordinated, indicating which person or department is responsible for getting the task done. As to the "what," the task name generally appears on the bar or becomes visible when you click on it.

In addition to showing all the tasks for a project and how long they will take, Gantt charts show sequencing and dependency. In other words, they show the order in which tasks need to happen, and whether one thing must occur before another. Why is that so important?

WHAT DO GANTT CHARTS DO?

"Gantt charts make it visually clear that you can't do everything at the same time," said Chris Savoie, Workfront's direct of product strategy. He used the example of building a tree house. You can buy the nails and the wood at the same time, but you must cut the wood before you nail it into the tree.

Gantt charts show dependencies between tasks, usually with something like a line connecting them.
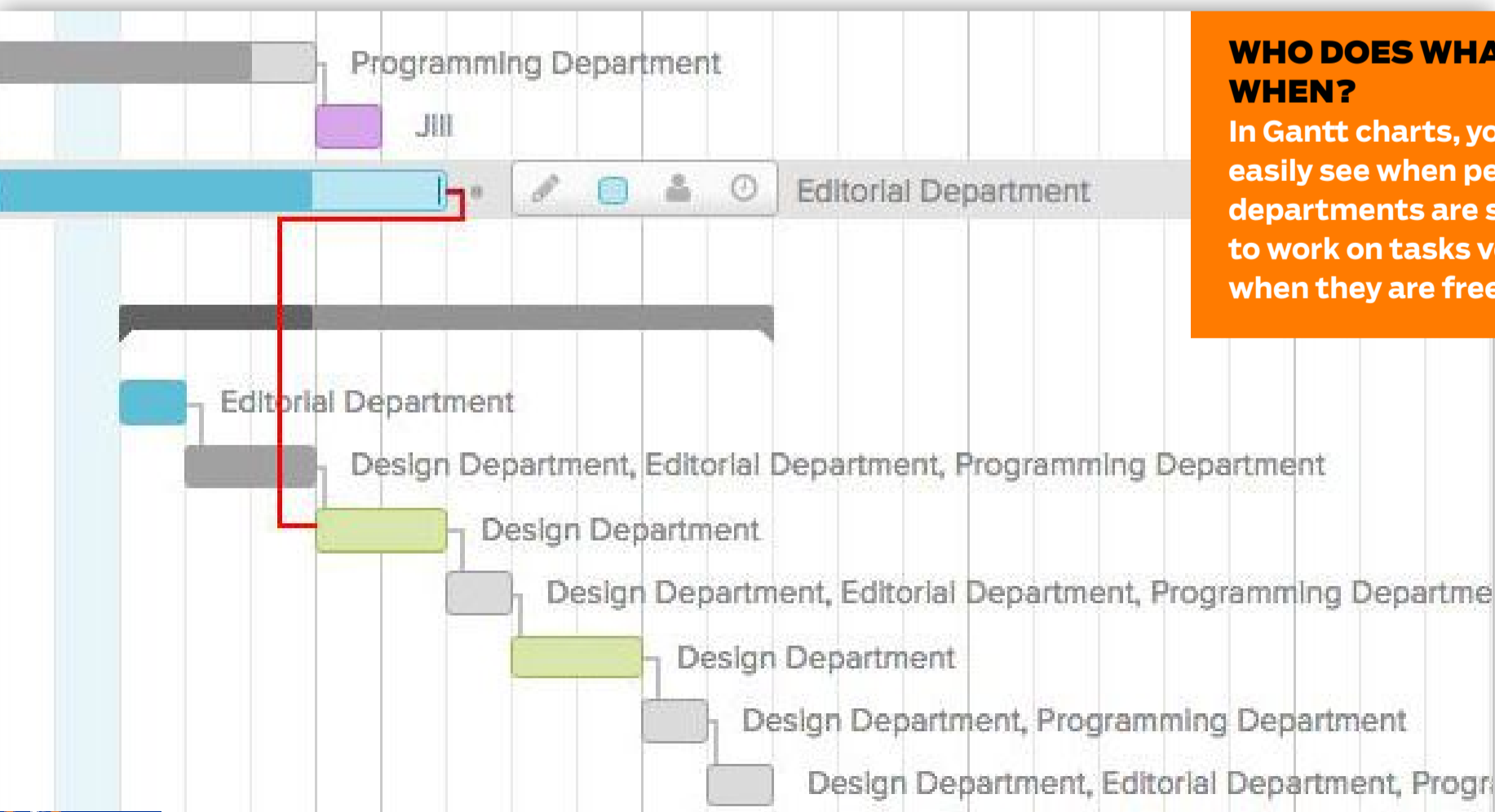
WHO DOES WHAT, WHEN?
In Gantt charts, you can easily see when people or departments are scheduled to work on tasks versus when they are free.

