

VIRTUAL REALITY

Companies are pooling IT resources for many different applications. The result: a quantum leap in efficiency.



Online Collaboration

On-demand computing is the new model for organizations looking to get the best returns from their technology investments.

EVEN TECHNOLOGY CAN be too much of a good thing. Servers, storage devices, and networks can boost an organization's efficiency, yet they are often deployed in surprisingly wasteful ways. Equipment is under-used, systems are duplicated, gear is installed on a scale that probably won't be necessary—just in case. The result: a lot of untapped resources and unnecessary expense. It's a lesson the world's largest consumer of information technology—the U.S. government—discovered when it recently analyzed its own high-tech infrastructure.

"Our average utilization of processing power is 27%," Vivek Kundra, the country's first chief information officer, told *Fortune* in July, a month before leaving his post for an academic position at Harvard University. "Average utilization of storage is under 40%."

It's not just Uncle Sam, either. Many businesses doing their own technology audits are finding similarly alarming results, and the problem isn't tech chiefs asleep at the wheel but the traditional ways technology has been deployed throughout an organization. Different departments have their own systems. Different applications—like cus-

tomers relations management (CRM) and payroll—get their own servers and storage. Enterprises buy more resources than they need so that they are covered if demand suddenly spikes. It's an approach that gets the job done but leaves much room for improvement.

Back to the Mainframe

That's where virtualization comes in. The concept traces its history to the mainframe days of the 1960s, but its popularity is burgeoning within business and public IT sectors—and for good reason. Virtualization enables organizations to pool computing resources and use the same servers and storage devices for many different users and applications. The technique vastly increases flexibility and efficiency.

"The big benefit of virtualization is that it lets you consolidate your resources," says Matt Sarrel, executive director of Sarrel Group, a technology consulting company based in New York City and Silicon Valley. "You use less equipment, need less space, and use less electricity."

Working with Dell PowerEdge R900 servers, virtualization enabled the Municipality of Copenhagen, Denmark to cut the number of servers it uses from 638 to just 32. That meant not only less infrastructure to maintain but also less power consumption—not to mention carbon emissions, which were reduced by 77%. Citigroup Inc. used virtualization to minimize the server count in its Frankfurt, Germany data center, which uses

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70% less energy than a conventional data center of similar size. The two-year-old facility was the first data center to be awarded LEED (Leadership in Energy and Environmental Design) Platinum certification, the highest level possible, from the U.S. Green Building Council.

“Virtualization is a big driver of green IT,” says Jennifer Kerber, vice president for federal and homeland security policy at TechAmerica, the technology industry’s oldest and largest trade association, representing some 1,000 companies. “With information technology—in particular, data centers—the sustainability benefits of virtualization are going to be very significant, and very welcome.”

Cloud computing has been a big beneficiary of virtualization—not surprisingly, as cloud services live and die on efficiency—enabling many organizations to share computing resources and pay only for what they use. The cloud is the route

the federal government is taking to get more bang for its IT spending, now approximately \$80 billion a year. As part of the new Cloud First initiative, government agencies are required to consider cloud options before making new IT investments.

Economies of Scale

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“The government is being very aggressive in its Cloud First initiative, and also in consolidating servers and data centers,” says Kerber. “One of the big things the Obama administration wants to do is get rid of waste and duplication of efforts in IT. With virtualization, it’s trying to leverage the same efficiencies that the commercial market has seen.”

Businesses looking to bring virtualization inside company walls will need to tread carefully, however. Among other things, gaining the full benefits of the technology requires having the right infrastructure in place—in particular, the right network.

“With virtualization, your network is

“Virtualization is a big driver of green IT.”

the glue that connects all of the components—including the servers and the storage—together,” says Doug Ingraham, vice president of data center products at Brocade, a

leading provider of cloud-optimized networks and fabric-based architectures that are required in highly virtualized environments. “It’s vital that your network allows fast, reliable access to every part of that shared environment and that it configures automatically to scale.”

