Cloud security and current state of cloud adoption

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Abstract

Over the times, Associations have put a veritably heavy reliance on pall computing as IT has evolved through time. To achieve faster time to vend and product, increased responsiveness, and cost reductions, Associations are shifting all their workloads on pall at a rapid-fire pace and calculate on this technology in order to perform business as usual and use it as a backbone of their companies ' IT structure '. As maturity of associations anticipated to have further than half of their workloads in the pall within the forthcoming times, there won't be any surprise to say that pall security will be a top concern. This paper investigates the organizational adaption for pall- reviewing case studies from colorful companies worldwide to give a detailed analysis of innovative ways with pall and security challenges and offers fresh perceptivity on the state of the pall and pall security moment.

Aim: The aim of this research paper is to better understand the insights of the cloud computing current roleplay and current state of cloud distribution as well as the security concerns over a period of time.

Introduction

Let us start with the concept of cloud.

For making data processing more efficient on multiple computing and storage systems where accessibility is executed through the internet cloud computing came into picture. In the initial days in late 90s Grid Computing was developed in the 1990s and then later in 2005, there was the invention of cloud computing and utility computing.

A crucial aspect of the services which facilities in cloud computing technology, that offers and aggregates various standalone virtual computing components into a single hardware platform-CPU, network, storage, and memory known as "Virtualization" was introduced.

This virtualization technology provides important qualities for cloud computing environments, including scalability as well as multi-tenancy occurring in a single software application that can simultaneously serve various several users. These qualities are fundamental to cloud computing by enhancing the pooling and sharing of resources to improve various things such as enhanced business value, flexibility, agility, and reduced costs.

Cloud providers needs to generate many virtual machines appropriately and reserve the appropriate resources to maintain users' requirements.

Dynamic provisioning provides cloud services and resources which are often faced with many challenges such as the ideal or configuration for VMs and shortcomings in the technology of disks, CPUs, memory, and network bandwidth to be shared among users.

Certain challenges are still present with the practical aspects of virtualization with networking, cloud system configuration and scaling in virtual machines. Cloud resource providers offers security to virtualization mechanisms by having the ability to eliminate vulnerabilities, attacks, and threats by having the necessary financial, knowledge, and capability aspects.

Workloads in Cloud

As per the Global reports of 2022, organizations continue to shift workloads to the cloud at a rapid pace. Today, 39% of respondents have more than half of their workloads in the cloud, while 58% plan to get to this level in the next 12-18 months.
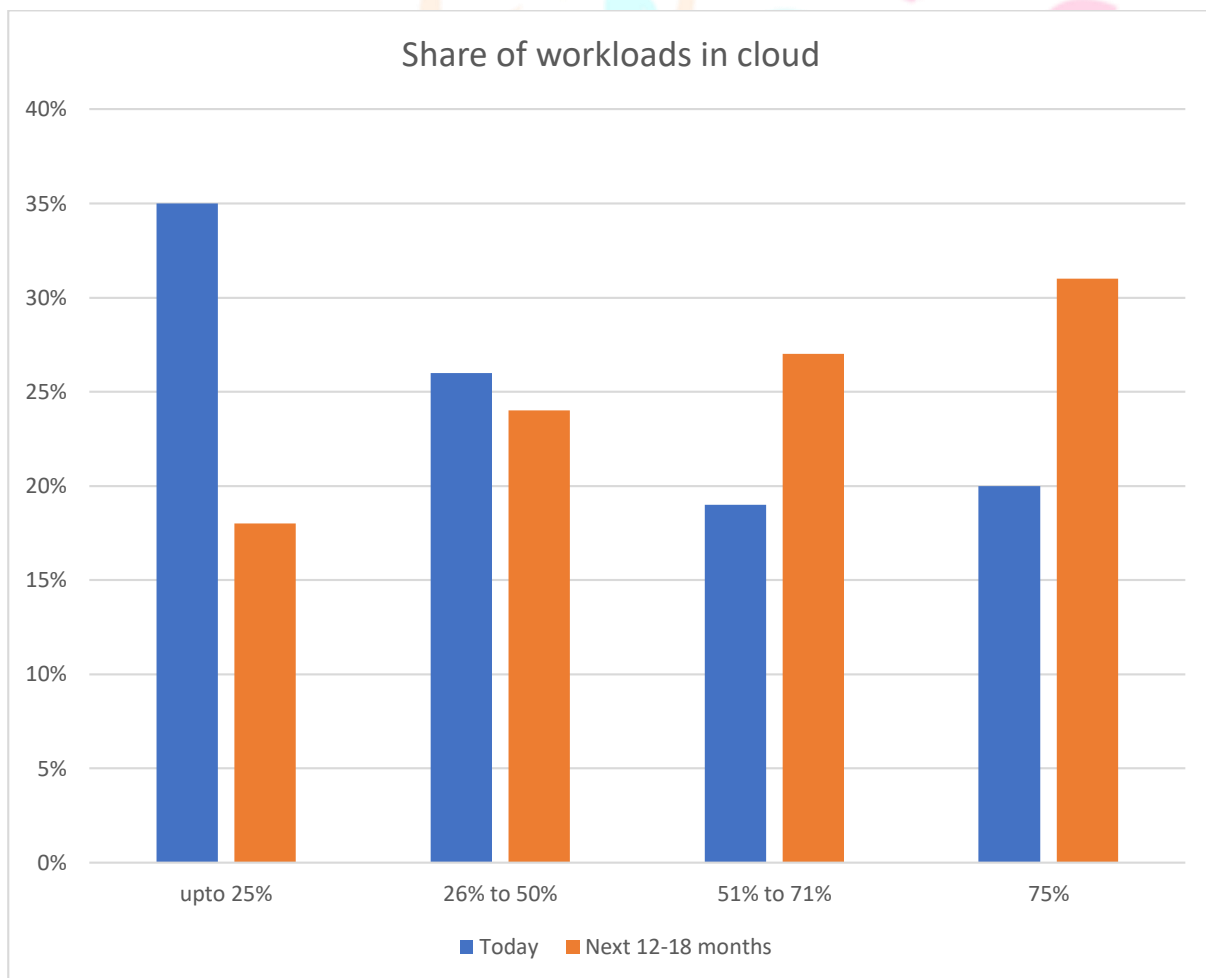
CLOUD SERVICES DEPLOYED

As per the global cybersecurity professionals the services and workloads their organizations are most frequently deploying in the cloud in this security services top the list (58%), followed by compute (56%), storage (55%), and virtualization (53%).

