Vidhyayana - ISSN 2454-8596
An International Multidisciplinary Peer-Reviewed E-Journal
www.vidhyayanaejournal.org
Indexed in: Crossref, ROAD & Google Scholar

Adoption of Cloud Platform in Small and Medium Enterprises

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Doi: 10.58213/vidhyayana.v8i5.691

Abstract

With information technology invading into almost all the aspect of life starting from manufacturing, banking, education, social media, digital business etc and the major contributor to enable businesses to run during known and unknown disruptions like pandemics, and natural disasters. During such incidences, it assumes the driver seat for all the businesses right from finance and accounting to the logistics execution which has no face but only means the result driven execution, and thereby enabling the organizations to run the businesses as usual and smoothly during the troubled times.

With the growth in IT enablement resulting into increased dependence on automation, integration, and cater business growth, the enterprises are looking forward to have cost effective, scalable, sustainable, and secured infrastructure, thereby evaluating the option of cloud adoption which provides higher scalability, flexibility, lower Total Cost of Ownership and robust infrastructure.

This paper attempts to review select research publications on cloud adoption and deployment options. This further also includes an independent survey in select Small and Medium Enterprises in Gujarat across various industry sector such as Manufacturing, Processing, Education, FMCG etc. sectors to identify cloud adoption and delivery options along with key

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parameters to select the best suited cloud deployment options for Small and Medium Enterprises

Keywords: Cloud, Infrastructure, Scalability, Security, Cost

Introduction

While most of the Small and Medium Enterprises as on today are still working with disintegrated legacy systems to run their operations having outdated hardware and infrastructure which is due for overhaul, replenish or replacement, which is in turn impacts operational efficiencies of the organization and adds to overhead cost in terms of higher administrative, sustenance and infrastructure cost along with slower performance in the operations resulting into reduced efficiencies and productivity across multiple business functions, thereby causing delays and dissatisfaction among customers and employees.

According to (Fisher, 2018) ; to keep in mind long term Total Cost of Ownership, while selecting right ERP decision makers are increasingly comparing the merits of Cloud offering, however it is important to weigh the below aspects before making decision:

- Key requirement for accessibility and performance
- Security and related compliances
- Total long-term cost of ownership

In the same article (Fisher, 2018) has done in depth study for comparing total long-term cost of ownership between cloud hosting and on-premise hosting further to provide the guidelines for suitability of the hosting options for the respective organizations in terms of:

- Initial investment cost to set up the cloud
- Simpler and regular upgrades of products and infrastructure alike to stay compliant
- Reduces dependency on inhouse team for maintenance
- Enables creating of the users for the most recent versions and features
- Provides most efficient and secured solution which enables scalability, business continuity, upgrades

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Cloud Infrastructure is a hardware platform which provides a scalable, flexible, on- demand access to a shared infrastructure servers, storage, and applications. This allows enterprise not to their own hardware, data center and also upgrading the required operating systems, database versions along with security patches. This also transfers the ownership of maintaining the infrastructure along with Service Level Compliances to the Service Providers. There multiple types of cloud service providers and the enterprises can use the cloud services based their requirements, growth, security and other compliance.

Cloud Deployment Options and their comparison

There are multiple cloud deployment options available with their advantages and disadvantages. Table 1 describes various cloud deployment options which has been elaborated by (Golightly, 2022) , (Tavbulatova, 2020) , *and* (Arora, 2017).

Table 1 :Cloud Deployment Options

Cloud Option	Definition
Public Cloud	• This is Owned and maintained by cloud service provider (Hyper scalars) • Service provider hosts the physical and IT infrastructure as well and applications are also hosted by the service provider at the location
Private Cloud	• This is dedicated hosting designed to be used by only one organization and can be maintained either by the organization or by other service provider or by external vendor • The hosting of this can either be located at the organization itself or away from the organization's location.
Hybrid Cloud	• This is a combination two or multiple clouds either of private or community or public • This type of cloud combines either private and public cloud which facilitates to retains required capabilities of each set and allows sharing of data whenever required
Community Cloud	• This type of cloud allows sharing of the resources between multiple but similar type of organizations • This type of cloud is can be maintained either by the team in the organization or external vendor

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(Haris, 2018), has compared the various cloud deployment options based on some of the important parameters as described in Table 2

Table 2:Comparison of Cloud Deployment Options

Parameters/Cloud Deployment Options	Public Cloud	Private Cloud	Hybrid Cloud	Community Cloud
Initial Set up Cost	Low	High	Medium	Low to Medium*
Maintenance Cost	Lowest	Highest	Medium	High
Scalability	Low to Medium	High	Medium to High	Medium
Security	Low	Highest	Medium	High
Performance	Medium	Highest	High	High
Reliability	Low	Highest	High	Medium
Ease of Use	High	Low	Low to Medium	High
Data Control	Low	Highest	Highest***	Medium to High**

* Varies as per the number of organizations having common goals and accesses

** This depends upon the community collaboration

*** This requires extremely right set up

Key Considerations for Selecting Cloud Deployment Option

Though all the deployment options have their own advantages and disadvantages of various cloud deployments. (Golightly, 2022), has discussed various deployment options in terms of scalability, cost, service management and other aspects.