Before joining Workfront (like LiquidPlanner, a tool for workplace collaboration and project management), Savoie worked on some highly complex projects with United Space Alliance in conjunction with NASA's Johnson Space Center. He mentioned that while sequencing and dependencies are important for even simple projects, such as building a treehouse, they are crucial for massive, years-long projects such as building the International Space Station.

Another thing that Gantt charts do is help organizations or project leads manage resources. "Just because a task exists doesn't mean there's a person who is free to do it," Ghaffari said.

With a Gantt chart, you can easily see when people or departments are scheduled to work on tasks versus when they are free. "You need to be able to account for people's schedules and how many hours there are in the day," he added. Gantt charts create an effective way to see time, tasks, and resources.

GETTING STARTED WITH GANTT CHARTS

Once you have a high-level understanding of what Gantt charts are and why they're useful, you can start making them for your own projects. These five steps will help you start.

1. Choose a template or build one from scratch.

Generally, when you start a new Gantt chart, you have the option of using a template or starting from scratch. Templates might come from an outside source, in the case of those provided by project management software, or they can come from a past project of your own.

One of the benefits of using your own previous work to create a template is that you can often learn a lot from what happened in the past. The template will provide information about not only the tasks and sequencing, but also whether any tasks took longer than expected.

2. Mark your milestones.

Most software for creating Gantt charts includes the ability to add milestones, markers that indicate a phase of a project is complete. For example, in building a website, locking down the wireframes is a typical milestone.

When building a Gantt chart from scratch, it's often helpful to plot all the milestones before adding any tasks. Listing all the milestones helps break down the project into smaller pieces, and those smaller pieces are easier to conceptualize than the whole project at once.

3. Add tasks, sequence events, and create dependencies.

The next step is to add tasks, sequence events, and create dependencies. When adding tasks, be sure to look at historical reports or talk to the people who will complete the tasks to get accurate estimates for how long they should take.

When sequencing events, keep in mind that it is possible for multiple tasks to be performed at the same time, but not by the same person. In a website build, one person can work on wireframes while another person gathers sample content for the prototype. But the wireframe designer can't also create mood boards simultaneously.

> **People rarely, if ever, look at an entire Gantt chart at once, because they're typically huge.**
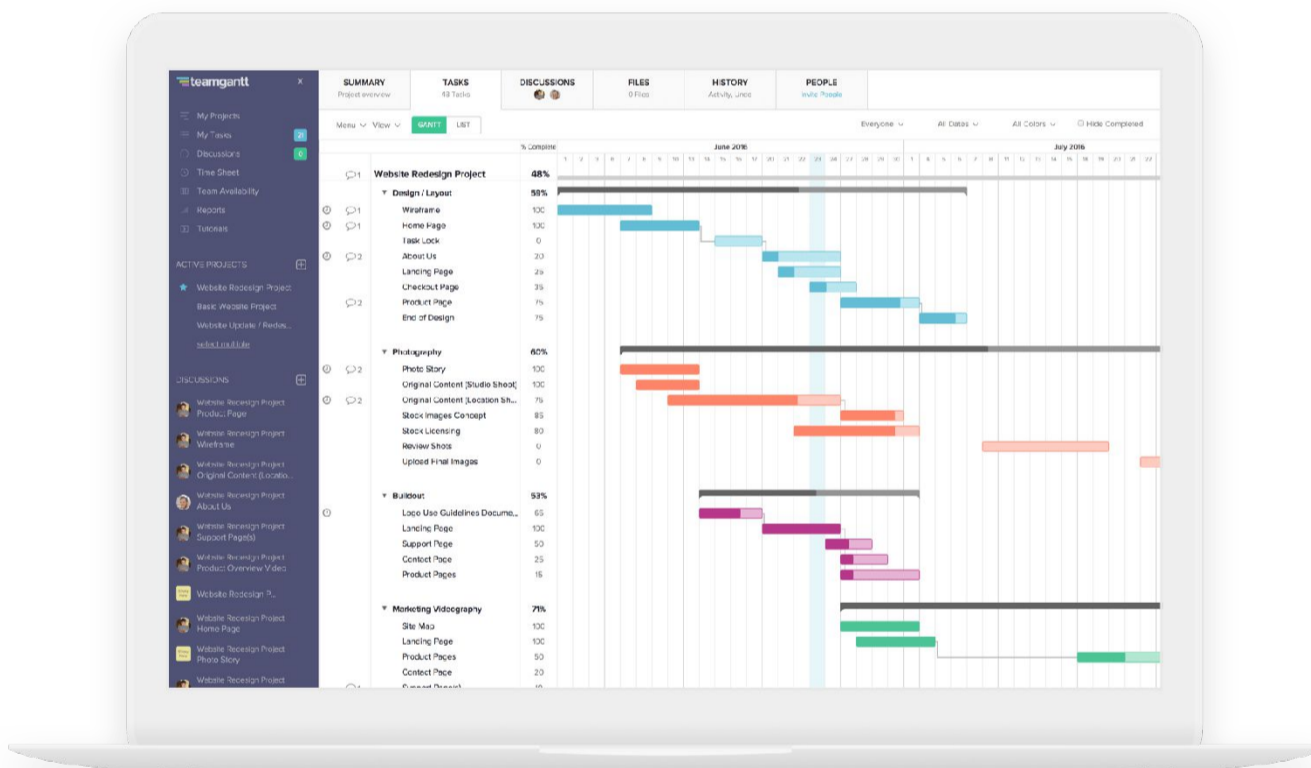
Add dependencies only after you've listed all the tasks and put them in the right order, and be careful with them. "The thing that can really mess you up is if you go halfway into the Gantt chart and see that, say, task 12 is no longer dependent on task 5," said Savoie. He added that beginners should be extremely careful not to remove dependencies unless they're sure it's correct to do so, because getting them back is very difficult if they create a long chain of events.