58%

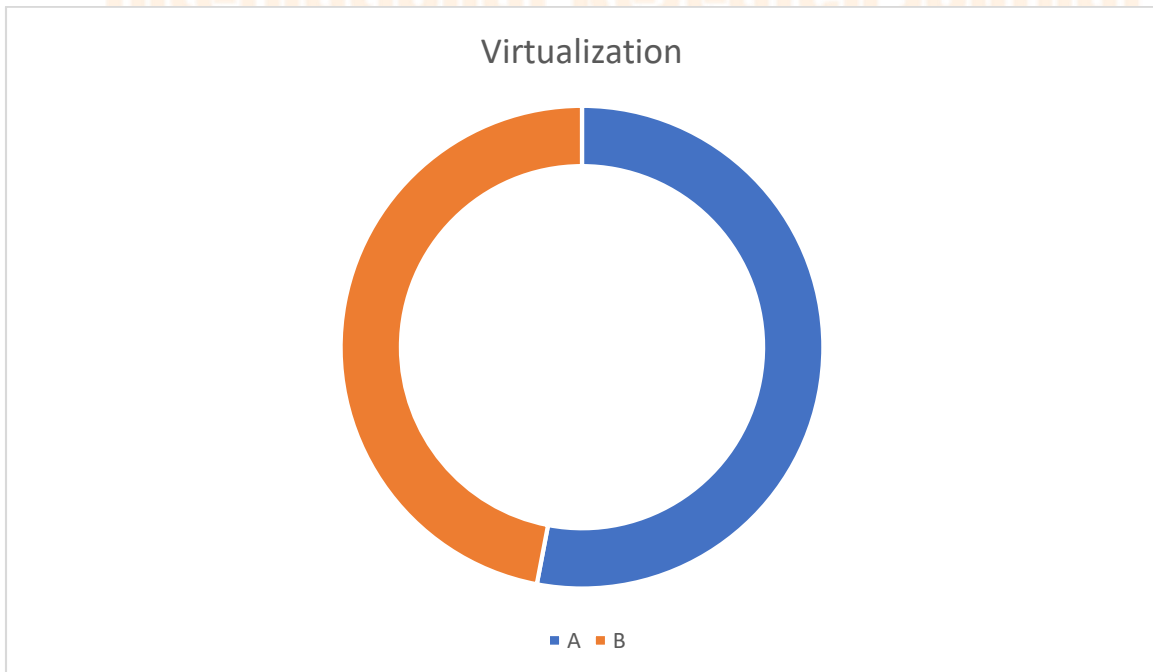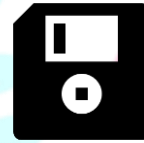**SECURITY**

(Identity management,

access control,

data protection, etc.)

56%

COMPUTE

(servers, containers, etc.)

55%

STORAGE

(Object storage,

archive, backup, etc.)
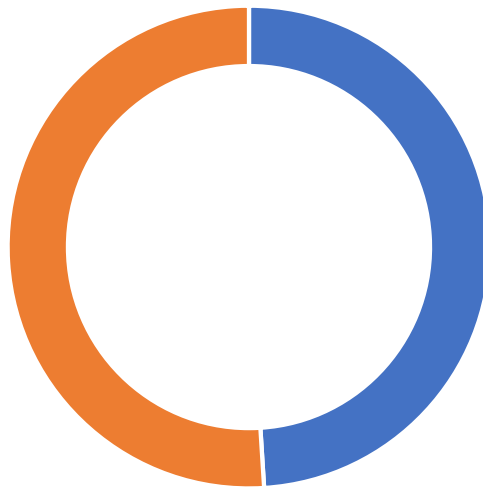
Virtualization

■ A ■ B

Business applications (CRM, Marketing, automation, ERP, BI, Project management, etc
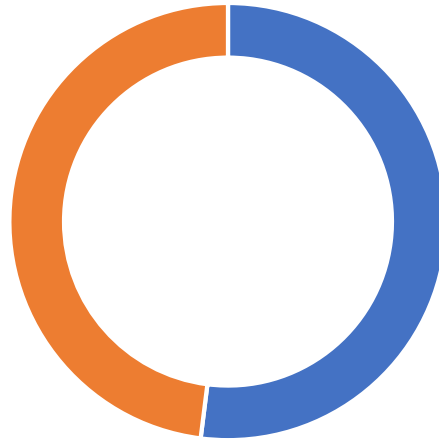
■ A ■ B

Database (relational, NoSQL, caching, etc.)

■ A ■ B

Productivity applications (email, collaboration, instant messaging, etc.)

■ A ■ B
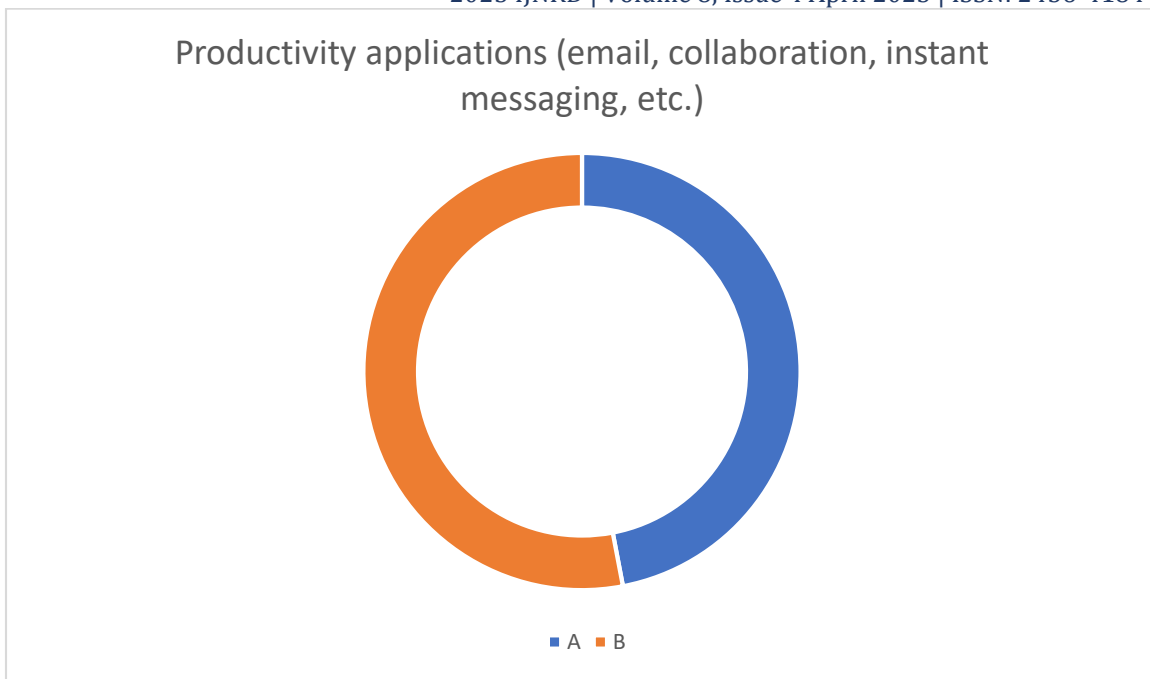
Deploying Cloud deployment techniques and strategies

