

# The Internet of Things

The day is coming when your every move could prompt an automated transaction, with products that are smarter and more interconnected than ever. Out of milk? No problem: Your refrigerator will just order more.

BY JOSEPH FLAHERTY

- 1 **Away from home?** Nest Protect sends a message to your smartphone or tablet if the smoke or CO2 alarm goes off.
- 2 A product called Automatic plugs into your car and links to your smartphone to help you drive better.
- 3 Sleep Number is creating a mattress that can track your sleep and even let you elevate your snoring partner.
- 4 Wristbands such as the UP24 and FitBit monitor your exercise and sleep habits and give you tips for better health.



Imagine if your dental floss was connected to the Internet. Seriously, as silly as it sounds, after you had unrolled half of the roll, it could place an order on your behalf at amazon.com, ensuring that a new roll arrived before this one ended. If you forgot to floss one day (or month), it could send a friendly reminder with stats about the benefits of flossing pulled from your dentist's Website. Floss regularly, and that data might even earn you a discount from your insurance company. "Smart floss" sounds like satire, but like your next cleaning, it's

coming up faster than you expect. Omnipresent smartphones and widely accessible Wi-Fi have created hundreds of millions of new access points to the Web. Wireless chips and sensors are becoming small and cheap enough to be disposable. Combined, these technological developments have made it possible to imagine a future where everything—from cars to soda cans—is connected to the Web 24-7. This vision of the future is often called the Internet of Things, and it's almost as old as the Web itself. The first Internet-connected fridge was announced to great fanfare

  
For a slide-show on the Internet of Things, go to [deltasky.com/april](http://deltasky.com/april).

in 1998. It made headlines, but in a world in which most people were still using dial-up Internet connections to argue about the relative merits of *Star Wars* versus *Star Trek*, it didn't get much traction. It would be easy to dismiss the current crop of connected devices, such as the iGrill thermometer that allows Bobby Flay wannabes to monitor meat temperature using an iPhone, as similarly far-fetched. But Peter Corbett, the founder and CEO of Washington, D.C.-based iStrategyLabs, an innovative marketing consultancy, disagrees. His team has built a bevy of Internet-

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connected gadgets for clients such as Coca-Cola, Ford and GE. “It’s the furthest thing from a fad—the enhancement of our physical environment is the present and the future,” says Corbett. “But it’s going to take five to 10 years for people to see the changes in their lives.”

In the short term, we’ll see a lot of gimmicks, such as a special cooler Corbett’s team designed that only unlocks when people check in at its location using Foursquare. It’s a cute concept, but Walmart is using similar technologies to monitor the movement of thousands of product pallets in their warehouses, simplifying its supply chain and saving millions of dollars in the process.

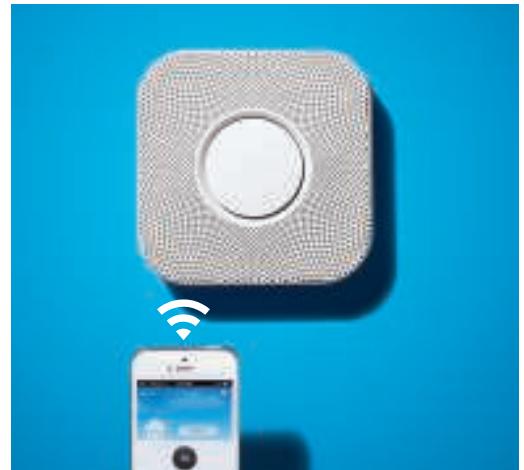
Cisco predicts that by 2020 there will be more than 50 billion objects connected to the Web. Phones and computers make up a healthy share of that number, but soon everything from parking meters to pet food bowls will have an IP address.

In the past 20 years, the Web has become central to every facet of our lives, from banking to buying music. Still, for most people, the Internet is something that’s accessed on a computer or smartphone. Before long, however, it will be embedded in the objects we interact with throughout the day—and even while we sleep.

#### A DAY ON THE INTERNET OF THINGS

One nice benefit the Internet of Things will bring is the end of the alarm clock. Conductive threads in your sheets will record your sleep

state to a Website and your REM patterns will be compared to traffic data. If it looks like a traffic jam will make you late for your 9 a.m. meeting, a wristband will gently vibrate to wake you up at the perfect time in your sleep cycle.



#### IF THE NEST AIR QUALITY MONITOR DETECTS DANGEROUS LEVELS OF CARBON MONOXIDE, IT CAN SHUT OFF THE FURNACE AND CALL 911.