4. Watch your resources.

"Tasks need to be in the right order, and then you need to control for who is available to complete those tasks," Ghaffari explained. As mentioned above, just because there's a task to do doesn't mean there's someone free to do it.

Ghaffari noted that his company's Gantt chart software doesn't allow for overbooking, meaning LiquidPlanner won't let you assign someone to a task if that person is already assigned to a different task at the same time.

Gantt charts help you see not only if a resource is overbooked, but what the consequences are on the rest of the project schedule when it's corrected.

5. Collaborate.

"It's really important that people understand that the Gantt chart isn't magic," said Ghaffari. "Just because you've planned something, doesn't mean it has anything to do with reality."

The way to make sure the Gantt chart is in tune with reality is through collaboration. Often, Gantt chart software is part of a larger project management or workplace collaboration package. Everyone on a team should have the ability to at least see the chart, if not update tasks and other information that feeds into it. That way, if an assignee finishes a task early, and she has the power to update her progress to mark the task complete and correct the estimated time, and by doing she may help other assignees to get their tasks done early, too. Or she might also flag herself as an available resource to help with some other task until her next scheduled assignment.

Ghaffari summarized the power of collaboration this way: "If the Gantt chart is in a vacuum, who knows if it's accurate? If it's collaborative, then there are checks built in, and it's more likely to reflect reality. That's where the value of the Gantt chart shines."

FINALLY, DON'T RELY TOO MUCH ON GANTT CHARTS

Both Ghaffari and Savoie told me that they use Gantt charts for planning and to check in on a project, but they don't like to manage day-to-day work in it. "It's a plan, not an execution schedule, typically," said Savoie.

Savoie also noted that a beginner might not realize that people rarely, if ever, look at an entire Gantt chart at once, because they're typically huge. "You'd need a billboard to print it," he said. "Building the Gantt chart is not the end goal. It's a visualization of the task plan and sequencing. The Gantt chart helps people understand how the plan is going to work."

