



Cloud Computing

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Technologies and market players will change over time, but the bottom line is that cloud computing is here to stay.

Cloud computing was defined by NIST in 2011 as “a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction” (nvlpubs.nist.gov/nistpubs/Legacy/SP/nistspecialpublication800-145.pdf). On Gartner’s Hype Cycle of Emerging Technologies, cloud computing has cycled from the peak of inflated expectations in 2009 to disappearing from the 2015 list, indicating mainstream adoption and therefore a growing level of understanding of what cloud computing can do for organizations. Given the increasing adoption numbers reported by analyst organizations such as IDC, Gartner, and Morgan Stanley, we can expect more cloud computing usage over the next several decades.

HYBRID AND COMMUNITY CLOUDS

Hybrid clouds—a combination of public and private clouds—will continue to increase as companies build

systems composed of self-contained, independently deployable microservices (www.martinfowler.com /microservices). Microservices will be deployed in a combination of public and private cloud instances, either by design based on security and privacy requirements, or decided at runtime based on load or cost.

Community clouds are tailored for organizations with common computing requirements, interests, or regulatory concerns, such as healthcare, government, education, research, financial services, and regulated private industries. Examples include Amazon’s GovCloud and Microsoft’s Azure Government—targeted at US government organizations—and United Health Group’s Optum Health Cloud for the healthcare community. As communities start seeing reported benefits in terms of cost savings, embedded regulatory and security compliance, combined purchasing power, and simplified management, more partnerships will form community clouds.

INTERNET OF THINGS

Companies will continue to collect and generate large amounts of data to understand their markets, customers, users, and processes. Combined with increasing amounts

of data coming from Internet of Things (IoT) devices, it will simply be a matter of cost efficiency for many organizations to move to the cloud for data storage and analytics.

CYBERSECURITY

Cybersecurity is an asymmetric problem, meaning that it takes a large amount of resources to protect against attacks that are generated with a small amount of resources. Given the high cost of security and the losses for a cloud provider in terms of money and reputation as a result of data breaches, many organizations simply can't make the security investments that cloud providers can and will to protect themselves. This means that despite what's reported in the news, the cloud will be considered safer than on-premise deployments for many organizations.

SOFTWARE AS A SERVICE

Gartner's Magic Quadrant for cloud infrastructure services in 2016's second quarter shows Amazon Web Services, Microsoft, IBM, and Google dominating the market with a 54 percent combined market share (www.gartner.com/document/3400818) More stringent legislations regarding data security and privacy, growing availability and low latency expectations driven by the digital economy and increase in mobile devices worldwide, and an increase in more sophisticated cyberattacks will make it very difficult for companies to remain competitive in the infrastructure-as-a-service (IaaS) provider market. In contrast, as software vendors shift their business models from on-premise licensed software to public cloud-based offerings, the number of software-as-a-service (SaaS) products will continue to grow, as reported by analysts such as IDC and Gartner.

Another trigger for the increase in SaaS providers is the move from

horizontal SaaS—broad business functions such as customer relationship management and enterprise resource planning—to vertical SaaS, which focuses on vertical industries such as healthcare, energy/utilities, real estate, and retail. Many of these SaaS providers run on IaaS offerings, placing even more requirements on IaaS providers and making it difficult for smaller IaaS providers to survive.

Cloud computing is in essence an economic model—a different way to acquire and manage IT resources. Organizations typically adopt cloud computing as a way to solve a business problem and not a technical problem. Technologies and market players will change over time,

but the bottom line is that cloud computing is here to stay, especially for small and medium enterprises that don't have the internal resources to run IT departments. ■

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