In the work of Tavbulatova, Z.K et al., 2020 where the authors explore the various methods of cloud deployment. This paper firstly focuses on the advantages and disadvantages of utilizing these systems. Firstly, they begin with Private Cloud, which has benefits such as high protection and Storage capacity, improved data transfer speed, scalability of the organizational level resources, and easy-to-use payment systems to reduce energy and maintenance costs of a private cloud system. However, it includes the need to invest in the hardware and licensed software's, administrative costs, as well as the risk of physical threats for data. They then moved on to explore the deployment of Public Clouds, which are simple to use and are efficient, can deal with an unlimited quantity of computing resources, high data security at the physical and software levels using large data centers, fast and simple implementation of the new information system. The only requirement here is an internet access, and it presents lower hardware and software costs. Here, constraints using this technology include the inability to control the cloud in the organization, dependency on the service provider which is must, and complete dependence on the internet. Hybrid Cloud can maintain data security, reduce costs by transferring resources to cloud providers, and can develop a Community Cloud to provide data available anywhere in the world with low cost for data utilization. However, it does have a high cost for cloud deployment and has a low level of data protection with limited volume.
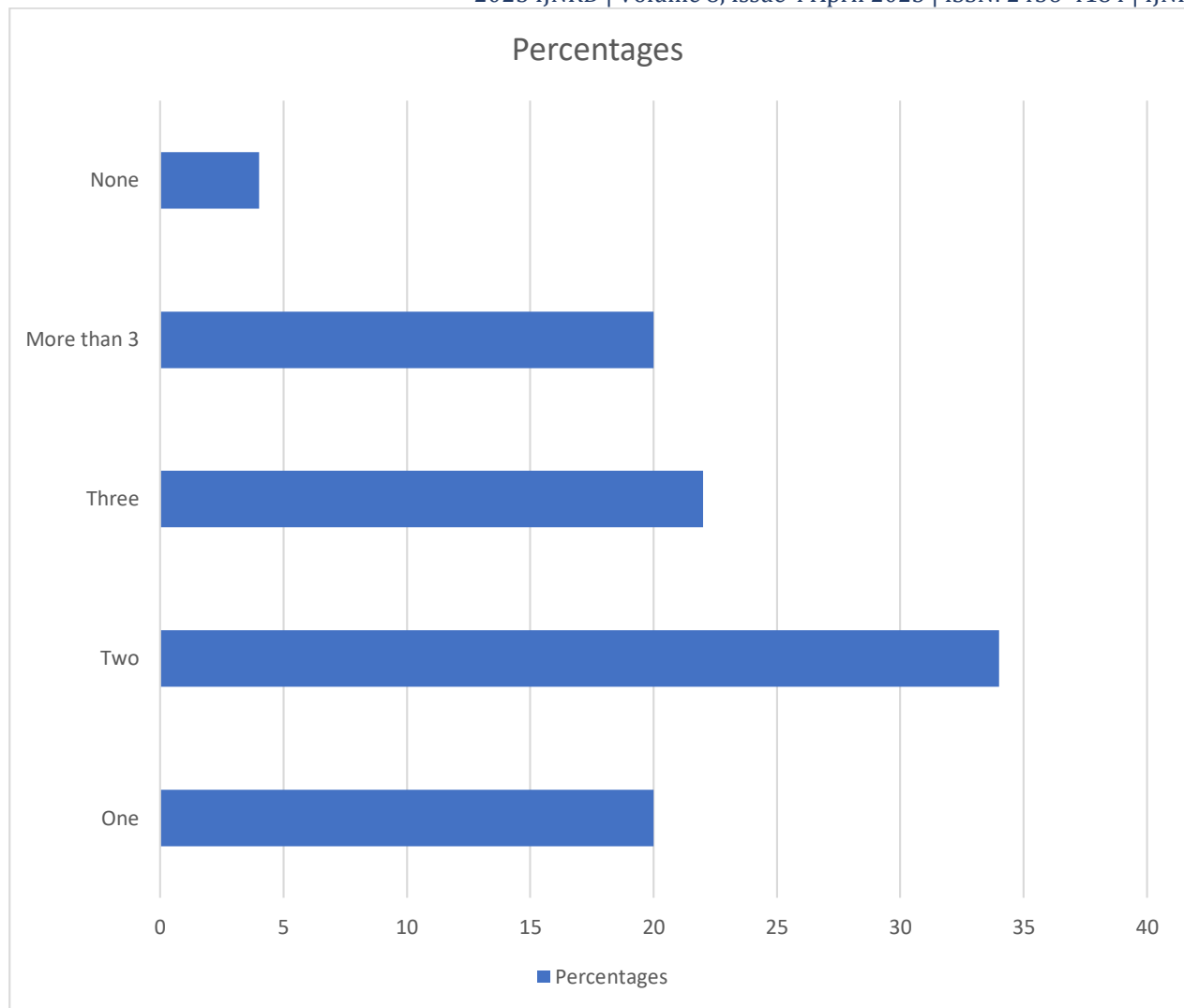
Let's discuss about Strategies:

Most organizations continue to adapt a hybrid (39%, up from 36% last year) or multi-cloud strategy (33%, down from 35% last year) for integrating multiple services, scalability, or business continuity reasons.