How to Free Up Disk Space on Your Windows 10 PC

BY LANCE WHITNEY
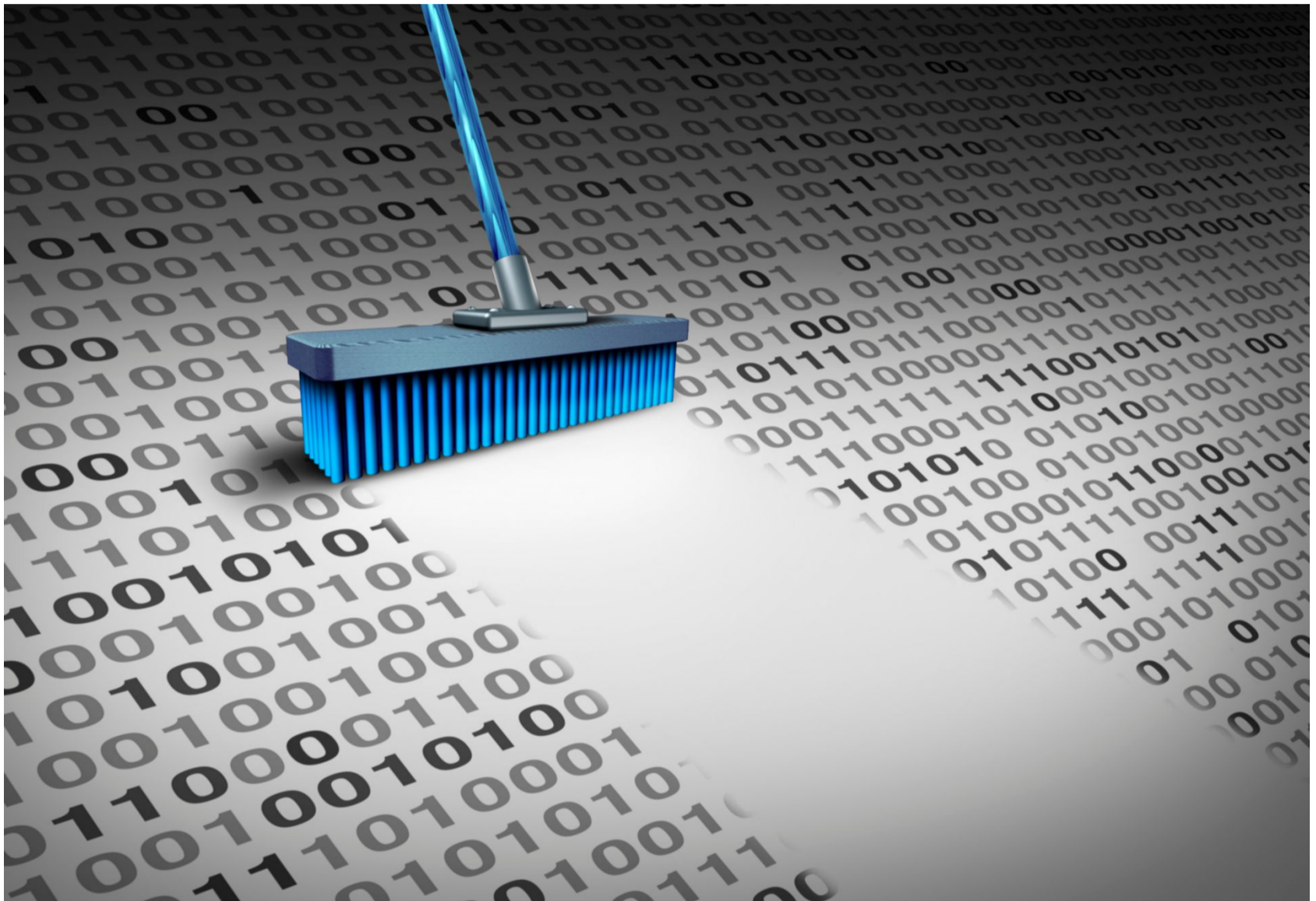
So your Windows 10 hard drive is showing signs that it's close to empty. You barely have enough room for your current applications and files, let alone new ones. Sure, hard drives are cheap, so you can always clone your existing one. But let's say you first want to try to get more mileage out of your current drive. There are a few ways you can do this.

The first and most obvious task is to delete files you no longer use. Granted, this chore will likely take awhile, since you may bump into hundreds or even thousands of files you no longer need. To do this, open File Explorer, jump to the folders that contain your documents and other personal files, sort your files by modified date with the oldest ones appearing first, and then simply scrap the old and unneeded ones.

Here's another method to put the kibosh on unneeded files in Windows 10. Click on the Start button and then select Settings > System > Storage. Click on your main hard drive at the top of the window. Windows 10 calculates the types of files on your drive and how much space they take up. Click on a particular file type such as Documents, Pictures, or Music. Then click on the button to view those specific types of files. And finally, browse through the list to see which you can delete.

Next, you may want to uninstall applications you no longer use. This includes Windows apps as well as full-

blown desktop programs. Click the Start button and select Settings > System > Apps & features. Sort your applications by size, and see whether you can rid yourself of some of the heavy hitters. If you're not sure about a particular program, though, best to keep it.

For those who upgraded to Windows 10 from Windows 7 or 8.1, here's another trick. As part of the upgrade, Windows left behind a copy of the older version, which you no longer need as long as you plan to stick with Windows 10. Fire up File Explorer and open your C drive. Look for a folder called Windows.old and delete it. If you can't find it, though, don't worry—Windows will delete the folder automatically a month after you upgrade.

Here's one we usually forget: Empty your Recycle Bin. By default, any file you delete remains on your hard

drive via the Recycle Bin so you can recover it if necessary. But at some point, the bin will get big, so you'll want to prune it. You can double-click on the Recycle Bin to view and delete any individual files you no longer need, or you can right-click on the Recycle Bin icon and click on the Empty Recycle Bin command to purge all the files within.

Do you use Microsoft OneDrive to sync your documents and other files in the cloud? By default, your OneDrive files are saved on your PC and your OneDrive storage site. But you can tweak the settings so the files are stored only online and not on your hard drive. Here's how: Right-click the OneDrive icon in the Windows system tray. Select Settings > Choose folders. Uncheck the checkboxes for the folders you don't want to save on your PC and then select OK.

