TECHNICALLY

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Letter From the Editor

The 2016 presidential campaign has been dominating the news. That's why we elected to look at the polling process in this issue's cover story.

In "Tech the Vote," we hear about the technology behind balloting from the chief executive officer of an Arizona-based election company, one of six in the nation. Tech advances are changing the way Americans vote around the U.S. And though internet voting isn't here yet, other improvements are combining new and old IT to enhance the voter experience. Plus, we find out the easiest, most secure and reliable way to cast your ballot — and why it's not likely to change — in an exclusive video interview.

Similar to voting technology that has been slow to change, healthcare IT has held on to legacy systems for too long. However, health-monitoring devices are helping the healthcare industry and patients work together for better outcomes. Read how in the feature, "Hacking Healthier Behaviors."

Swinging the pendulum away from slow-changing voting and health technology is a discussion about ever-evolving cloud computing. In our feature, "The Year of the Cloud," review some of the top cloud computing solutions available today and what's to come in the future.

Our columns, Tech Translation and Tech Tools on the Job, define the Internet of Things (IoT) and how analysts can help their company cash in on their data.

Shay Moser is Technically's editor-in-chief
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Tech Translation

The Internet of Things

BY SHAY MOSER

The Internet of Things (IoT) is a term we're hearing a lot lately. A surprising number of appliances are already smarter than you might think. For example, Heating, Ventilation and Air Conditioning (HVAC) systems can be connected to the internet. We'll explain:

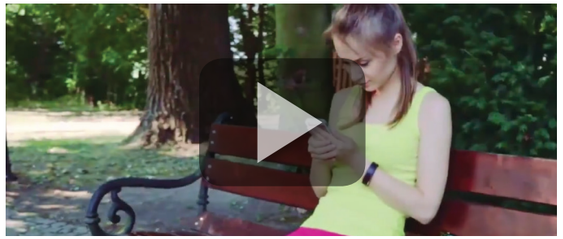
Let's say the office where you work has not only a connected HVAC but smart lighting, too. This means the connected HVAC and lighting can sense whether people are in the area and adjust. Maintenance staff will receive alerts about the productivity of the HVAC equipment and lighting, helping save electricity.

There's also a customer service benefit to the IoT. If the HVAC isn't working, anyone can call customer service, who can take over your business HVAC from their external location to troubleshoot the issue.

Another example is in the healthcare industry, which is faced with more than just technological evolution. IT professionals at hospitals, for instance, are managing a new healthcare delivery system — from genomics and personalized medicine to new value-based care delivery models. These new modern needs and capabilities are largely incongruent with traditional systems architected to take care of the patients inside the hospital rather than in the community. The challenge is to achieve data interoperability, compliance and security — while putting patients' health and experience first. Watch how connected devices will help manage the healthcare of a population as they move freely throughout their daily activities.

What's next for the Internet of Things? We're not sure, but what's getting a lot of attention in the news is how to secure and use the data collected from "things" for competitive advantage.

See how customers receive personalized experiences in the banking industry:



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Tech Tools on the Job

Analytics leaders cash in on data

BY TERESA MEEK

What's your company's information worth?

Of course it's valuable to *you* — you use it to help your business run smoothly and serve customers every day.

But that's not the kind of value we're talking about. We mean the literal dollars-and-cents value of the hoards of data your company collects — on its products, its operations and the habits of the people it sells to. Any idea what that might be worth?

If you're like most analytics leaders, you don't have a clue. Most information leaders don't even know how to organize their company's data well enough to *attempt* to find out its worth, according to a new Gartner report.

As an information strategy chief for a large company recently said to Gartner, "We have a better accounting of the toilets in our building than we do our information assets."

That's a sad state of affairs. Unless you organize information the right way, your company is losing out on money it could be making internally, externally or both.

Within your walls, your data could tell you how to operate with maximum efficiency or help you decide which product to develop next. Outside your company, the same old databases you work with every day could be a gold mine of new information for another industry.

Some business sectors are already reaping benefits from their data:

- Telecommunications companies routinely sell customer information to banks, which use it to detect fraud by analyzing customer location and purchases.
- Credit card companies sell information to retailers, who use it to spot high-value potential customers.
- Retailers sell their information to manufacturers, who use it to design products that are likely to catch on. For example, British grocery chain Tesco sells customer information to makers of consumer packaged goods, who are happy to pay for a trove of details about the people they want to sell to.

