The State of the Cloud

THE OBJECTIVE OF THIS LETTER IS TO CONVEY HOW I SEE THE STATE OF CLOUD COMPUTING. Before specifically looking at the cloud, it is worth mentioning that digitization is causing huge disruptions and changes in all public/government, education and research and businesses, including enterprises and small-medium businesses. I will lump many topics under digitization such as cloud, big data, Internet of Things (IoT), mobility, social, in-memory computing, artificial intelligence and hyper-connectivity. You can add to (or remove from) the list as you wish. Such digital disruption is forcing the Chief Information Officer (CIO) to put two hats on. The first requires them to be agile, fast and flexible; and the second requires them to be effective, resourceful and steady. For the former, the CIO needs to enable business growth, drive innovation, adopt smart services and ensure easy access to information. For the latter, the CIO focuses on reducing complexity, freeing up legacy IT budgets, ensuring high-quality operations and safeguarding data privacy & security.

We all know that at the dawn of integrating any new technology trend, there is an overabundance of challenges, whether technological, cultural, business, organizational or simple acceptance. Technological challenges revolve around how to deal with data - in terms of security, compliance, and privacy as well as from its five “Vs” (volume, velocity, variety, veracity and value) - legacy infrastructure, and heterogeneity of IT deployments, security, and integration. Specific examples include, but are not limited to growing applications landscapes (which come in a wide-variety of versions); data compliance, privacy, export control; exponential growth of unstructured data each year; and the need to support worldwide business presence, which usually happens through expansions, mergers & joint ventures. Organizational and cultural challenges revolve around the accelerated pace of change, skills uplifting and information overload. Business challenges revolve around how to tailor the business and operations models to new realities and more.

What about cloud computing? Cloud computing is becoming the de-facto hosting platform for all types of applications and all social innovations. This is true for industry, government, organizations and society (especially social media). According to a survey published in December 2016 by RightScale (www.rightscale.com), private clouds are showing stronger growth than public clouds for deployments with over 1000 Virtual Machines (VMs). The survey specifically mentions VMs, but there are usually other types of deployments besides VMs like containers. Readers should keep that in mind. Deployments increased from 22 percent in 2015 to 31 percent in 2016 for private clouds. However, for public clouds the corresponding numbers are 13 percent and 17 percent, respectively. Additional artifacts from the survey are a cloud user leverages six clouds on average; the lack of resources and expertise ranks as the number one challenge (surpassing security, which was demoted to number two), and cost management is becoming a major issue.

The fact that the RightScale survey found that an average cloud consumer uses around six clouds, clearly shows there is abundance of cloud providers in the market. Having many providers is of course good for users, but it can also cause headache and challenges for them. For example, with many cloud providers, users can select best-of-breed cloud service with the best price. We also see there is a race to the bottom when it comes to pricing cloud services, mainly bel-
cause providers are jockeying for market share at the expense of more profits. However, interoperability and VM mobility remain open issues. Additionally, customers always fear of lock-in to a single cloud provider. A few other observations of what is happening in the cloud market:

- Cloud providers are forced to have global presence due to data compliance and legal requirements.
- IaaS and SaaS services seem to be dominant and have more traction with users than PaaS.
- Public cloud providers are establishing Private Virtual Cloud (PVC) to further attract enterprises.
- Cloud providers are playing tactical games such as price reduction.
- It is clear that the cloud market is getting bigger than any one single player.

Looking a little further into the challenges for adopting clouds, I would first like to categorize the challenges into three high-level buckets: migration, Total Cost of Ownership (TCO), and Data handling. You can add other categories, but for this article, let me stick to the three I listed. Concerning migration challenges, there is a basic issue that in many instances, an enterprise may not have full knowledge about all of their applications’ landscapes. No one wants to admit it, but it is there. This is basic and essential to properly recognize which applications will migrate. In other instances, migration cost may reverse the savings from using the cloud, especially if there is a need for extensive manual handling. A third challenge is that migrated applications may never exploit the benefits of cloud such as scale up/down, because the applications are not cloud-native because they were not written with cloud features in mind. The only way around this is to refactor applications, which again can be costly. Fourthly, some migration approaches such as Lift&Shift seem to be more hype than reality.

Looking at the TCO angle, which is clearly more than unit pricing for a VM or container – the first price consumers research when wanting to use cloud services. A second element affecting TCO is that applications migration is usually more involved and costly than people think. Next, VM sprawl is happening and needs to be managed to control TCO. For the latter, we, of course, can develop policies to turn VMs off, but you can see the point conveyed here.

The third category I listed is handling and dealing with data, which requires more than technology to manage. We know that data is subject to local laws, in terms of privacy, compliance and legal of where data reside. This means that cloud providers need to have world-wide presence to support data requirements in different geographies. There is also the question of dealing with the 5Vs of data which may well include partitioning and replicating to optimize performance and/or security and privacy.

There is clearly a huge market for public clouds, and a greater need for private clouds. Given the enormously diverse IT requirements for businesses, it is becoming evident that hybrid clouds are going to be more dominant going forward. This is because certain applications landscapes can easily be relayed to a public cloud, while other landscapes, which need to reside in-house for all types of reasons, will remain in private cloud or traditional IT. Yet other landscapes may span both private and public clouds. Also with multi-cloud services, enterprises are able to spread the risk associated with cloud and can take full advantage of financials and other benefits offered by different cloud providers.

**SO WHAT SHOULD A CIO OF AN ENTERPRISE DO?** In order to succeed, many enterprises are adopting a centralized approach to dealing with cloud computing. This approach makes it very easy for anyone in business to purchase cloud computing services, establishing shadow IT operations and at the same time translating into lack of control by the CIO. A centralized approach allows the CIO to broker and govern services and maintain consistent approaches to security, privacy, and costing in line with organizational policies.

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**MAZIN YOUSIF** is the editor in chief of IEEE Cloud Computing. He’s the chief technology officer and vice president of architecture for the Royal Dutch Shell Global account at T-Systems International. He has a PhD in computer engineering from Pennsylvania State University. Contact him at mazin@computer.org