Finally, here's an oldie but a goodie to catch anything still left to delete. The Windows Disk Cleanup tool can get rid of a whole mess of files in one shot. Click on the Start button and scroll down the Apps list, open the Windows Administrative Tools folder, and then select Disk Cleanup. The Disk Cleanup tool displays a series of file categories and determines how much space you can free up per category. Click on each category to view a description. In some cases, you can also view the files in that category. Click on the checkmarks next to the categories you feel comfortable deleting, and then click the OK button.

> **You can tweak Windows 10 settings so your files are stored only online and not on your hard drive.**

Tips for Preserving Your Photos

BY JIM FISHER

Forgetting about the old ways of doing things is easy. Rotary phones, cassette tapes, and film are all relics that seem alien to youth raised on smartphones, streaming music, and digital cameras. But many families have photo albums gathering dust on a shelf or locked away in storage, and those with less organization may simply stumble upon a shoebox full of old prints and negatives in varying conditions. Converting those images to digital format will ensure that they're available for generations to come.

KEEP YOUR PICS AROUND
Don't abandon those old albums and shoeboxes full of photos and negatives—digitizing them now can preserve family memories for generations to come.

SCANNING PRINTS

Digitizing old photos can be a time-consuming process, but a worthwhile one, as you'll be able to share images easily with family members and friends scattered about the globe. You could save time by opting for a scanning service, but for those with the DIY spirit (or who are looking to save some money), scanning at home is a solid option.

A good flatbed photo scanner is all the hardware you need to scan prints. Make sure that prints are as clean as possible. If they're dusty, use a soft cloth that's free of oil (a freshly-washed handkerchief will do the trick) or compressed air to remove the dust.

Once prints have been digitized, it's decision time as to what to do with the physical media. The easy road is to throw them away—after all, you have digital copies now. But you may wind up regretting that. Consider moving them into modern albums with acid-free materials. That way, you'll still be able to sit around the fireplace and page through images if the mood strikes you. Just make sure to remember to store albums in a temperate environment, free of excessive heat or humidity.

SCANNING NEGATIVES AND SLIDES

Working with negatives is a bit more tricky than with prints, but with the right care and equipment, quality will be much stronger. Many flatbed scanners will also scan negatives, but if you're working with the most common consumer negative size, 35mm, resolution can be disappointing.

DIGITIZING YOUR NEGATIVES
A dedicated 35mm scanner delivers better-quality scans of negative than a flatbed scanner does.

Dedicated 35mm scanners are expensive, but the scanning technology hasn't improved by leaps and bounds over the past decade, so if you've got a large number of negatives to digitize, consider buying a used one. The difference in quality versus a flatbed scanner is palpable. You may have to spend a few hundred dollars to buy a scanner that's dedicated to slides and negatives, but for those who have a large volume of images to scan from film, it's worth the money. And you can always sell the scanner when you're done with the project.

With larger negatives—medium format (120 roll film) and large format—a flatbed scanner does a better job. These negatives have significantly more surface area and information, so the scanner has an easier job putting them into a digital format. Pros will still want to invest in a dedicated film scanner that supports medium format, but a $2,000 piece of hardware is overkill for everyone else.

Flatbed scanners ship with negative holders for medium format film, but the plastic frames don't do a great job of keeping negatives outstretched and out of contact with the scanner glass. Investing in a third-party holder ensures that negatives lay completely flat and include ground glass that eliminates the Newton's Ring effect (an interference pattern that's created by the reflection of light between two surfaces) that plagues negatives scanned with flatbed equipment.

Regardless of whether you're scanning negatives with a flatbed or dedicated 35mm scanner, pay attention to settings. If your scanner supports digital ICE (Image Correction and Enhancement) technology, leave it turned on when scanning color negatives and slides. It does a fine job of removing dust and minor scratches. But if images are black and white, turn ICE off. Not only does it not work with black-and-white negatives, it can significantly harm image quality.

> **"Working with negatives is tricky, but with the right care and equipment, quality will be much stronger."**

The software bundled with your scanner can vary in quality. It will include the basic settings that you'll need to scan prints and documents, but you may find it lacking support for negative scanning. If that's the case, consider a third-party option that gives you a greater level of control.

As with prints, storing negatives after you've scanned them is a personal choice. But once again, my advice is to keep them. A good three-ring binder and sheets of transparent sleeves will keep them safe. And also make sure to store them in a temperate, low-humidity environment.

RETOUCHING

Scanning photos is the first part of your job. Next, you'll want to perform some basic image editing and retouching. Photo-editing software lets you easily crop images and remove redeye from snapshots.