(Kansara, 2021) and (B. Patel, 2021) They along with other researchers have observed that to stay relevant and adapt the fast-changing business environments Small and Medium Enterprises (Enterprises having employee strength between 100 to 999) are mostly benefitted with the public cloud deployments which is also observed by (Aggarwal, 2009) ; (Arora,

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2017). Based on the observations by various researchers, some of the important factors that are considered by Small and Medium Enterprises are:

I. Cost: Converting CapEx to OpEx

Unlike large enterprises Small and Medium Enterprises have smaller budgets and fewer IT staff. (Aggarwal, 2009) has observed typically an IT generalist—to support a complex array of IT resources and users. (Aggarwal, 2009) they have further elaborated that in medium enterprises (100 to 999 employees) who manages various IT functions ranging from infrastructure and applications. Hence these enterprises are bound to look for the infrastructure which has lower initial set up and maintenance cost.

This enables the enterprises from not procure and manage the hardware and instead facilitates flexible paying options

II. Scalability & Sustenance: Catering changing demands of business

Small and Medium Enterprises are not sure of how their business requirements as they are fluctuating due to highly competitive market condition. Small and Medium enterprises have very limited budgets, in which they need to ensure to have scalable and flexible capacity that can be ramped up or down without spending high cost on their IT hardware, software and thereby on maintenance services. In a public cloud these enterprises can take advantage of adding or removing the capacity as per their requirements to for data storage and to get better performance to meet their needs.

Also, this enables the enterprises to optimize the utilization of the resources, thereby reducing the upfront investment cost; which otherwise need to be planned and procured with future growth plan and generally doesn't reach the full capacity for 3-5 years.

III. Business Continuity: Running business as usual during outages

Unexpected business stoppages and loss of data may lead to closure of emerging business or the start-up. However, cloud hosting provides them business continuity by providing them right approach for backup along with local machines. Cloud based backup is one of the most widely used technique that is provided by using public clouds.

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This in turn enables Small and Medium Enterprises that do not have CapEx, which can provide better hardware and tools to continue business as usual with restricted budgets.

IV. Security: Keeping the data and environment Secure

Though Security continues to be the one of the concerns in cloud adoption especially in Public Cloud deployment, however with the increased adoption the Public Cloud Providers have evolved in better and secured environment. (Solutions, 2015) , also mentioned Security continues to be the one of the concerns in cloud adoption especially in Public Cloud deployment, but in reality cloud- based servers are probably more secure and resilient that traditional than on-premise servers.

In order to have more secured infrastructure some of the enterprises use Hybrid cloud which enables them to leverage benefits of both Private and Public cloud. (Anuary, 2011) discussed this further mentioning these enterprises use private cloud for applications and data that require a high degree of compliance and security such as enterprise HR, CRM, financial and payroll-related applications and use public cloud for less-sensitive data and provides benefits such as scalability, pay-per-use billing and lower expenses. Most of the enterprises use public cloud deployment use them for storing data not to be shared with suppliers and Ideal use of the public cloud is for backups, e-mails, disaster recovery and storage of data that need not be shared with isolated business functions.

Cloud service providers will likely have antivirus, intrusion detection and network protection capabilities built into the infrastructure, making cloud services an extremely secure, resilient and disaster-proof option for Small and Medium Enterprises.

Cloud Deployment trends in Small and Medium Enterprises

Researchers have observed that the most of the Small and Medium Enterprises are increasingly moving towards adopting the cloud that enables them the reduction in cost both CapEx and OpEx to these enterprises. To validate the observations made by them, an independent survey is carried out in Small and Medium Enterprises in Gujarat across various industry sectors such as Manufacturing, Processing, Education, Services, and FMCG etc.

50 plus responses that are received from various industry segments from these enterprises are analyzed further. Figure 1 shows the results obtained from the survey and indicates that 70%

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of the enterprises have already adopted the cloud and further indicates Education and Banking & Financial Sector has the highest adoption of cloud which is 100%.