Unfortunately, networks and virtualization aren’t always a dream team. “Traditional networks tend to isolate resources, which was fine when your CRM system had its own server and its own storage,” says Ingraham. “But in a virtualized environment, your servers and storage are spread out in a big pool, and you need seamless interaction between every resource, no matter where it is.”

Modern Architecture

To address this challenge, Brocade Ethernet fabric solutions transform traditional networks from treelike layers of switches—where data often has to take convoluted paths to reach far-off destinations—to fabric-based architectures that weave components together so data can travel directly between any two points automatically with zero-touch VM discovery, configuration, and mobility. “A fabric lets you move around with much more freedom and speed,” says Ingraham.

Ideal for virtualized environments, fabrics boost a network’s efficiency, flatten the architecture, and reduce complexity, making it easier to deploy and manage. Still, most organizations won’t want to transform their networking architecture overnight—a plus for Brocade solutions, which allow for a gradual transition that protects existing technology investments. “Most customers already have a lot of equipment and want to move gracefully into a new environment without ripping everything out,” says Ingraham. “Our fabrics can work with existing network components, and let companies start small and grow big, on their own timetable of implementing virtualized environments.”

But the right network isn’t the only thing that needs to be in place before the benefits of virtualization can truly be unleashed. Companies

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need to think about policies, as well. Does all data, for instance, need to be stored on the fastest—and often most expensive—hard disks or solid-state storage media? The beauty of virtualization is that data can reside across a shared pool of storage devices, but the devices themselves don't have to be equal. Critical

information that needs to be accessed frequently can be sent to high-performance storage—the equipment with the fastest response times—while less important data can go to lower-cost devices with slower response times. Data that is rarely accessed or needed only in emergencies can be sent to devices that are less advanced, and less costly.

For applications, the process is transparent and automatic. Special virtualization software—from companies like VMware Inc.—works out all the mapping between data and devices. It also figures out where a particular type of data should be stored, and where to find it when it needs to be retrieved. In the end, companies get a far more cost-effective storage solution. Virtualization ensures that they are using their most expensive storage devices only for their most important data, which means they can buy less of them.

“With virtualization, your network is the glue that connects all of the components.”

That's not to say virtualization doesn't entail hard choices. For some businesses, a cloud-based storage solution run by third-party providers on their own infrastructure may be a less complex, less costly option for housing data. But here businesses need to be careful. Particularly important or sensitive information may be better off kept under the company's sole control. “I'm

not sure if the cloud is ready for primary storage,” says Sarrel. “But it can be a good option for secondary storage or disaster recovery.”

Companies also need to keep in mind that virtualization can change the way people work inside a business. With the silos gone, and IT resources much more tightly linked, collaboration becomes crucial. The networking team, the server team, and the storage team will need to interact on a scale much greater than they might be used to. That might take some adjustment, and require new procedures and a new focus on diplomacy.

Over the past few years, businesses have been chanting the mantra of doing more with less. It hasn't always been a happy tune and has often meant painful sacrifices. Virtualization shows that the right technology can lead to greater efficiency—at a great price. ●

Just The Beginning

At Dell, the search is on for breakthroughs that will further automate and empower the virtualized data center.

Virtualization has transformed the corporate data center, enabling businesses to use their servers and storage in vastly more efficient and cost-effective ways. It's an impressive feat, and it's just the beginning.