More-advanced editing tools are also available. For instance, you can use editing software to wipe away dust spots, scratches, and creases. It takes information from a location that's close to the damaged area of the photo and uses it to fix the damage. This effect works well in areas of an image with repeating patterns—a blue sky or grassy field—but can be tricky to use on faces, so take care when retouching. Your scans may show color shift or faded colors. Thankfully, color balance is also something you can fix.
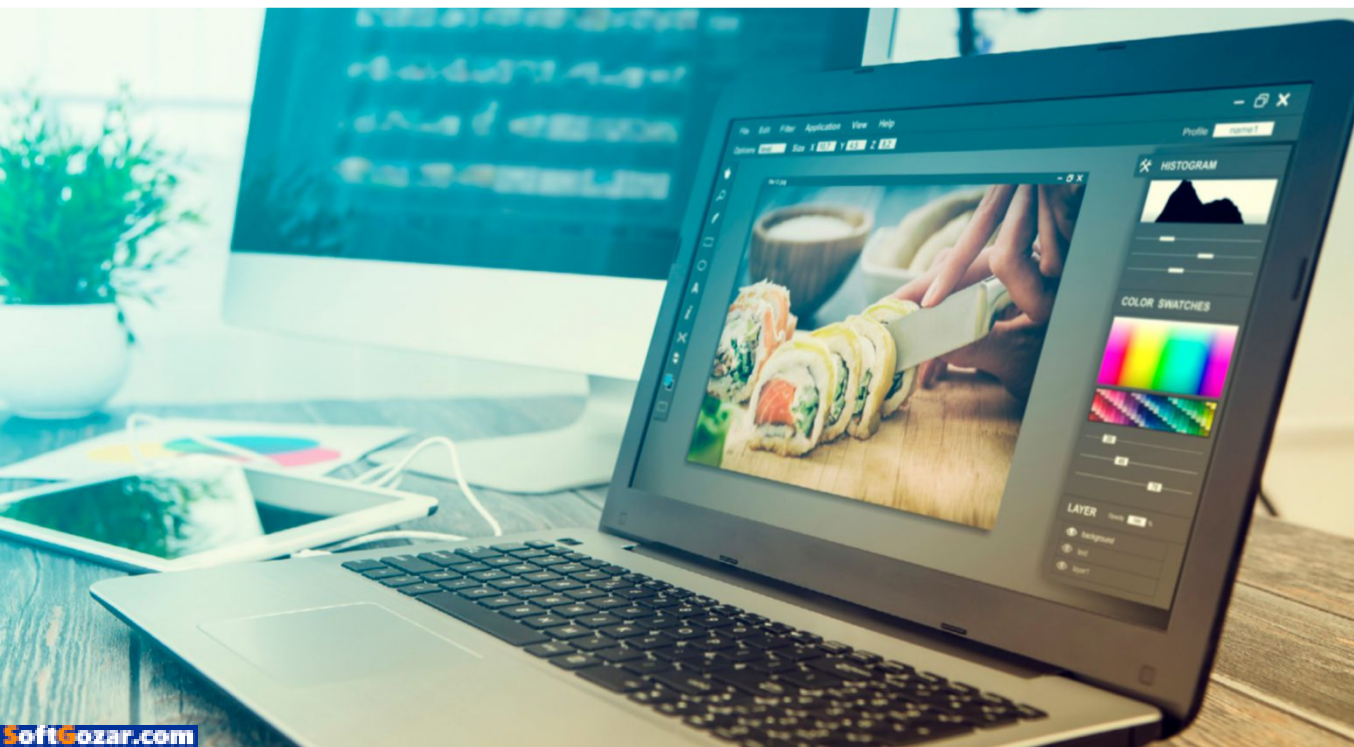
EDITING SCANNED PHOTOS
Editing software can wipe away dust spots, scratches, and creases. It takes information from a location that's close to the damaged area of the photo and uses it to fix the damage.

DIGITAL ARCHIVING

Once you've got your prints and negatives converted to digital format, consider how to organize and store them. At minimum, keep a local backup copy of photos so a hard drive crash doesn't wipe away all of your hard work.

You can back up to a second hard disk (either manually or via software) or to a burned DVD or Blu-ray disc—though with optical media going the way of the floppy disk, the latter is not a forward-thinking method in today's world.

Cloud storage should be looked at as an additional layer of backup. Some services let you store images in folders, share photos with family and friends, and add tags so you can easily view images of the same person, location, or event. And you can find software that offers free storage so you don't have to shell out a yearly fee.

PRESERVING HISTORY

Bringing your family photos into the digital realm can be a daunting prospect. But it's worthwhile. Not only are you stopping the deterioration of physical prints and negatives in its tracks, you're also putting photos in a format that can be viewed on tablets and phones. Your kids can flip through family memories during screen time, and it will prompt them to ask questions about your family history and heritage.

