ON OUR RADAR

CLOUD COMPUTING IS HERE; NOW WHAT?

By Greg Shipley

In the fall of 2011, the *IQT Quarterly* tackled some of the issues surrounding the promise and hype of cloud computing. While the discussion is far from over, three years later we find ourselves with a bit more insight into some of the key questions. How secure is cloud-based infrastructure? Answer: about as secure (and insecure) as the IT infrastructure that preceded it. Does using cloud-based services save money? Answer: it depends — in some cases, yes, but in many others, no. Does cloud computing have an impact on the IT labor force? Answer: definitely, but that impact is often more about change, and less about reduction.

Most debates regarding the long-term viability of cloud computing are over; the movement has become "the new normal" in corporate America. We believe that the changes related to the rise of cloud computing will continue to have a profound impact on the future of enterprise computing. However, both questions and misconceptions remain, and much work lies ahead.

The Evolution of Enterprise IT

The story is all too familiar: a business unit or mission group has specific technology needs, becomes frustrated with its enterprise IT organization, and decides to use some of its coveted budget dollars to stand up pieces of its own IT infrastructure — independent of enterprise IT. While not often discussed, these secondary IT teams, or "shadow IT," exist in both government and corporate contexts, and in some cases have been around as long as the IT departments themselves. Their presence is not new; however, there is a rising trend in corporate America of using cloud-based service providers as a third option — another path around enterprise IT organizations. The trend raises an interesting question: have cloud-based service providers simply become the latest incarnation of shadow IT?

There's little doubt that a more "frictionless" IT environment is the end state that developers, IT operations personnel, and end users alike are all seeking. Who doesn't dream about resources on-demand, provisioning within minutes, and lower barriers to use? This is the lure of a cloud-enabled world and the reason Amazon Web Services' revenue is now measured in billions. These are achievable goals, but understanding the broader story is essential to executing against this vision.

For the technology portion of the tale, much of what drives the largest cloud providers remains a blend of traditional approaches and technology combined with some modern and significant shifts. For example, technology vendors like Cisco and Juniper continue to supply IT teams with significant quantities of network infrastructure. However, some of the largest providers are now embracing software-defined networking (SDN) concepts running on top of more generic "white box" switches; both cost and functionality are driving this change. Dell, HP, and IBM may still be selling thousands of servers into data centers, but companies like Facebook — now one of the largest purchasers of server hardware on the planet — claim to be using 100 percent Open Compute-based hardware. Cost reduction was a driver here, too: Facebook credits its Open Compute initiative with saving the company over a billion dollars in the last three years.

VMware remains the dominant virtualization player in the traditional enterprise infrastructure space, but the growing popularity and momentum behind the open source OpenStack project is undeniable. Configuration management and orchestration technologies from projects like Ansible, Chef, Puppet Labs, and SaltStack are far more prevalent in the cloud space than equivalents from the larger, legacy software vendors. These technologies also influence how new applications are developed, deployed, and scaled as the lines between developers and system administrators continue to become less defined. Finally, traditional relational database technologies are still powering thousands of cloud applications, but NoSQL-based counterparts offering graph and document-based alternatives continue to gain popularity. So does the use of object-based storage systems (e.g., Amazon S3, OpenStack Swift, Cleversafe) by a growing group within the development community. These significant shifts in technology usage will have lasting effects.

Cloud-enabled IT teams are facing new considerations and skill set requirements. For example, understanding resource constraints, and specifically bandwidth usage requirements, is even more essential. If the dynamic capabilities of cloud-enabled applications are realized, applications and workloads have the potential to be resized or moved. In a traditional model where static resources (e.g., servers) reside in a single physical data center with relatively static network connections, there are a number of variables that can affect performance. In a cloud-enabled world, that number of variables increases substantially. In effect, moving a 500 GB image file between two systems within the same data center is one thing, moving it between two data centers is quite another, and having it moved automatically is even more complicated. In some cases, having cloud-enabled applications will actually *increase* complexity; a counter-intuitive notion to some, but a harsh reality for those who are already living in the world of dynamic resource allocation.

The need for greater collaboration between facilities teams and IT personnel is another area in which organizations are becoming more mindful. For example, both Facebook and Google realized early on that their power, space, and cooling footprints would become increasingly relevant to their total delivery costs. This realization resulted in a re-engineered approach to data centers, and has saved them billions of dollars. Yet even today, most large organizations lack teams populated by facilities managers, building engineers, and IT personnel; the groups certainly communicate, but the disciplines remain far from integrated.

But perhaps the most relevant human component to the story will be the acute and growing need for cloud technology advisors, translators, and educators. Many IT personnel will need to transform into cloud ambassadors: advisors who help consult about when, where, and how services should be migrated or delivered. It's not just greater understanding of the technical "big picture" that will be important — it is the ability to help teams make the best choices and effectively serve as service brokers and enablers.

The Next Chapter

There has historically been much discussion around when, where, and why to deploy cloud related technologies, and debate about whether cloud computing models will eventually consume all of IT. Similar discussions occurred regarding the mainframe, as well as the migration to "client-server" computing models. Decades later, these technologies remain active in our computing environments, and perhaps regrettably, the domain of "legacy IT" does not appear to be leaving any time soon. As time goes on, it appears less likely that the question will be, "do we move to the Cloud?" and more likely to be, "which applications do we move, and to which cloud do we move them?" Savvy IT personnel will build out the criteria to answer these and related questions.

From lowering the cost and resources required to launch companies to inspiring entrepreneurs to build cloud-enabling technologies, the impact of public and private cloud technologies has been profound in the startup community. Questions relating to the security, cost, and functionality of the shift to Cloud will soon be replaced by more specific inquires relating to the security/cost/functionality delta between Cloud Provider X and existing infrastructure. Transparency has never been more important.

The answers to these questions will determine how much cloud, and how much computing, lies ahead. Q

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