What is your Primary deployment strategy?

Cloud deployment strategy
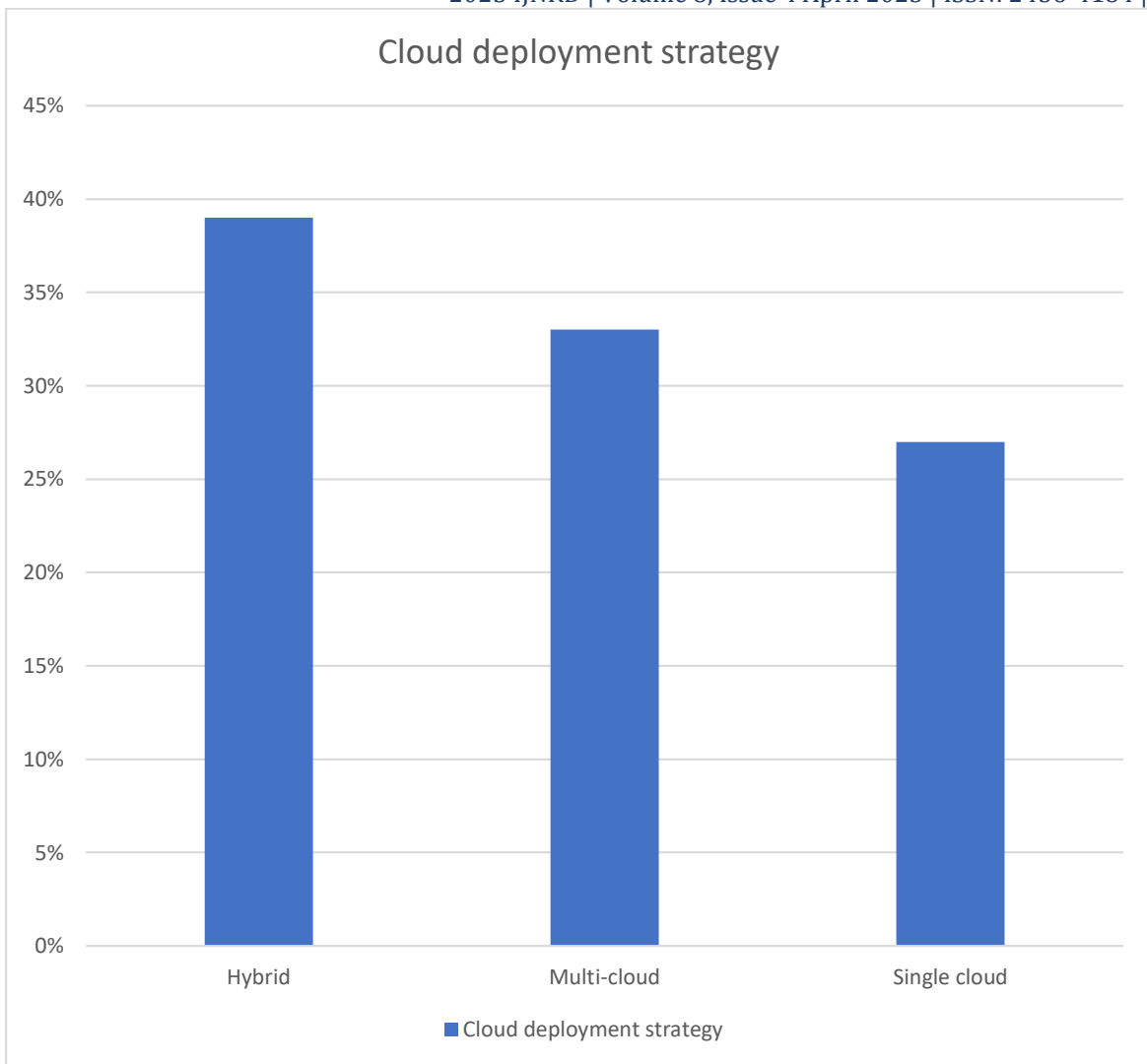
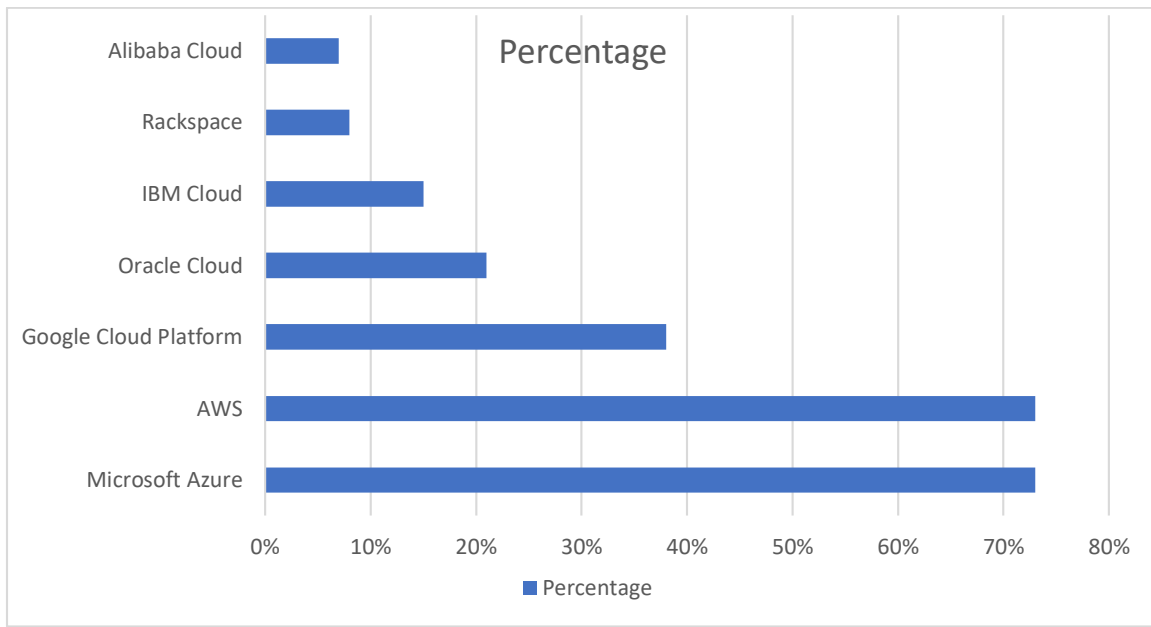**How many Cloud providers are these organizations using?**

Popular Cloud providers

Microsoft Azure and Amazon Web Services (AWS) stands at (73%), as AWS has gained popularity. List is followed by Google Cloud Platform (38%). Year-over-year, Oracle Cloud use has increased the most (from 15% to 21%).