There's a greater purpose, too. Family photos often provide historians with a close look into bygone eras, more personal and intimate than you get with newspaper coverage. The work of street photographer Vivian Maier is an example. Maier shot thousands of images in the 1950s and 60s, and those photos, which were languishing in storage until they were discovered in 2008, have become the subject of gallery shows and documentary films. Not every shoebox of snapshots is going to garner the same amount of attention or acclaim. But small pieces of history, when viewed in the context of the greater tapestry, go a long way to show the styles, customs, and mores of any given era.

How to Delete Your Facebook Account

If you're ready for a Facebook break, you have two options: deactivate or delete. We'll show you how to do both ERIC GRIFFITH
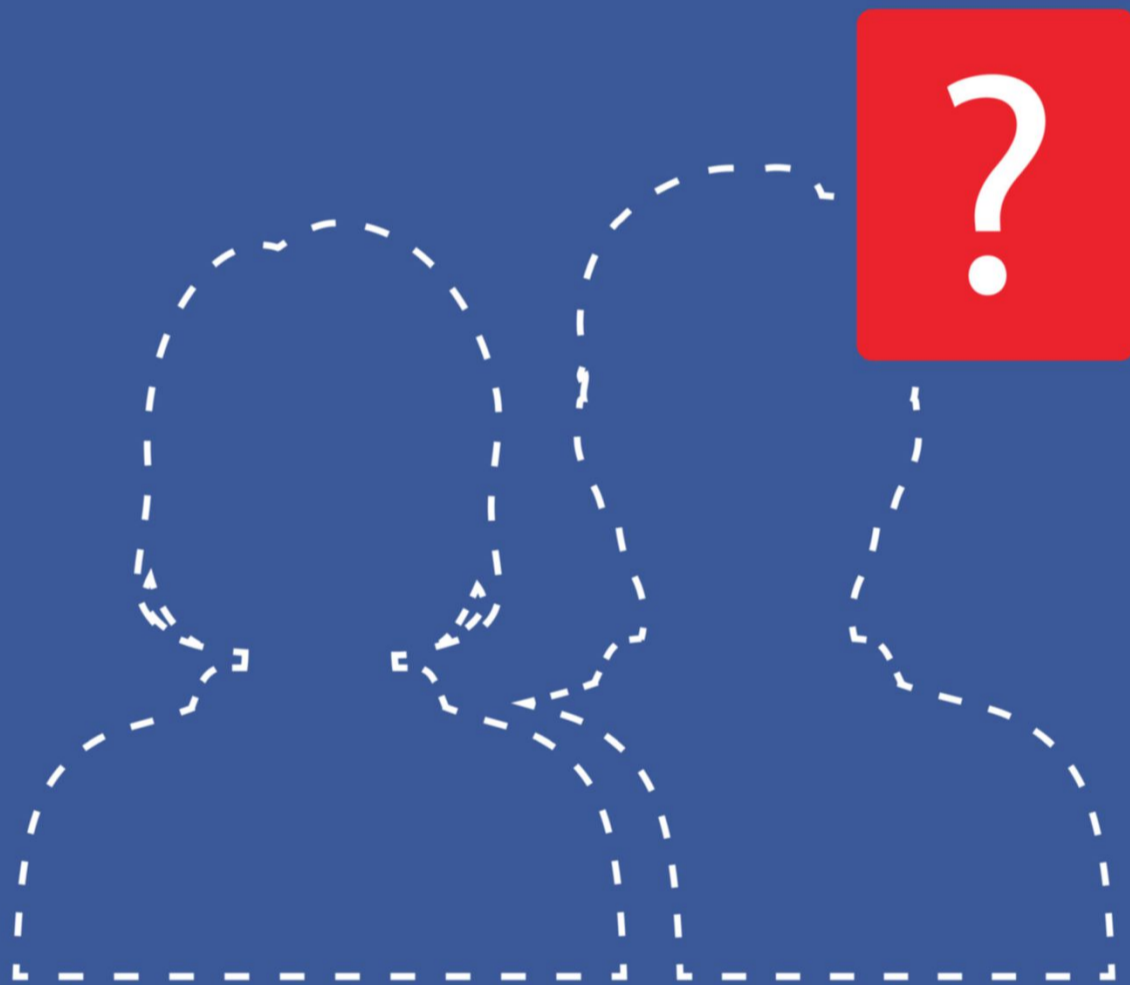
DEACTIVATE

This option couldn't be easier. On the desktop, click the drop-down menu at the top-right of your screen and select Settings. Click Security on the left, and you'll see Deactivate My Account at the bottom; click it. If you're on a mobile device, such as using Facebook for iOS, similarly go to Settings > Account Settings >Security and you'll see a link that says Account—Deactivate

Facebook doesn't take this lightly—it'll do whatever it can to keep you around, including emotional blackmail about how much your friends will miss you.

