Cloud computing and its services categories

Vikram Ravishankaran

IT professional, Tata Consultancy Services Limited

Abstract- **This document gives an overview of cloud computing, need for business transition to cloud infrastructure model, ways to address inhibition of business to migrate to cloud infrastructure model, details on private, public and hybrid cloud models. This also presents comparative study between public and private cloud and gives an idea of the cloud computing service categories like SaaS, PaaS and IaaS.**

I. INTRODUCTION

Cloud computing is the storing and accessing of data and programs through the internet, rather than through physical means such as hard drives. It's safe to say that cloud computing is the next "big thing.

II. CLOUD COMPUTING

Cloud Computing is a utility service that gives access to technology resources managed by experts and available on demand. These services can be simply accessed over internet with no upfront costs and we only pay for the resources we use. Technology has changed the way business works, making computing power more available and cost-effective, and regularly surpassing previous performance benchmarks. By delivering innovative new products and services that were not popular a decade ago, IT has become a business enablement machine. Businesses are connecting with customers via social networks, analyzing data trends, and creating new must-have products and services—all by harnessing the power of cloud computing.

III. PUBLIC, PRIVATE AND HYBRID CLOUD

Before we discuss about private cloud, we need to know that there are differences between public and private cloud as they are different models of cloud computing. Public clouds are internet-based computing that allow the on-demand sharing of software, resources, and data. Private clouds operate according to the same principles, but only a limited number of approved users can access them, ensuring greater data security. Users of internally managed clouds have full control of and responsibility for their data. Users who want the security of the private cloud model also have a third option: a (third-party) managed private cloud. These private clouds are cloud infrastructures operated by third-party providers. Often called "the best of both worlds," hybrid clouds combine on-premises infrastructure, or private clouds, with public clouds so organizations can reap the advantages of both. In a hybrid cloud, data and applications can move between private and public clouds for greater flexibility and more deployment options. In hybrid cloud model, one can maintain a private infrastructure for sensitive assets. There is flexibility in terms of taking advantage of additional resources in the public cloud when required. With the ability to scale to the public cloud, one pays for extra computing power only when needed.

IV. PRIVATE AND PUBLIC CLOUD - COMPARATIVE STUDY

The main differences between public and private cloud is listed in below table.

Public cloud	Private cloud
A public cloud is one based on the standard cloud computing model, in which a service provider makes resources, such as virtual machines (VMs), applications or storage, available to the general public over the internet.	A private cloud hosting solution, also known as an internal or enterprise cloud, resides on company's intranet or hosted data centre where data is protected behind a firewall

Public cloud services may be free or offered on a pay-per-usage model	
Data is stored in the provider's data centre and the provider is responsible for the management and maintenance of the data centre	Management, maintenance and updating of data centres is the responsibility of the company
Insecure shared network	Critical data is in the hands of experienced and knowledgeable operators. They offer an increased level of security
Variable cost for additional capacity	On-demand scalability
No guaranteed resources	Guaranteed resources
A smaller business might choose a public cloud	A large company may choose a private cloud
This type of cloud environment is appealing to many companies because it reduces lead times in testing and deploying new products	Deploying new products consumes time in testing process and is the responsibility of the company

V. TRANSITION TO CLOUD INFRASTRUCTURE MODEL

When we meet with companies to discuss the value of migrating from traditional on-premises IT to cloud infrastructure, business stakeholders and financial teams are often skeptical. When a company changes how it approaches a business problem, it's quite common for changes to be met with resistance. Switching from traditional servers, storage, and other on premises IT equipment to cloud versions of these services often triggers resistance from leadership, finance, IT, and end users. Sunk costs should not be considered when making the decision to continue investing in an ongoing project, since these costs cannot be recovered. Companies do not do a cost based comparison between On-premise and Cloud infrastructure. If they do that, it will be easier to bridge this understanding gap and can help clarify the stakeholders' understanding of cloud infrastructure as a sensible cost alternative.

The cost comparison can also illuminate how cloud infrastructure can solve more difficult IT problems like staff retention and the elimination of thousands of staff hours spent on low-return IT projects. Often, the stakeholders revert to the least common denominator of comparison, which is price.

## VI. ADDRESS THE INHIBITION OF BUSINESS TO MOVE TO CLOUD INFRASTRUCTURE MODEL

The best cloud providers have hundreds of experts available to support the IT strategies and meet the hardware, software licensing, operating system, data protection, and disaster recovery requirements. The cloud provider frees up IT staff from performing hardware maintenance and upgrades, operating systems upgrades. This reclaimed time frees up IT to focus on innovation, or it can solve staff hiring and retention problems. Cloud manages risk by reducing downtime, improving application performance, and meeting compliance regulations. IT project backlogs and time-to-service are minimised by reducing the keep-the-lights-on IT maintenance work. This helps finance teams by accurately quantifying the incremental costs of specific projects. Ongoing difficulty in hiring and retaining IT infrastructure staff is addressed. It is very important that we connect the dots from business requirements to IT projects so all departments can clearly see the benefits. If we do not come up with a good business case, leadership, finance, IT, and end users will just stick to the comparison of old versus new – price.

