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On-Premise Cloud v/s Public Cloud: Enterprise Adoption and Challenges

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Abstract: ***This research provides a comprehensive view of the growing Cloud Computing services and the application of Cloud Computing models in various enterprises in India. Nowadays cloud computing is booming like no other technology. Every organization whether it's small, mid-sized or big, wants to adapt this cutting edge technology for its business. As cloud technology becomes extremely popular among these businesses, the question arises: Which cloud model to consider for your business? Primarily there are four types of cloud models available in the market: Public, Private and Hybrid. This research paper explains the adoption of cloud services by various enterprises in India and the challenges that are generally faced by them. To perform this research, a survey was carried out via 'Google Forms' by Ms. Akanksha Shrivastava. This survey has been brought to a wide range of working professionals playing a significant role in IT Industry. Numerically, 56 responses were saved during the survey within a time span of 10 days.***

Index Terms: Public Cloud, Private Cloud, Hybrid Cloud, Cloud Computing.

I. INTRODUCTION

To choose an enterprise resource planning system for your enterprise, first you need to be determined on what deployment model to adopt, whether an on-premise or public cloud. Cloud-based ERP systems are more common than ever before[4]. Before jumping into this, first let's just get an idea about what cloud computing actually means.

A. What is Cloud Computing?

Cloud Computing is commonly defined as a remote service that is employed to store, manage and process information on the cloud. Any data or information saved on the cloud can be accessed anytime and from anywhere.
There are three categories of Cloud Computing Services:

1) Infrastructure as a Service (IaaS)
2) Platform as a Service (PaaS)
3) Software as a Service (SaaS)

B. Deployment Models

A deployment model defines the aim of the cloud and therefore the nature of how the cloud is located.

1) Public cloud: The public cloud infrastructure is available for public use alternatively for a large industry cluster and is owned by a corporation mercantilism cloud services.
2) Private cloud: The private cloud infrastructure is operated for the exclusive use of associate organization. The cloud is also managed by that organization or a third party. Private clouds may be either on- or off-premises.
3) Hybrid cloud: A hybrid cloud combines multiple clouds (private, community of public) wherever those clouds retain their distinctive identities, however are shared along as a unit. A hybrid cloud may offer standardized or proprietary access to knowledge and applications, also as application portability.

a) On-Premise Cloud: On-Premise Private Cloud, often called Internal Cloud, is hosted within an organizations own offices, or data center, and Provides an internal solution for hosting needs. Since an Internal Cloud is completely controlled in-house this means you often have more flexibility. If you need to have things setup in a very specific way, with specific hardware, you have that control.
However you also have to carry the full burden of server costs and maintenance. You're all in. From the initial up-front hardware costs, software licensing, and even the unfortunate hardware failures. While providing more control On-Premise solutions don't come without their own downsides.

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Additionally, to ensure successful operation you'll need to have qualified System Administrators on staff to maintain and monitor the systems. For organizations already staffed with Admins this maybe less of a concern, however this can be a tough hurdle in some cases.

Advantages & Disadvantages of On-Premise Cloud:

i) Advantages

a. Total Cost of Ownership: Since you are only paying for your user licences once, an on-premise solution can have a lower Total Cost of Ownership (TCO) than a cloud system.

b. Complete Control: Your data, hardware and software platforms are all yours. You decide on the configuration, the upgrades and system changes.

c. Uptime: With on-premise systems, you do not rely on internet connectivity or external factors to access your software.

ii) Disadvantages

a. Large Capital Expenditure: On-premise systems usually require large upfront purchase which means capital expenditure (CapEx) is often required. On top you need to include maintenance costs to ensure support and functionality upgrades.

b. Responsibility For Maintenance: With an on premise system, you are responsible for maintaining server hardware and software, data backups, storage and disaster recovery. This can be an issue for smaller companies who have limited budgets and technical resources

b) Public Cloud

Public cloud is a deployment model where the services are accessible to any of the users who would like to opt for cloud services. This cloud model is generally used for public data or where the security is not the main concern for the user as it is accessible to all the users.