To get started monetizing your data, a good tool to use is a matrix chart. Set up a chart showing various types of information your organization collects and assign a feasibility score to each. For example, on a scale of one to four, how likely is it that the data will be useful to a noncompeting industry? Using the same scale, how would you rate your company's capability to package the information into a list you can offer for sale? Be ruthless in your assessments — you probably have a lot of data you can use in some way, so take the time to repurpose it.

For more tips, download this exclusive Gartner report, "Seven Steps to Monetizing Your Information Assets," published October 2015. The report explains what monetizing information is all about and provides a framework for getting started.

Hacking Healthier Behaviors

The Future of Medicine

BY JAKE POINIER

A century ago, the healthcare system focused the bulk of its efforts on communicable diseases and sanitation. Today, the Centers for Disease Control and Prevention (CDC) estimates 86% of healthcare spending in the U.S. is tied to chronic diseases and conditions that are partly or entirely preventable, or can be mitigated with healthier diets and increased exercise.

"The question becomes, 'How do we arm people to hack their own behaviors?'" says Eric Zimmerman, CMO of RedBrick Health, which serves as a hub for adaptive technologies and behavioral models for employers, health plans and healthcare organizations.

Companies from small venture capital startups to the biggest players in big data are hoping the answer to behavioral change lies in technology. Soreon Research, for example, projects that the smart wearable healthcare market will grow to more than $41 billion by 2020.

Beyond the FitBit

Wearables such as FitBit and Jawbone popularized the measurement of consumer fitness and track bio-related stats, but the demand is growing for increasingly sophisticated devices. "Wearables, provided they are relevant and use clinical-grade data, help drive compliance," says Waqaas Al-Siddiq, CEO and founder of Biotricity Inc., a developer of medical remote monitoring solutions that help prevent and manage chronic diseases. "For example, patients with diabetes are a unique group that need to be enabled with medical-grade data from wearables that focus on diet, exercise, cardiac data and seamless integration into their glucose meters — a complete lifestyle solution."

That's the thought process behind Kudolife, a relatively new entrant in the health and fitness space that has incorporated artificial intelligence and machine learning into its weight loss and diabetes management app. The fitness tracker's

algorithm detects what type of activity you're doing, whether walking, running or cycling — or even sitting in traffic — while the mealtime component personalizes each user's nutritional intake. Paired with a glucose meter, the app also helps users understand how activity and foods affect their blood sugar levels. "The idea is that you start to understand your habits," says Kudolife co-founder and CEO Zeeshan Hayat. "First you teach the machine, and then it teaches you the behaviors that are working."

Technology is also making an impact on the clinical trials process. The Janssen Autism Knowledge Engine (JAKE) is an integrated system designed for children with autism, their families and care teams. In addition to streamlining the electronic healthcare records and communications processes, one of its key components is a biosensor array to capture data. "Wearable sensors, patches and computer- or task-based challenge tests allow measurement of the biology of an individual with autism without them having to do anything at all," says Gahan Pandina, senior director and venture leader at Janssen Research & Development. "In the future, we hope to take advantage of remote monitoring to gather information in the individual's home environment, which is less artificial than the lab."

Ultimately, connected health devices offer the promise of less time at the doctor's office and fewer visits to the hospital, while conveying better and more timely information about our behaviors and the impact on our health.

Maximizing accountability and compliance

Ultimately, connected health devices offer the promise of less time at the doctor's office and fewer visits to the hospital, while conveying better and more timely information about our behaviors and the impact on our health. Part of the convergence of technology and healthcare, Zimmerman says, is about leveraging big data to create successes at the individual level. But it's also about money and accountability. "As risks begin shifting, and healthcare delivery organizations get paid for producing better health outcomes, they're going to need to get better at this," he says. "In turn, if we're going to be more accountable as consumers and patients, we need the right tools."

To that end, Robin Farmanfarmaian, a futurist and author of "The Patient as CEO: How Technology Empowers the Healthcare Consumer," sees the monitoring-device trend becoming even less obtrusive than wearables. "It's an industry in its infancy," she says, citing next-gen tools such as epidermal electronics, which are temporary tattoos that stick on your skin for a few weeks, or subcutaneous sensors that stay under the skin for months at a time. "We're already using those for birth control, so imagine doing that with continuous glucose monitoring, an accelerometer or a blood pressure detector. Once it becomes seamless, compliance is 100% — because you've taken the patient out of the equation."