As such, "Deactivation" is not the same as leaving Facebook. Yes, your timeline will disappear, you won't have access to the site or your account via mobile apps, friends can't post or contact you, and you'll lose access to all those third-party services that use (or require) Facebook for login. But Facebook does not delete the account. Why? So you can reactivate it later.

Just in case that expected reactivation isn't in your future, you should download a copy of all your data on Facebook—posts, photos, videos, chats—from the Settings menu (under General).

ACCOUNT DELETION

To fully delete your Facebook account forever and ever, go to the Delete My Account page at *facebook.com/ help/delete_account*. Just be aware that, per the Facebook data-use policy, "after you remove information from your profile or delete your account, copies of that information may remain viewable elsewhere to the extent it has been shared with others, it was otherwise distributed pursuant to your privacy settings, or it was copied or stored by other users."

> Facebook doesn't take this lightly—it'll do whatever it can to keep you around, including emotional blackmail.

Translation: If you wrote a comment on a friend's status update or photo, it will remain even after you delete your own profile. Some of your posts and pictures may hang around for as long as 90 days after deletion, as well, though just on Facebook servers, not live on the site.

DELETION ON BEHALF OF OTHERS

Facebook bans kids under 13 to comply with federal law. If you want to notify Facebook about a user you know is under 13, you can report the account (you narc). If Facebook can "reasonably verify" the account is used by someone underage, it will delete the account instantly, without informing anyone.

There's a separate form to request removal of accounts for people who are medically incapacitated and thus unable to use Facebook. For this to work, the requester must prove they are the guardian of the person in question (such as by power of attorney) as well as offer an official note from a doctor or medical facility that spells out the incapacitation. Redact any info necessary to keep some privacy, such as medical account numbers, addresses, and so on.

When a user has passed away, a legacy contact—a Facebook friend or relative who was designated by the account owner before they died—can get access to that person's timeline, once approved by Facebook. The legacy contact may need to provide a link to an obituary or other documentation such as a death certificate. Facebook will "memorialize" the page so the deceased's timeline lives on (under control of the legacy contact, who can't post as the deceased) or if asked, remove it.

To designate a specific legacy contact person to handle your account after your passing, go to Settings > Security > Legacy Contact. Once you set one up, you get a notification every year from Facebook to double-check that the contact should stay the same. You can also take an extra step: After your death, if the legacy contact doesn't report you to Facebook as deceased, your account is deleted (even if the legacy contact wants the timeline to be memorialized).

How the Stylus Doomed Microsoft's Phone Business

Steve Ballmer, in a recent wide-ranging interview, was asked to explain what went wrong with Microsoft's smartphone business. He pointed to skepticism over iPhone carrier subsidies, but I have another idea.

As someone who was burned by the Apple iPhone, I know why Microsoft screwed up. Since I was unable to secure any hands-on time with the iPhone prior to its release, I based the critical columns I wrote about the device (for example, in April 2007: "The iPhone Can't Live Up to Its Hype") on the fiasco I saw with Microsoft phones.

Once I got my hands on an iPhone, my tune changed fast; I had to admit the device was a world changer. Not so for Microsoft; Ballmer had nothing good to say. It was peculiar. What was Ballmer not seeing?

I am now convinced it had to do with Ballmer's personality and nothing more. Steve Ballmer, I will argue, is a neat freak. He is organized. Buttoned down. He may yell and scream and seem slovenly, but really, he's just boisterous.

He probably had a Palm Pilot with a stylus, which were all the rage back in the day. When you visited many random Silicon Valley corporate headquarters, the reception desk would have a bowl of free styli for you to take, compliments of the house. "Take a few" was a common refrain; I still find them randomly around my house.

Unlike the rest of us, Ballmer is probably the type of guy who never lost his stylus and scoffed at the notion of a touch-screen iPhone. Thus, he could not really understand its genius.

Just look at how long it took to get the first true Windows phone to market. The company could have easily rejiggered the old software by enlarging the icons and getting rid of the stylus, but no. There were obviously philosophical debates going on about the stylus and other features. Microsoft had already partnered with Sony and Ericsson and could have followed the path that Google took with Android to quickly release a mobile OS. It already had software.

Instead, it partnered with Nokia, which was conflicted with its miserable Symbian software, and the rest is history; one ill-conceived botch after another.

Nobody normal felt any love for the stylus. It was practical but annoying. Now, put yourself in the mind-set that the stylus was great and necessary. Imagine (if at all possible) that you could never lose it and it was anything *but* annoying. This had to be the mindset that kept Microsoft from transitioning to the modern smartphone with any alacrity. It made no sense to them.

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