What cloud IaaS providers are currently in use?

Case studies in the industry for cloud computing adoption

In the case study of Wang,L.C etal., 2021, the authors explore a frame for Cloud Computing deployment for a case study around a scheduling and planning system. The proposed pall- APS System consists of four main factors similar as(1) User Layer- furnishing a UI for users including the product itineraries who planned a product schedule.(2) Application Layer- This includes the system's operation functions, including order adding, order operation, intelligent scheduling, schedule query, and MRP updating.(3)Service Layer- containing the schedule models simulation- grounded scheduling machine to induce the product and operations schedule grounded on the parameters. Eventually,(4) Resource Layer- consists of virtual coffers, including data and information stored in MES and ERP. likewise, in the work of Liu, Z etal., 2022, the experimenters probe the architectural design and perpetration of a digital platform for industry 4.0(known as DIGICOR). With the ideal of stoutly forming force-chain collaborations to pool product capacities and capabilities to address complex force- chain requests. They proposed three main benefactions in the exploration, which includes the armature and design and its installation as a platform supporting dynamic modeling of systems and services. The armature adds to EDSOA mechanisms for modular and effective communication through semantically defined dispatches and icing compliance with case-specific governance rules procedures for knowledge protection and security. The system contains an array of factors for specification similar as Company knot, Collaboration knot, plant knot, Tools, Tool Store, Marketplace, DIGICOR portal, DIGICOR gateway, and supporting services. This literature review can be used for a variety of association relinquishment styles for being or unborn structure and systems.
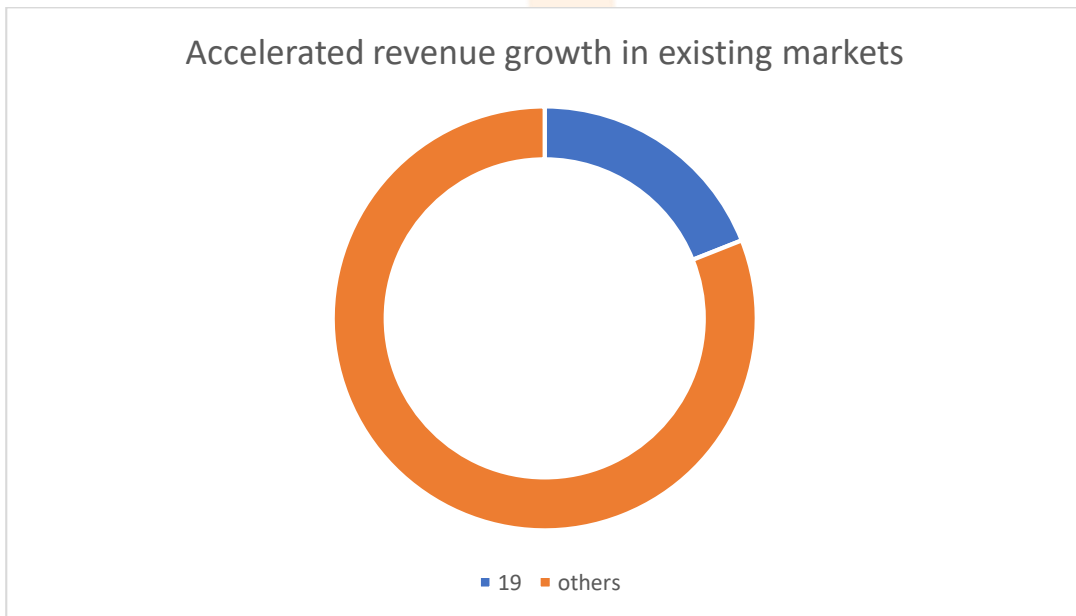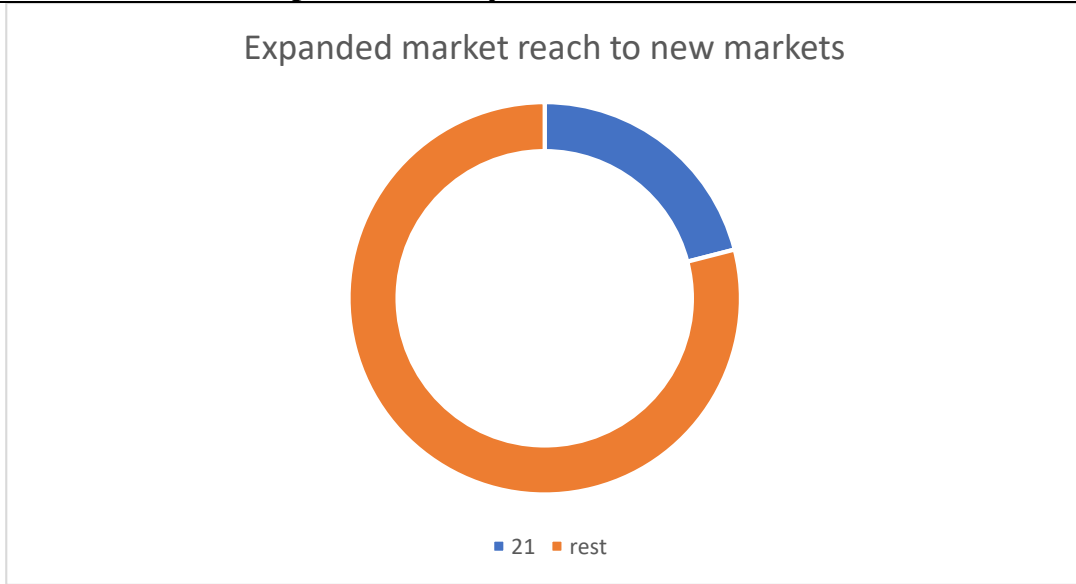
Benefits of the Cloud:

CLOUD DELIVERS BUSINESS RESULTS

Organizations are receiving the promised business outcomes of cloud computing: faster time to market (51%), increased responsiveness (50%), and cost reductions (39%).