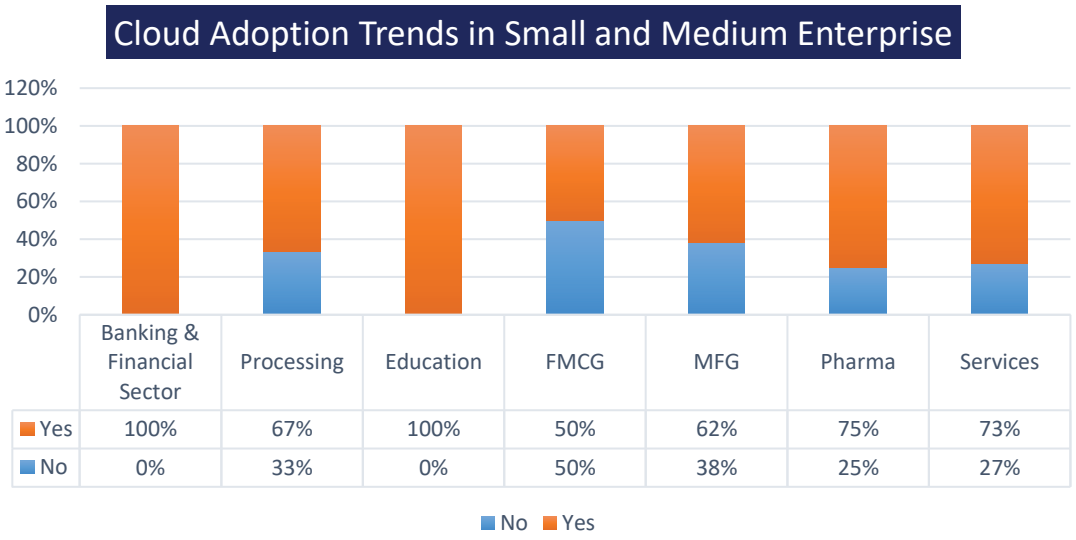

Figure 1: Cloud Adoption Trends

Further analysis on the data has been done to find out various cloud deployment options that are adopted by the Small and Medium Enterprises across various industry segments. Figure 2 indicates that approximately 57% enterprises have adopted the public cloud and 43% have adopted the hybrid cloud. Banking & Financial Sector along with the Manufacturing Sector are the leading adopters of hybrid cloud while FMCG Sector has the highest adoption of the public cloud followed by Education Sector.

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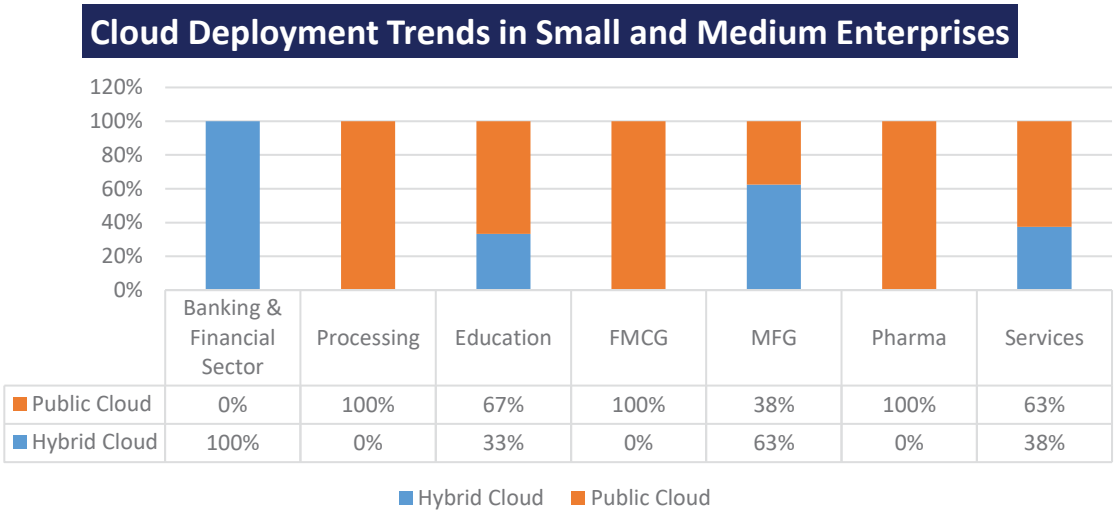

Figure 2: Cloud Deployment Options

Conclusion

In today's competitive business environment, Small and Medium Enterprises are required a kind of hosting options which can cater the changing demands and meet their business growth, and also enables them to optimize the cost in terms of one time and recurring cost and are looking for the flexible payment options which can enable them to scale up or scale down the infrastructure requirements. Hence cloud deployment options can facilitate organizations to achieve these requirements, and provide added flexibility to scale as per business demands and provide better pricing models to optimize the spend in infrastructure requirements.

This research paper attempts to discuss the importance of adoption of cloud as a most effective hosting option in Small and Medium Enterprises and various cloud deployment options available that can cater the requirements of these Enterprises. Along with this, the paper also provides high level insights into basic guiding principles which Small and Medium Enterprises must consider along with comparison of various options available. The next step of this research can be focused towards benefits of cloud adoption in these enterprises and to address the step-by-step elaboration to arrive upon Cloud Deployment Strategy in Small and Medium Enterprises.

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