On your drive to work, a small device plugged in under your dashboard will coach you on how to drive—starting and stopping more slowly and keeping your foot off the gas—to help reduce the amount of money wasted on fuel while also reducing carbon in the atmosphere.

At work, task chairs will monitor your posture and send you an email if you slouch. Cameras in your computer will monitor your eye movement and bring more energizing tasks to your attention if you start to slow down.

A trip to the gym at lunch will burn a few hundred calories, but also produce a surfeit of data that will sync effortlessly with the



electronic medical record at your doctor's office. At your next appointment, instead of asking you how much you exercise, the doctor will know down to the step.

If you stop for groceries on the way home, when you walk through the store and look at the items on display, they'll be looking back at you. Cameras built into the shelves will be able to identify your gender, age and family size, and instantly tailor a coupon to match your demographics. Oh, and an array of cameras inside your fridge will let you check to see if you need milk.

Even while you sleep, the Internet of Things will be watching. A start-up called Nest, which recently was sold to Google for \$3.2 billion, manufactures a smart thermostat and air quality monitor. If the air quality

monitor detects dangerous levels of carbon monoxide, it can shut off the furnace and send an emergency notification.

Cars, furniture, health care, food and architecture—all are multibillion-dollar industries that haven't been impacted by the Internet in the way video games or movies have been, but they will be, and soon.

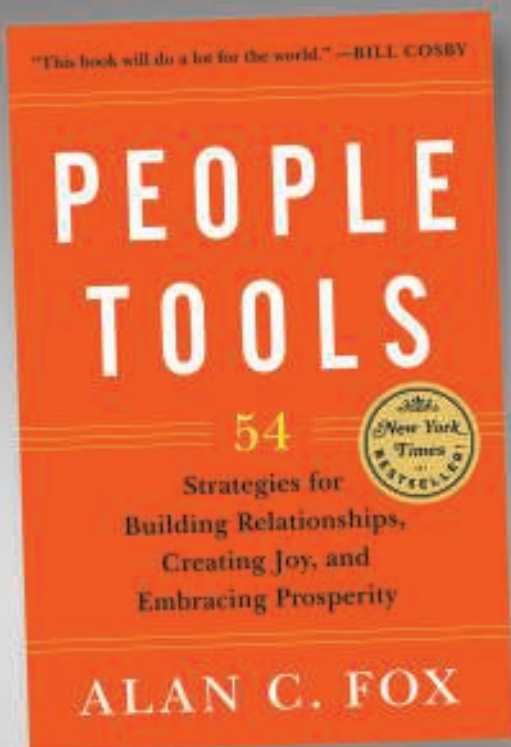
#### FORGET HACKED PASSWORDS

These interactions will delight many and transform the lives of others, but the Internet of Things has a dark side. Computer hackers can infect your computer with a virus or steal your credit card numbers online, but the next-gen variety could potentially hijack your pacemaker, holding your heart for ransom.

This scenario was a plot point on *Homeland*, but when Vice President Dick Cheney had his pacemaker replaced, his doctor demanded that the Internet connectivity features, used for remote monitoring, be turned off. "There have always been risks to being on the Internet, but you probably didn't have to worry about having your organs get hacked," Corbett says.

Privacy will also be a challenge. Sensors and cameras will be monitoring you around the clock, and while this may initially be seen as a boon to parents of teenagers, it could be a devastating tool in the hands of a despotic government. Even in the United States, the NSA already knows to whom you're sending email, but soon it will know what you ate for breakfast. This will frighten many, but it's an inescap-

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able reality. “We’re not going to have a fully automated and utopian technical society and have the level of privacy we have now,” Corbett says.

These scenarios are dramatic, but the Internet of Things will also face the more mundane danger of mediocrity. The Web was able to grow remarkably quickly because of the amazing value it provided, but also because its novelty caught people off-guard. With few patents to slow down start-ups and the low cost of starting new companies, industry after industry changed—usually for the better. In today’s patent-filled and highly regulated world of physical devices, we’ll see many more roadblocks that could

**“WE’RE NOT GOING TO HAVE A FULLY AUTOMATED AND UTOPIAN TECHNICAL SOCIETY AND HAVE THE LEVEL OF PRIVACY WE HAVE NOW.”**

feel more like clunky cable boxes than ultracool iPhones.

Just think, the Internet of Things might force you to consult an app—just to use your toaster.