What business outcomes have you realized by moving to the cloud?

51% Accelerated time to market
50% Increased responsiveness to customer needs
39% Reduced cost
37% Reduced risk and improved security

Expanded market reach to new markets

■ 21 ■ rest

Accelerated revenue growth in existing markets

■ 19 ■ others

Gained parity with competitors

■ 19 ■
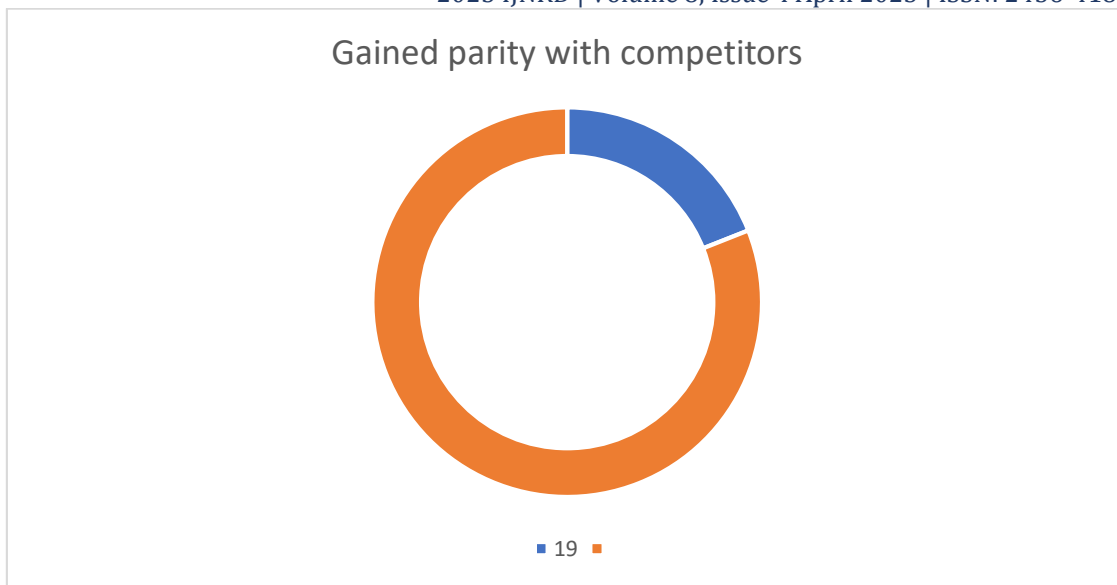
Users states that the cloud is delivering on the promising with flexible capacity and scalability (53%), much increased agility (50%), and much improvised availability and business continuity (45%).

CLOUD SECURITY CONCERNS

Cloud security has proved to be a significant concern . With an increase of two percentage points from last year, 95% of the organizations are moderately to extremely concerned about their security structure in a cloud environment.

Let's see how concerned are you about the security of public clouds?

