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Research Brief

What Every CEO Needs to Know About the Cloud
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A 2010 IBM survey of more than 1,500 CEOs suggested that the largest leadership challenge in some time was the gap between the growing complexity of the environment and the CEO's belief that his/her own company were equipped well enough to deal with it. Information technology infrastructure is at the core of driving complexity in organizations. Technology environments actually impede management's ability to sense and respond quickly. While there is no simple fix, "cloud computing" offers a new suite of digital tools and approaches to deal with information complexity.

Cloud computing is a sea change from the status quo in computing. For decades, most companies have invested significant capital to own their software and hardware, and keep them within their walls – in data centers and other specialized facilities. Cloud computing offers a radically different paradigm where companies lease their digital assets from the cloud rather than owning them on premise.

In doing so, companies that use the cloud can off load the details of a big IT department – they just rent what they need from the cloud, when they need it. But is this a temporary or permanent method of managing information technology? I would argue that it is a deep and permanent shift in how computing power is generated and consumed. It is as inevitable and irreversible as the shift from steam to electric power in manufacturing nearly one hundred years ago. Just as that transition brought many benefits and opened up new possibilities to factory owners, so too will the cloud confer advantages on its adopters – particularly as business models and management practices "catch up" to the technological change.

Cloud computing has its skeptics, particularly among those technology professionals who have deep expertise with, or attachment to, on-premise computing. This is human nature, and just as steam engineers were unlikely to become electrical engineers, so too must many on-

premise hardware and software specialists give way to others as companies move into the Cloud. After all, it wouldn't have been optimal to the crew that ran the boiler and steam turbine in charge of electrifying a factory. So the CEO and other senior business executives need to take responsibility for bringing their organizations into the era of cloud computing.

Most executives that I talk with point to three key questions: Why will the cloud be a big deal beyond the IT department? What are the main concerns and areas of skepticism, and how valid are they? And how should we get started? Read on.

The Benefits of the Cloud

Some argue that a large company can perform the IT functions within their walls just as easily as they can outside of them through the cloud. This is certainly possible, but it is a large and expensive undertaking. To make matters worse, IT departments have been squeezed for budget for at least the last five years. They are even further hamstrung from legacy systems. According to Microsoft, 89% of a company's IT budget is spent on maintenance and infrastructure. That leaves little for ensuring that employees have access to all the documents they need no matter where they are, what device they have, and whom they're working with.

Making Individuals More Productive

For global contractor Balfour Beatty, that kind of access is a critical capability. The company's design and construction professionals spend much of their time on job sites overseas, where they need instant and reliable access to cost estimates, photos, blueprints, and other large files. They found a solution in Box, a provider of cloud-based content management and file sharing. As is often the case with cloud offerings, resources stored on Box can be accessed via a web browser or applications developed for computers, tablets, and smartphones. As long as Balfour employees have an internet-connected device, they have access to

all their files when on the road. Not surprisingly, Balfour found other, unanticipated advantages. Users could administer their own accounts and digital properties, saving valuable time. Director of IT operations Rick Roman explains: "One of the comments we were continually getting from our end users was that they wanted an up-to-date solution that was powerful and flexible enough to fit the way they work. With Box, not only did we find a solution that met the requirements that our employees were asking for, but it gave us a useful suite of collaboration features that has improved productivity tremendously." In Balfour's case, cloud-based file management was initiated to make individuals more productive but ended up delivering group-level benefits as well.

Facilitating Collaboration

Another benefit of cloud computing is enabling groups and communities to work together in ways that were not previously possible. Consulting firm CSC turned to Jive, a maker of cloud-based collaboration software, to connect its 90,000 employees across the globe. Jive was made available to all employees, an approach that would have been prohibitively expensive if CSC had to buy all the hardware and software licenses itself. More than 25,000 people registered for the new cloud-based resource, called C3, which has now become a permanent fixture at the company. "C3 has been simply stunning," says Lem Lasher, the company's president and chief innovation officer. "It is the de facto standard for how we collaborate. It's the language of the company."

Mining Insights from Data

With the digitization of business, companies are now gathering massive amounts of data – and cloud providers are supplying the hardware and algorithms to help businesses generate advantages from it. Many of these efforts have focused on understanding, predicting, and influencing customer behavior both online and

offline. But Radiant Systems, which supplies the ARG point-of-sale system to thousands of restaurants and keeps their data, is using cloud analytics in a different way—to help its clients control their operations more tightly. Jim Nichols, the owner of Nichols, a casual dining restaurant in Marina Del Ray, California, grew concerned about theft after reading a "scam bible" written by former waiters. Through his POS vendor he learned that many of his servers were engaging in behavior consistent with shrinkage. He calls analytic theft detection revolutionary for his business and estimates that it increases profit by \$20,000 to \$40,000 at his single location. To acquire this capability from the cloud, he didn't have to buy or install any new software, hire technologists or analysts, or alter his technology infrastructure in any way. He simply had to request ARG from Radiant.