Tech the Vote

Innovation drives wide-ranging changes in how we vote

BY SUSIE STECKNER

Registering to vote on the go. Breezing through check in at the polling place. Quickly casting your pre-filled ballot. Maybe even voting online with your morning cup of coffee.

Your voting experience has been simplified.

See why you should cast your ballot by mail.

Tech innovations are changing the way we vote in elections throughout the country. And though internet voting may be at least another decade away, a host of innovations in place now or on the horizon will impact virtually every step of the voting process.

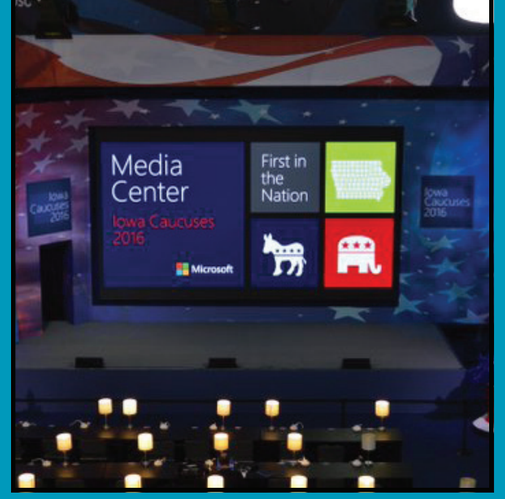
Change is happening, but not overnight.

"The industry is very, very slow to move primarily because of limited funding at the jurisdictions, and voters can be adverse to change," says Kevin Runbeck, chief executive officer of Arizona-based Runbeck Election Services, which provides election technology, printing and mailing services. "We'll see a (voting) system in place for 20 years."

Machines are aging.

Many of the voting machines we use today are reaching their shelf life. They were purchased with federal funds through the Help America Vote Act, established after the infamous punch-card machine failures in 2000 that left the presidency hanging in the balance.

Today, as many as 43 states will employ machines that are at least a decade old, says a report from the Brennan Center for Justice. Election officials in at least



Results On Demand

The Iowa caucuses have the distinction of being the first contest of the presidential campaign. This year, they claimed a tech first — the 2016 Iowa Caucus App.

The creation of InterKnowlogy and its partner, Microsoft, the app is a first-of-its-kind major tech component to caucus reporting. It allowed officials to capture more than 90% of the caucus results within three hours.

The app enables precincts to report their results directly by party, whether using mobile or PC platforms, and ensures that only authorized Iowans are reporting results.

31 states want to purchase new voting machines in the next five years; officials in 22 of these states don't know how they will pay for them.

Researchers suggest states seek out new voting systems that are more modern and flexible, the same conclusion reached in a 2014 White House report on the American voting experience.

That report says tech innovation is critical, and cites a broad range of potential solutions that can help reform the voting process, including:

- Software-only products that can be integrated with off-the-shelf commercial hardware such as laptops, tablets, scanners and printers
- Tablets that are integrated into the check-in, voting and verification processes at the polls
- On-demand ballot tech that can meet wide-ranging voter needs at vote centers
- Technologies that allow voters to "pre-fill" sample ballots at home — and then scan them at the polls place — to expedite voting

Vote online — not so fast.

The innovation on the minds of many — particularly tech-savvy millennials — is internet voting. If so much of our daily life already happens online, why not voting?

At the South by Southwest conference earlier this year, President Barack Obama suggested that Americans should be able to vote in presidential elections online. Obama told the crowd that it's "easier to order a pizza than vote."

Internet voting has long been used by Americans who serve in the military overseas and is a part of elections in other countries. It has been tried in states, notably in Arizona in 2000 and this year when Utah's GOP opened caucuses to online voting.

"The problem with internet voting is it's absolutely hackable," Runbeck says. "And there's no bigger hacking prize than the U.S. presidential election."

But internet voting comes with a host of security concerns — chief among them attacks from lone hackers, political operatives or even foreign governments. Security, privacy and transparency needs won't be met anytime in the foreseeable future, says the nonprofit Verified Voting.