VII. CLOUD COMPUTING SERVICE CATEGORIES

Software as a Service (SaaS) - Cloud applications allow the cloud to be leveraged for software architecture, reducing the burdens of maintenance, support, and operations by having the application run on computers belonging to the vendor and not in the premises of the customer. With SaaS, a provider offers an entire application stack. Users simply log in and use the application that runs completely on the provider's infrastructure. Software as a Service (SaaS) opened a flexible and financially attractive door for businesses and consumers to try early cloud services. The growth of infrastructure and platform as a service (Iaas and PaaS, respectively) has expanded the number of cloud solutions available in the public and private sectors. In 2018, we expect to see many more organizations take advantage of the simplicity and high-performance the cloud guarantees.
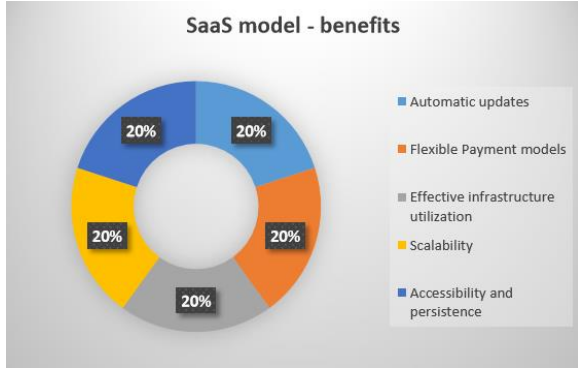
Infrastructure as a Service (IaaS) - Infrastructure as a Service, or IaaS, gives business access to the web architecture, such as storage space, servers, and connections, without the business need of purchasing and managing this internet infrastructure themselves. This can benefit both the business providing infrastructure and the one using it. In particular, IaaS allows an internet business a way to develop and grow on demand. Both PaaS and SaaS clouds are grounded in IaaS clouds, as the company providing the software as service is also providing the infrastructure to run the software.
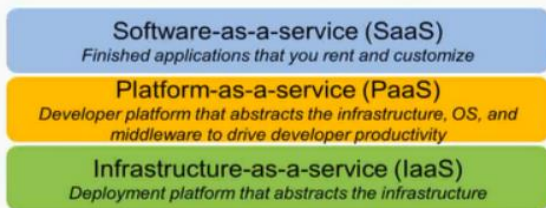

Platform as a Service (PaaS) - PaaS provider supplies much of the infrastructure and other IT services, which users can access anywhere via a web browser. A PaaS provider builds and supplies a resilient and optimized environment on which users can install applications. PaaS does not typically replace a business's entire IT infrastructure. If a provider experiences a service outage or other infrastructure problem, this can adversely affect customers and result in loss of productivity. Some PaaS providers charge a flat monthly fee to access their service, as well as the apps hosted within it while few PaaS providers charge for that access based on per-use-basis.

VIII. CLOUD COMPUTING – GROWTH AND POPULARITY

Cloud adoption is increasingly becoming a need for next-generation digital business, as well for agile, scalable and elastic solutions. CIOs and other IT leaders need to constantly adapt their strategies to leverage cloud capabilities. 70% of the enterprise companies have atleast one application running in cloud. Almost 46% organizations are integrating cloud APIs for databases, messenger systems, and storage systems and trends are increasing rapidly for other integrations too.

Annual global spending on cloud services is expected to increase by 19% by 2019. 10% of enterprises with over 1000 employees are projecting that they will spend $10M or more on cloud computing apps and platforms throughout this year.
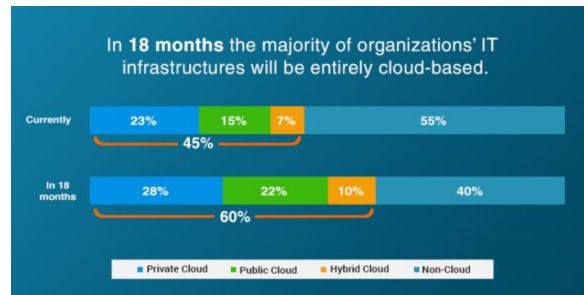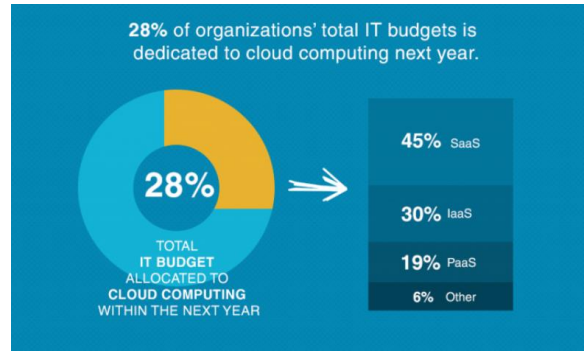
IX. CONCLUSION

Moving to the cloud is not just about saving costs on IT anymore—it's about creating the environment that lets your business thrive. The digital revolution has made it easier than ever to connect with customers, develop ground-breaking new insights and scientific breakthroughs, and deliver innovative new products and services. The future of cloud computing is a chance for a huge technological breakthrough for the companies using this technology today.

Cloud computing is one of the most trendy terminologies. Cloud providers aim to satisfy clients' requirements for computing resources such as services, applications, networks, storage and servers. Many popular companies have begun to enhance

their services and apply the technology of cloud computing to provide cloud environment for their customers.

Growth in cloud services solutions is expected to surpass the predicted growth in upcoming years. Businesses which look to simplify operations and make it easier for their customers to access services will move aggressively toward integrating SaaS, IaaS, and/or PaaS into their processes.

REFERENCES

[1] Marc Olson - Cloud computing trends to watch in 2018

[2] https://azure.microsoft.com/enus/overview/what-are-private-public-hybrid-clouds/