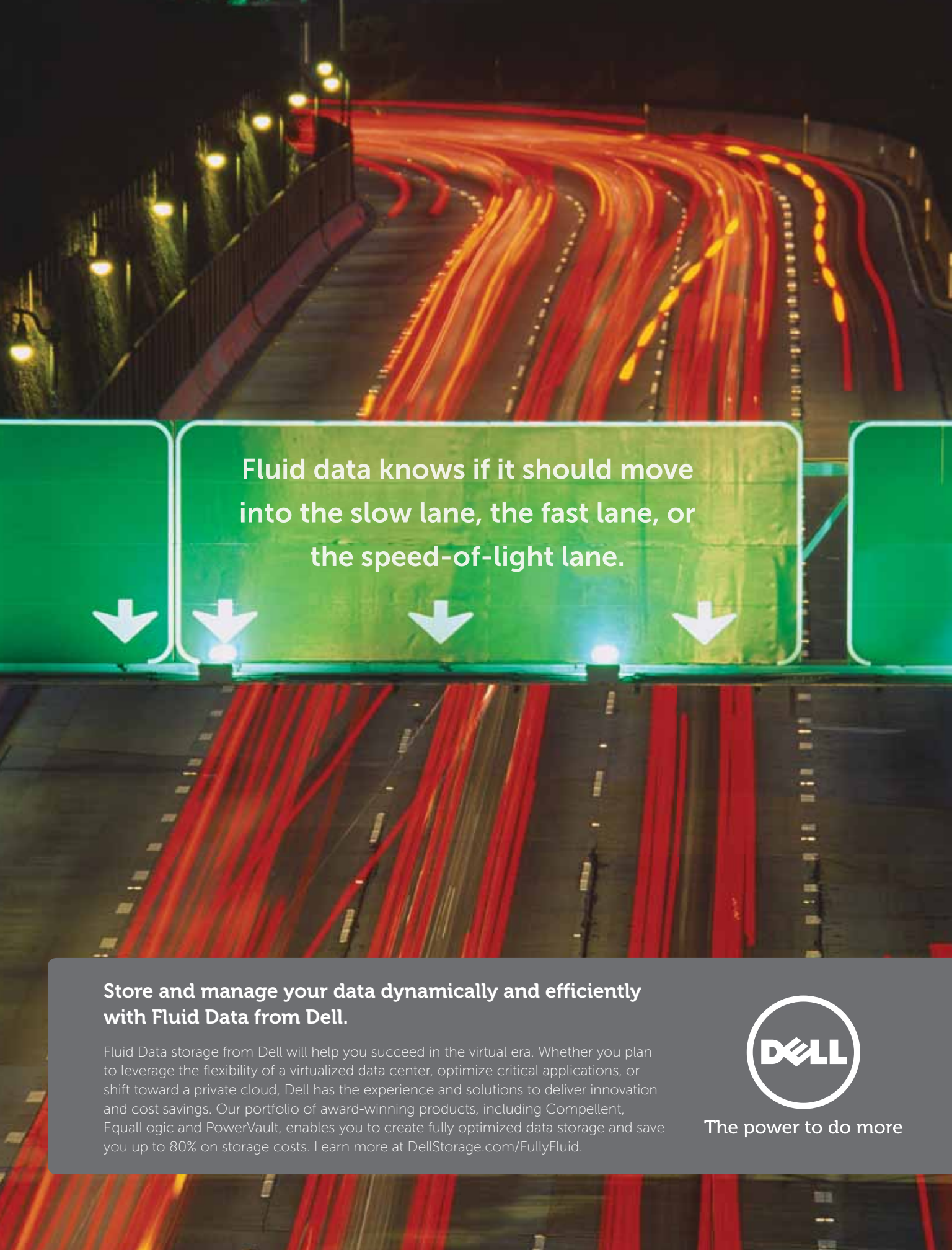
Recognizing that shared storage is a key component of virtualization, Dell is leading the charge to develop the breakthroughs that will

further automate, and empower, the virtualized data center. During the past few years, it has acquired several of the storage industry's most innovative companies, among them Compellent Technologies and EqualLogic. By combining their know-how with its own R&D, Dell has developed products based on “fluid data architecture”—an array of innovations that boost the performance of virtualized environments, while reducing the work needed to run them.

“The idea is to build a level of automation where the product is always seeking your best interests, without waiting for you to take action,” says Darren Thomas, vice president and general manager

of Dell's enterprise storage business. “If data on one machine is suddenly accessed repeatedly, the system knows to spread the load over multiple devices to avoid bottlenecks. It also will know to move older, less frequently accessed data to more economical storage, freeing up the high-performance equipment for more critical data.”

Dell understands, too, that its solutions may become even smarter tomorrow, enabling older hardware to run the latest software. This means companies can upgrade components gradually, instead of replacing everything at once. Technology, after all, should help avoid disruptions—not create them.



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