"The problem with internet voting is it's absolutely hackable," Runbeck says. "And there's no bigger hacking prize than the U.S. presidential election."

The landscape is changing.

The shifts that we are experiencing, enabled by tech and innovation, are

designed to foster more efficiency, transparency, uniformity and security, says James Suver, vice president of business development at Runbeck Election Services.

Here's a sampling of what we are seeing:

Online registration — More than 20 states have implemented changes to voter registration, and the White House report urges others to come on board. The early adopters have seen big payoffs. For instance, Arizona — the first state to offer online voter registration— saw youth registration jump from 29% in 2002 to 53% in 2008. States say new reforms have increased registration accuracy and boosted voter satisfaction.

On-demand ballots — On-demand ballot printers are gaining traction with the growing popularity of early voting and vote centers. Once a voter's eligibility is verified, the printers produce the specific ballot type required "on demand." This eliminates the need for keeping large numbers of ballots on hand, which ultimately saves money, and can reduce ballot errors that occur when poll workers distribute the wrong ballot type to a voter.

Touch screen with paper ballots — New and old come together under this system. Voters cast a ballot using touch screen machines but also receive a paper ballot for review. This system creates a paper record to verify vote totals. Experts envision an updated system that uses commercial-off-the-shelf (COTS) hardware, such as an iPad, along with the paper ballot. This would allow jurisdictions to deploy equipment that is far less expensive than current voting machines and replace it easily and at a low cost.

Electronic poll books — More states are moving toward adoption of e-pollbooks, which allow poll workers to find a voter's information quickly and accurately, confirm a voter's registration status and distribute the right ballot. Compared to the traditional paper list, poll books in the form of a tablet or laptop could dramatically speed up check-in procedures and access information in real time.

Innovation is disrupting every arena in American life — sometimes at lightning-fast speed, as with Uber — and the election process is no different. Change won't be coming nearly as fast as that on-demand driver to your doorstep, but it will continue to alter voting in the U.S.

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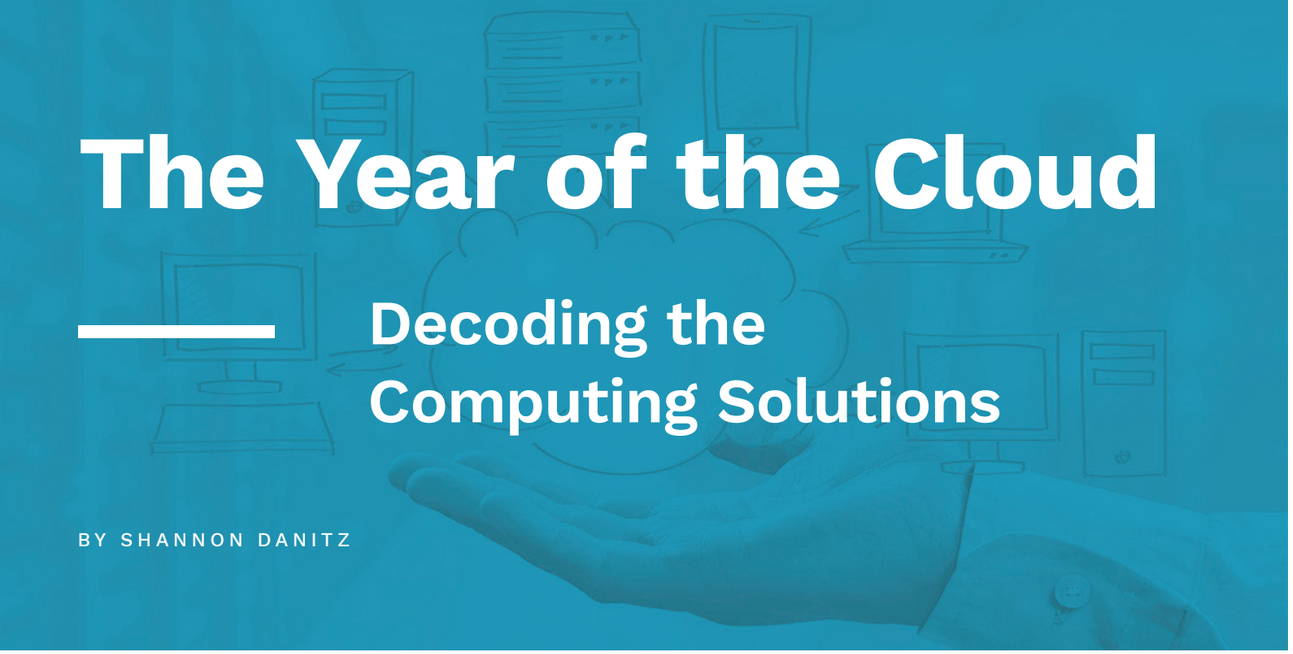