Percentage

■ Percentage
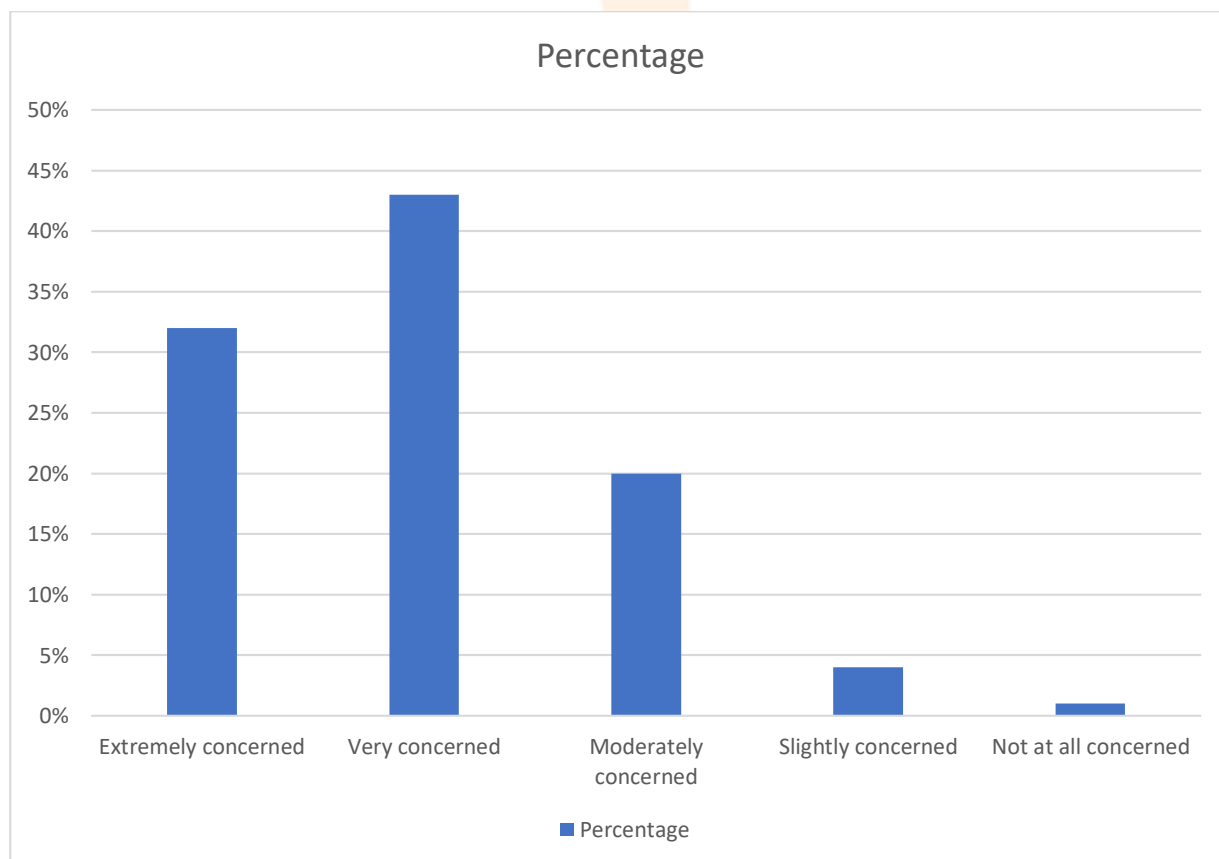
BIGGEST SECURITY THREATS

As per the professionals about the cloud security threats that most concern them, the misconfiguration of the cloud platform remains the biggest cloud security risk, which stands to 62%. This is followed by insecure interfaces/APIs (52%, up from 49% last year), exfiltration of sensitive data (51%), and unauthorized access (50%).
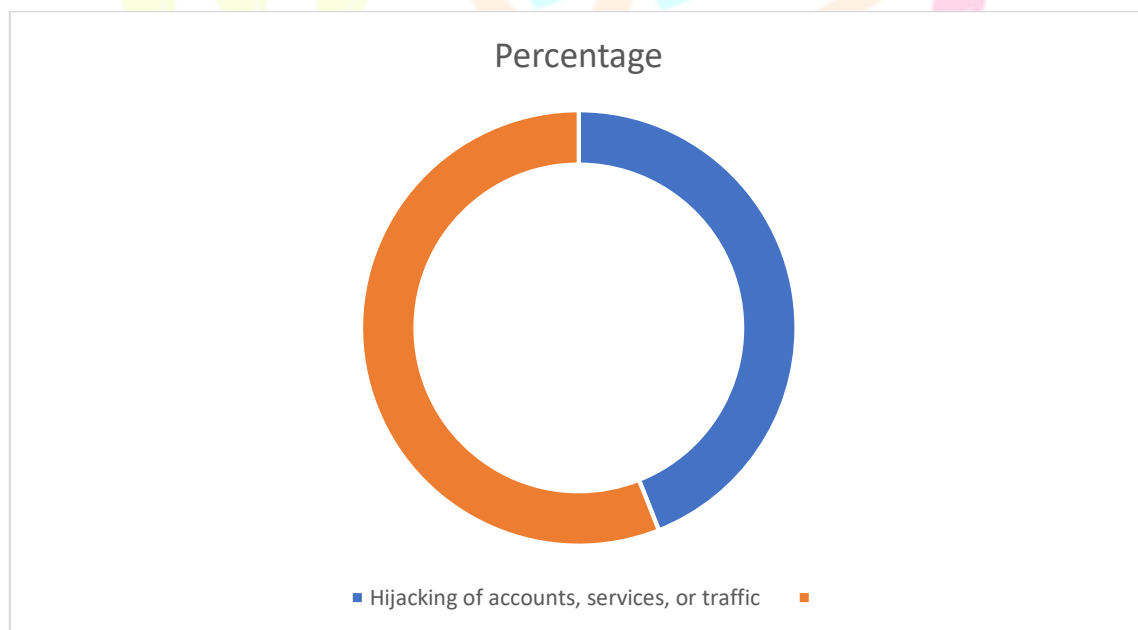
Let's see what do you see as the biggest security threats in public clouds?

62% Misconfiguration of the cloud platform/wrong setup.

52% Insecure interfaces/APIs.

51% Exfiltration of sensitive data.

50 Unauthorized % access.

Percentage

■ Hijacking of accounts, services, or traffic   ■

Percentage

■ External sharing of data ■

Percentage

■ Foreign state-sponsored cyber attacks ■
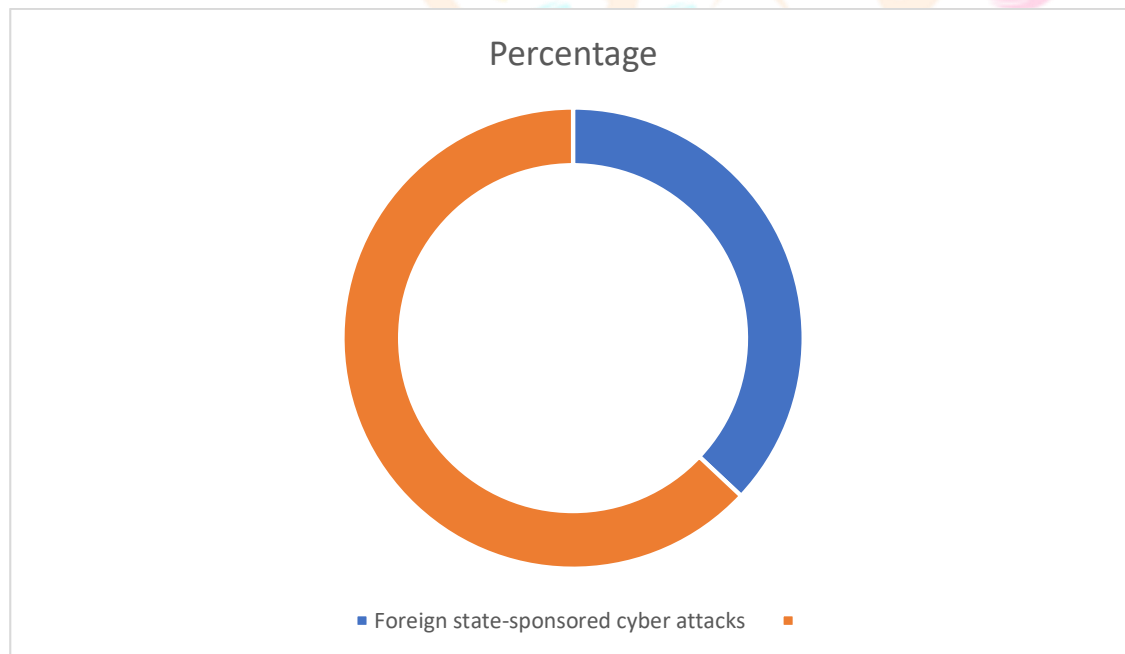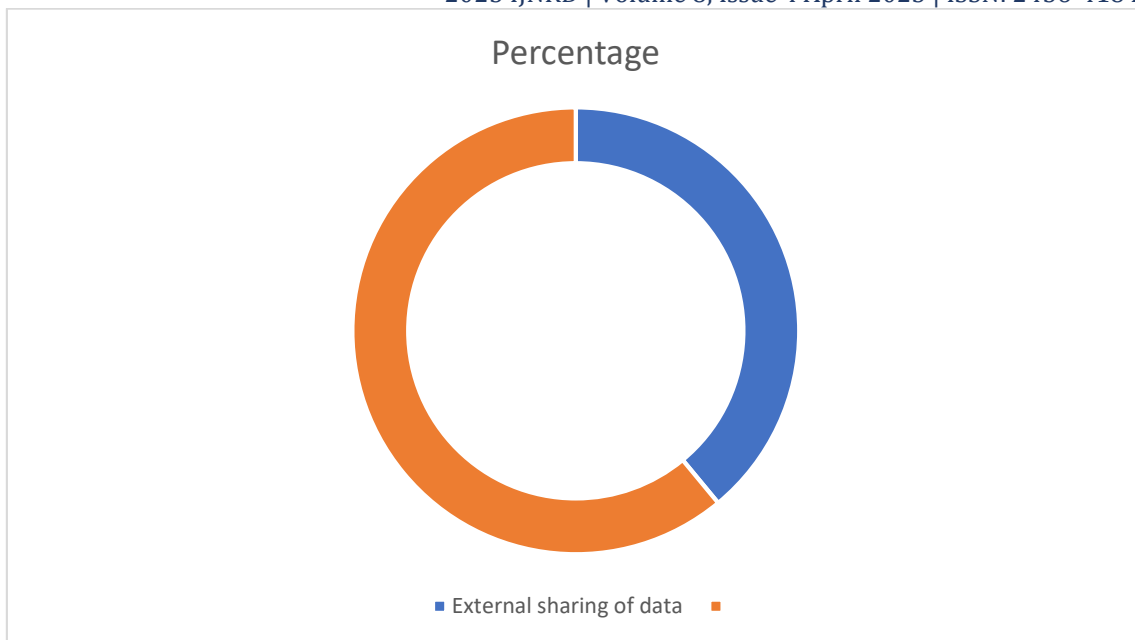
Objectives of this study:

1. To study the role of cloud computing model selection.

2. To measure the security of cloud computing with respect to IT sector.

3. To Identify which Cloud provider is more popular.

Hypothesis of the study:

H1: Cloud Computing services are more secure.

H2: Cloud Computing is applicable in all IT and educational sectors.

Sampling method:

This research is confined to veritably small sample size by visiting IT professionals for collection of data. The overall exploration will be done with a sample size of 33 respondents from different cities.

• Area covered: - IT Organizations.

• Population of interest: - Cloud Computing technology

used by people in the age group of 20-60 years.

• Testing frame: - Working class.

• Sample size: - 33 Respondents.

Methods and Tools of Data Collection:

Considering our objectives, we are collecting data through both primary and secondary sources.

Sources of Primary Data Collection:
Primary data has collected through online questionnaire (Google Docs) and offline questionnaire from IT sectors.

Source of Secondary Data Collection:
Secondary data has collected from the past research-work done by various people in the field of cloud computing Research articles, Magazines, News and Newspaper articles, Environment based books, Periodicals, and Internet , etc.

Objective 1: To study the role of cloud computing model selection.
For studying this objective, various deployment models like private, public, hybrid and community etc are considered. Following Table shows deployment models in IT sectors.

Deployment models in private sector

Deployment Models	Number of Respondents
Private	4 (12.00)
Public	2 (6.10)
Hybrid	25 (75.8)
Community	2 (6.10)
Total	33 (100.0)

As per Table, it reveals that most of the IT organizations used Hybrid Deployment model as compared to other models.

Objective 2: To measure the security of cloud computing with respect to IT sector

Security of cloud computing

Security	IT Sector
Yes	29 (81.80)
No	4 (18.20)
Total	33 (100)

For measuring this objective, opinion from IT sectors has been considered. Following Table shows the status of security of cloud computing as per their views. As per table it clears that security of cloud computing is very high.

Objective 3: To Identify which Cloud provider is more popular.

Cloud providers	
Providers	Respondent
AWS	15 (49%)
Azure	15 (49%)
Google	3 (2%)

As per Table, it reveals that most of the IT organizations prefer AWS or Azure cloud provider.

Testing of Hypothesis:

Various statistical tools used to test the hypotheses. If majority of the replies of respondents support a hypothesis, then that hypothesis will be accepted. Otherwise, it will be considered as rejected. The data connected with the hypothesis and obtained from respondents has been used for this purpose.

Hypothesis 1:

Cloud Computing services are more secure.

Null and alternative hypothesis are
H0: Cloud Computing services are not secure.
H1: Cloud Computing services are more secure.
For testing this hypothesis, one sample t test has been applied. T- Statistics for the same has been shown in following table.

T	DF	Sig (2tailed)	95% Confidence Interval of the Difference

			Lower	Upper
17.140	50	.000	1.16	1.47

As per above table, P value is 0.000 which is less than α=0.05, the level of significance. Therefore, we can reject the Null hypothesis and accept alternative hypothesis that, "Cloud Computing services are more secure."

Hypothesis 2:

Cloud Computing is applicable in all IT and educational sectors. As per primary data, 93.9% respondents agreed that cloud computing is applicable in IT and educational sectors.
H0: Cloud computing is not applicable in IT and educational sector.
H1: Cloud Computing is applicable in all IT and educational sectors.

T	DF	Sig (2tailed)	95% Confidence Interval of the Difference	
			Lower	Upper
19.072	54	.000	1.32	1.63

As per above table, P value is 0.000 which is less than α=0.05, the level of significance. Therefore, we can reject the Null hypothesis and accept alternative hypothesis that, "Cloud Computing is applicable in all IT and educational sectors."

Conclusion

In today's fast moving life people checks for facilities at their maximum convenience which is provided by the cloud computing over the internet, and that is why the cloud computing popularity is growing. Still large proportions of people today refrain themselves from using these facilities due to the security reasons or reliability with cloud computing. This means that the IT professionals mostly look for just internet services or intranet within their organization without implementing the cloud computing which then results in increased cost. Also through various research studies from researchers we can conclude that with the upcoming advancements in cloud as well considering the security and minimizing the threats, Cloud computing will be reaching a new height in the upcoming years.

References

1. Tavbulatova ZK, Zhigalov K, Kuznetsova SY, et al. July. Types of cloud deployment. *J Phys Conf Ser* 2020; 1582: 012085.

2. www.google.com

3. Wang LC, Chen CC, Liu JL, et al. Framework and deployment of a cloud-based advanced planning and scheduling system. Robotics and Computer-Integrated Manufacturing 2021; 70: 102088.