Advantages & Disadvantages of Public Cloud:

i) Advantages

a. Anywhere and Anytime Access: You can access your applications anytime and anywhere via a web browser from any device.

b. Affordable: Cloud requires no upfront costs, instead you make regular payments which makes it an operating expense (OpEx). While the monthly cost adds up over time, maintenance and support services are included removing the need for annual contracts.

c. Predictable Costs: Benefit from predictable monthly payments that cover software licences, upgrades, support and daily back-ups.

d. Worry Free IT: Because cloud software is hosted for you, you don't need to worry about the maintenance of your software or the hardware it resides on, compatibility and upgrades are taken care of by the cloud service provider.

e. High Levels of Security: Data centres employ security measures beyond the affordability of most businesses, therefore your data is often safer in the cloud than on a server in your offices.

f. Quick Deployment: Cloud-based software is deployed over the Internet in a matter of hours/days because, compared to on premise applications which needs to be installed on a the physical server and each PC or laptop.

g. Scalability: Cloud technologies provide greater flexibility as you only pay for what you use and can easily scale to meet demand, for example adding and scaling back licences.

h. Lower Energy Costs: When you move to the cloud, you no longer have to pay to power on-premise servers or to maintain their environment. This significantly reduces the amount you pay on your energy bills.

ii) Disadvantages

a. Connectivity: Cloud solutions require reliable internet access for you to remain productive.

b. Long-Term Costs: Although requiring a lower upfront investment, cloud applications can be more costly over the course of the system's life cycle, increasing total cost of ownership (TCO).

c. Less Customizable: Cloud software is typically configurable but depending on how it is hosted a cloud solution may not be able to cope with complex development.

C. Challenges Faced by Enterprises using Cloud Services

An enterprise has to face many challenges in order to set up a cloud computing environment across the organization. Some of the challenges are mentioned below:

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1) *Security and Privacy*
2) *Connectivity and Open Access*
3) *Reliability*
4) *Interoperability*
5) *Economic Value*

D. Cloud v/s On-Premise Software Comparison

Essentially, the fundamental difference between cloud v/s on-premise software is where it resides. On-premise software is installed locally, on your business' computers and servers, where cloud software is hosted on the vendor's server and accessed via a web browser.

As well as accessibility, there are a raft of other things that need to be considered when making a decision, including software ownership, cost of ownership, software updates and additional services, such as support and implementation.

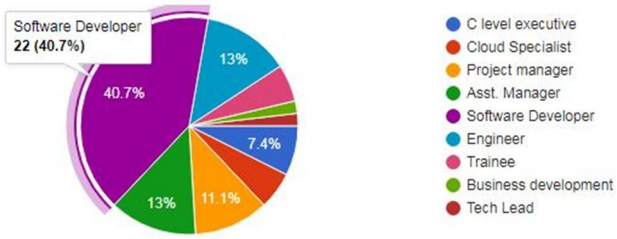
II. METHODOLOGY

This research paper has been possible with the help of a survey introduced to a large number of working professionals. The survey constitutes a variety of questions. The responses to these questions have helped in analyzing the current scenario of Cloud adoption in the enterprises, the main features that an enterprise aims to achieve, and what are the challenges they are facing currently.

III. LITERATURE REVIEW

This research aims to figure out the current scenario related to the adoption of cloud computing services by various enterprises in India, what are the business functionality criteria they are aiming to achieve with the help of cloud computing. And what are the main challenges faced by them while accessing the cloud services?

The research was brought in action by a public survey carried out amongst working professionals related to different enterprises or organizations in the industry and they were asked to fill the response on the basis of information related to the cloud services being used in their respective enterprise/organization. Professionals working on various profiles took the survey, the exact depiction of which is shown in fig.1.



Out of all, 40.7% of the respondents were software developers. Some C level executives and Cloud Specialists also took the survey. And other respondents were from various departments like project management, business development, etc.

Majorly, 77% of enterprises have at least one application or a portion of their enterprise computing infrastructure in the cloud. More technology-dependent industries including manufacturing, high-tech, and telecom are being led by executive management to become 100% cloud. [2].

% OF RESPONDENTS USING DELIVERY MODELS

	SaaS	PaaS	IaaS
Now	89%	61%	73%
In 18 Months	95%	73%	83%

Source: www.forbes.com

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IV. SURVEY ANALYSIS

A survey had been conducted to collect the data required for this research. The survey was taken by the working professionals in various enterprises. They were asked to fill the responses based on the information related to the cloud computing services being employed in their respective organization.

This survey consisted of several questions, which helped us extracting the required information regarding this research.

An elaborate description of the questionnaire is given below.

Fig.1 shows the percentage of respondents from various business sectors.

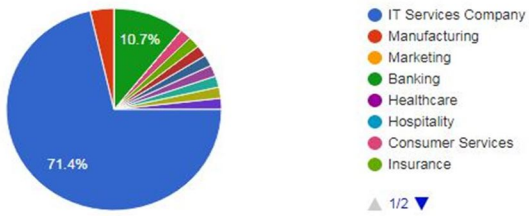

Figure 1: Type of Organization

The above chart helped to determine the distribution of respondents from various industries (fig.2) and their roles in the organization/enterprise is shown in fig.1

By analyzing the above chart, it can be concluded that a majority of working professionals who took the survey were from the IT industry.

BFSI industry comes second in the row. Whereas other responses were from consumer services and manufacturing industry.