The Year of the Cloud

Decoding the Computing Solutions

BY SHANNON DANITZ

In 2016, Gartner analysts predict the worldwide market for public cloud systems will see a 16.5% increase, Infrastructure as a Service (IaaS) a 38.4% increase and Software as a Service (SaaS) a 20.3% increase, year-over-year.

The recent Insight Intelligent Technology™ Index, which surveyed more than 400 IT professionals about the top concerns of technology decision makers supports these findings. Investment in cloud services was a top priority for more than eight out of 10 professionals surveyed. Nearly every single medium and large organization is planning on a substantial investment in cloud services in 2016.

We shouldn't be so surprised. Cloud solutions allow for flexibility, enhanced disaster recovery options, increased collaboration, reduced capital expenditures and security solutions. With cloud solutions constantly evolving, the opportunities to find the right solution for your organization are endless.

Let's review some of the top cloud computing solutions available today and what's to come in the future:

Public clouds — Public clouds are based on the standard cloud computing model where a service provider such as Amazon Web Services, Microsoft Azure or Google Cloud Platform make a variety of resources available to individuals and organizations via the internet. Given the size and amount of resources public clouds offer, users benefit from scalability, reliability and cost effectiveness. Each public cloud service has its own strengths and weaknesses, and many organizations use a combination of services. For example, Apple recently announced a move to use Google Cloud Platform and HTC has publicly discussed its multiple cloud solutions using Amazon Web Services, Google Cloud Platform and Microsoft Azure.

Private clouds — Private clouds use proprietary architecture to deliver services to a single organization. Organizations often choose to utilize private cloud computing services when dealing with sensitive data or navigating industry regulations. Private clouds allow for greater customization, control over the server, as well as flexibility in freeing up space via "cloud bursting," where non-sensitive data is moved to a public cloud to free up space during times of high demand.

Industry clouds — In highly regulated industries like healthcare and financial services, IT professionals are required to take extra steps to keep data secure, making public cloud computing solutions challenging. Industry cloud services are built for and, often by, organizations within a specific vertical market, including healthcare, financial services, oil and gas, manufacturing, life

With cloud solutions constantly evolving, the opportunities to find the right solution for your organization are endless.

sciences, retail and utilities. According to IDC, there are roughly 150 industry clouds around the globe today with 500 expected by the end of 2018 and more than 1,000 by the end of 2020.

Hybrid clouds — According to a recent Gartner report, by the end of 2017 nearly half of all large enterprises will have moved to hybrid cloud computing solutions. A hybrid cloud is a computing environment that uses a combination of on-premise, private cloud, and third-party public cloud solutions. Organizations with a hybrid cloud approach typically utilize some combination of public cloud solutions along with a private cloud built specifically for the organization and/or an on-premise virtualized environment.

Fog computing, or, fogging — If the Internet of Things (IoT) continues to grow at its current rate, cloud solutions are not going to be able to handle all of the data. Fog computing, a term coined by Cisco, is a new model to ease wireless data transfer to distributed devices. With a wide geographic distribution, fog services are typically hosted closer to the end user at the network edge or even a device. This allows for more efficient data transfer by reducing the amount that needs to be transported to the cloud for processing and storage. It provides benefits in advertising, computing and entertainment, as it allows for data analysis and multiple collection points.

The next big thing: The quantum cloud — In a recent interview with Reddit, Bill Gates predicted quantum cloud computing could be available in the next decade. As ZDNet explained in a recent article, "Quantum computers use subatomic quantum bits, or qubits, which can be in multiple states at once. This means they can carry out more calculations in parallel and could offer new ways of solving problems." Industry leaders like Microsoft, Google, IBM, as well as smaller organizations like D-Wave and Rigetti, are investing in quantum computing. Only time will tell what a quantum cloud solution looks like.