**A MAGICAL FUTURE AWAITS**

Despite the risks, venture capitalists—including many of the same ones who funded Google, Facebook and Twitter—are opening their wallets and investing hundreds of millions of dollars into Web-connected gadgets and the infrastructure that powers them. Even consumers are showing a willingness to support start-ups in this space. Pebble, makers of a smart watch that connects to your smartphone,

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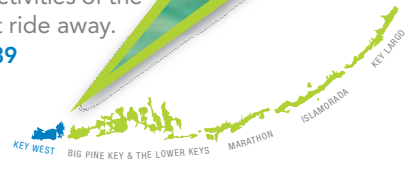


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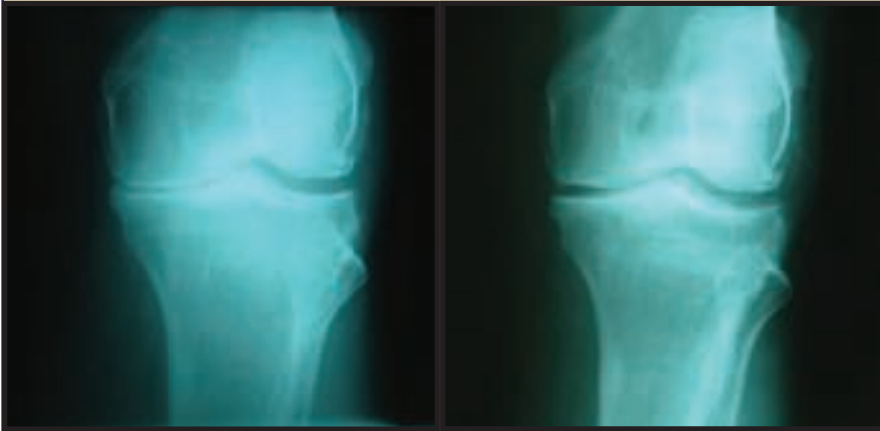
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### Pages 84-95

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## THE CENTER FOR REGENERATIVE MEDICINE A NON-SURGICAL TECHNIQUE TO FIGHT AGAINST ARTHRITIS AND SPORTS INJURIES



**The Knee Diaries:** SJ is a 60-year-old male with the chief complaint of knee pain who visited The Center for Regenerative Medicine over a year ago. He was diagnosed with bone-on-bone osteoarthritis of the left knee, causing much pain and discomfort; at that point he was told only a total knee replacement could help him. He is otherwise healthy. On exam he had point tenderness to the medial side of the left knee (medical lingo: inner side). An X-ray showed severe arthritis of the knee (X-ray on the left). Patient started receiving treatments at The Center for Regenerative Medicine. Today he is feeling better (X-ray on the right).

**This is how it works:** The physician introduces **Cell Therapy** into damaged, arthritic cells by means of a precise injection. This process is followed by several other modalities, including Collateral Artery Flow Exercises (C.A.F.E.), in order to accelerate the process. Depending on tissue damage, severity of the condition and the size of the joint that needs to be injected, people usually need a series of 1 to 6 treatments to improve. There is usually no downtime, and people can go back to their usual activities or work immediately. The treatments can help most musculoskeletal problems such as low back pain, neck pain, knee pain, shoulder pain, whiplash, sciatica, tendinitis, sprain, strains, torn ligaments and cartilage damage.

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For more information and to read more on "The Knee Diaries", please visit [www.arthritisusa.net](http://www.arthritisusa.net) or call (305) 866-8384.

(Continued from page 47)

raised \$10 million from early customers on Kickstarter.

The Internet of Things won't be limited to sensors and screens. Data from the Web will be transformed into physical objects using 3-D printers. Today, characters from video games can be transformed into toys, but scientists are using data from sonograms to create 3-D models and give parents the opportunity to hold their children months before they're born.

It will take years for these technologies to make their way into everyday life, but a trip to Walt Disney World in Orlando provides a snapshot of what an Internet of Things future might look like.

At the theme park, some visitors have the opportunity to use "MagicBands," bracelets with radio frequency chips embedded inside them, which transform tourists into wizards. By waving a hand in front of their hotel room door, it unlocks. Kiosks are able to access a credit card number associated with the band, and a dinner bill can be paid with the flick of a wrist. Mickey Mouse will even be able to address you by name, proving that it is a small world after all.

Twenty years ago, online dating was a punch line, but today, more than a third of marriages start online. A couple of decades from now, getting floss delivered by one of Amazon's drones could be equally commonplace. The concept of a self-driving car seems like the height of sci-fi, but dozens of Google engineers are ferried to their offices by robot cars—today.

Like it or not, the Internet of Things is going to change everything—large and small. "On the Internet of Things, I don't need to think about buying toilet paper," Corbett says. "It automates mundane activities and soon we'll be saying, 'I can't believe I had to remember to get milk; I can't believe I had to do these things myself.'" ▼