Developing and Hosting Applications

Before the cloud, software developers typically had to buy, configure, and maintain their own servers. Those activities are often perceived as a hassle and a distraction from the core work of writing good code. In addition to hosting applications, cloud providers are making their own powerful software available to customers. Google Earth Builder, for example, is a set of digital tools for geospatial data visualization and analysis that allows organizations to upload their own data and layer them onto popular resources like Google Earth, Google Chart Tools, and Google Maps. Ergon Energy, the electricity supplier for Queensland, Australia, plans to fly a customized airplane over its 150,000 kilometers of power lines, gather data about them, and transfer the data to Google Earth Builder. Ergon CEO Ian McLeod says that the company will use the data-rich maps and pictures that result to "understand the environmental status of the network and its associated risks. With this intelligence we can make better business decisions around our investments and improve operational response and business performance in key areas such as vegetation management, disaster response,

designing customer connections, and augmenting the networks.”

As these examples illustrate, the cloud offers benefits at the level of the individual and the group, and of the data and the application. It allows companies to increase the scale and power of their IT and the speed at which it can be accessed and deployed. It eliminates administrative headaches and works across locations, devices, and organizational boundaries. All these advantages will increase as we move deeper into the era of cloud computing.

Recognizing this, forward-looking companies are making aggressive use of the cloud even when they have the technical, financial, and human resources to pursue any computing strategy. The video service Netflix, the social game maker Zynga, and eBay are among the companies that have stated publicly that the cloud is a major part of their computing strategy. They have realized that they don't have to own technology themselves to compete effectively. They see, in fact, that owning all the computing assets they use is actually more likely to hamper their progress than accelerate it.

The Skeptics' Concerns

Despite the promise of cloud computing, the shift has been slow. Legacy systems continue to be the bane of every CIO's existence, and the cloud doesn't help other than forcing tough decisions about consolidation and standardization. Most organizations that have been around awhile have a hodgepodge of hardware, operating systems, and applications, often described as “legacy spaghetti.” It can't simply be transferred to the cloud but must first be untangled and simplified. And though everyone may grouse about legacy spaghetti, few are willing to give up their portion of it just so their company can move to the cloud.

Cost: The widespread uncertainty about the cloud may be most apparent in debates over its

comparative cost – but it shouldn't be a debate at all. First, most companies don't spend massive amounts on technology, so even substantial changes in the IT budget won't make a large difference on the income statement. Second, over time the economics of building and running a technology infrastructure will favor the cloud – both in overall cost and in adoption of ever improving technologies. Amazon Web Services, for example, has reduced its prices a dozen times in the past three years, even though it does not yet face intense competitive pressure.

Reliability: A second key argument is over reliability. The cloud's reliability was called into question most sharply in April 2011, when large portions of Amazon's Web Services infrastructure went down for as much as three days. This was a major blow to many companies that used it, but not all of them. The popular video service Netflix, for example, relied heavily on Amazon, yet remained unaffected by the outage. How did Netflix escape a crisis? By working hard to build in redundancy so that it could stay running even in the event of a huge disruption. Cloud companies are gradually learning this lesson and improving the redundancy and reliability of their offerings. Every outage by a prominent cloud vendor receives a great deal of attention, but overall cloud reliability records are admirable—and would be the envy of most on-premise operations. Google's Gmail service, for example, was available for 99.984% of 2010, or for all but seven minutes of each month. The Radicati Group, a technology market research firm, estimates that this is approximately 32 times more reliable than the average corporate e-mail system. Banks' trading systems might need greater uptime than this, but for most other uses it suffices.

Security: The third key argument falls to security – transmissions can be intercepted; firewalls can be breached; viruses, worms, and other forms of malware can invade. The only way to have 100% computer security is to have zero computers. The next best approach is to constantly monitor the threat landscape; buy or build the best

technologies to protect devices, networks, and transmissions; and hire and retain top digital security specialists. Cloud computing vendors are better able to do this than all but the very largest and most security-conscious organizations.

Regulation: And finally, the regulatory environment within the cloud is nascent. It is true that clarity is often difficult here; some regulations are vague, and case law has not yet had time to accumulate. But it's also true that many organizations are taking too conservative an approach to the cloud and that they're able to do far more than they think. For an example of a large organization that despite its many regulatory requirements is moving aggressively into the cloud, look no farther than the U.S. government. In 2011, Vivek Kundra, who was the government's CIO at the time, announced a strategy calling for \$20 billion, or about one quarter of all federal IT spending, to move into the cloud.

In summary, the uncertainty about the cloud's benefits and concerns over cost, reliability, security, and regulation will keep many companies and their executive teams from making bold moves into the cloud. What are the business implications of this uneven adoption of cloud computing? If the cloud's only impact was on companies' IT budgets, the implications would be minor, but as we've seen, this is not the case. Cloud computing offers advantages in productivity, collaboration, analytics, and application development.

How valuable are these? It's hard to measure, but here's some food for thought: How would you feel if your main competitors started pulling away from you in those areas simply by changing their computing infrastructure? And how much worse would it be if this change created other benefits that are not yet obvious? One common feature of major technological shifts is that their full effects are not visible at first. For example, it was inconceivable at the dawn of factory electrification that a separate motor might one

day be placed on every machine in the plant, yet this is exactly what eventually happened.

As the cloud grows and matures, its vendors will continue to innovate and to differentiate their offerings. The results may not be as transformative as those from factory electrification, but I predict that they'll lead to corporate computing environments very different from the ones in place today. The only way to learn about them firsthand is to start moving into the cloud.