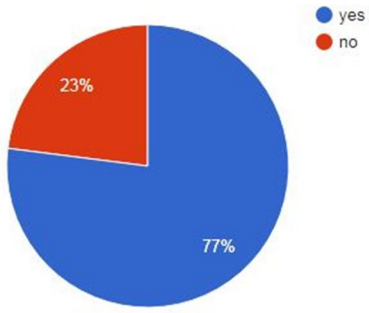

Figure 2: Organizations adopting with Cloud Services

The above chart helped finding out whether the enterprises are using cloud services or not.

The responses came for this question helped in roughly estimating that a majority of 77% of enterprises in India are using cloud services at present. And the other 23% are still not using cloud services. Whereas some of them aspire to adopt cloud services in the near future. Now the question arises, why are some enterprises not using Cloud services? There might be a number of factors playing a significant role. Some of them were mentioned by the respondents. The information depicted below helps in estimating the incapabilities behind the enterprises not incorporating cloud services.

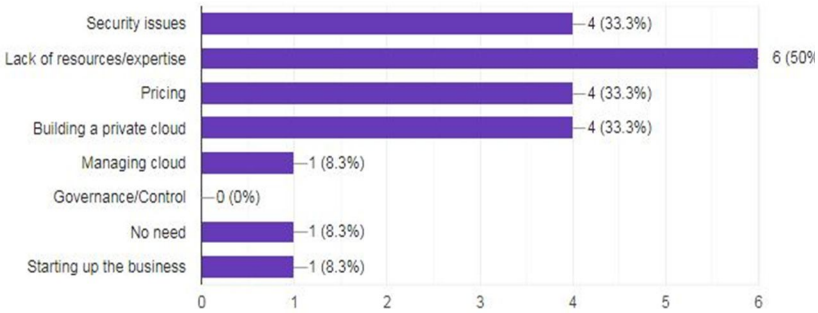

Figure 3: Reasons of not using Cloud Services

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In order to adopt and access the cloud computing services, the enterprises have to set up a cloud environment. That is when cloud deployment model come in action. A cloud deployment model represents a specific type of cloud environment, primarily distinguished by ownership, size, and access. [6]
Various enterprises use different cloud deployment models according to their requirements and capacity of their cloud environment.

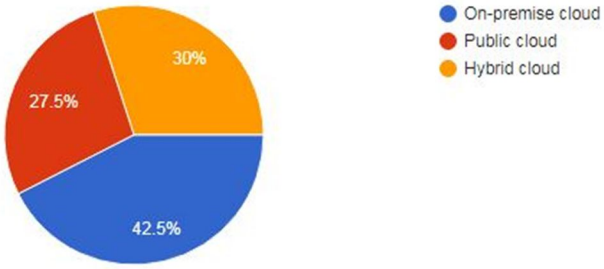

Figure 4: Cloud Deployment Model being used

With the help of stats depicted in the above chart, we can predict that On-premise workloads are the highest i.e. 42.5% whereas 27.5% of enterprise workloads runs on public cloud platforms (Amazon AWS, Google Cloud Platform, IBM Cloud, Microsoft Azure and others). An additional 30% are predicted to be hybrid cloud platforms. These services are being delivered to the enterprises by several delivery models. The below data explains the adoption of IaaS, PaaS, SaaS, and other models by the enterprises.
To deploy the cloud computing models, certain cloud services need to be incorporated in the enterprises.
Simply put, cloud computing is the delivery of computing services—servers, storage, databases, networking, software, analytics, intelligence and more—over the Internet ("the cloud") to offer faster innovation, flexible resources and economies of scale. You typically pay only for cloud services you use, helping lower your operating costs, run your infrastructure more efficiently and scale as your business needs change.[5]

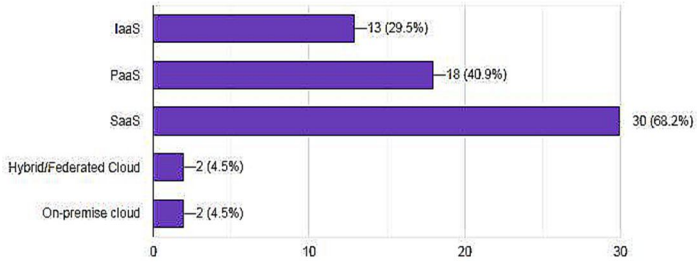

Figure 5: Cloud Services being used

By analyzing the information depicted above, we can predict that 68% of all organizations relies on the SaaS model for application delivery, with IaaS acquiring 29.5% of the enterprises and PaaS, 40.9%. Cloud platforms and apps already dominate organizations' technology stacks, and the momentum will continue through 2020. This completely changes the level of communication and collaboration within enterprises and underscores how critical it is to recruit and retain the best cloud talent possible.

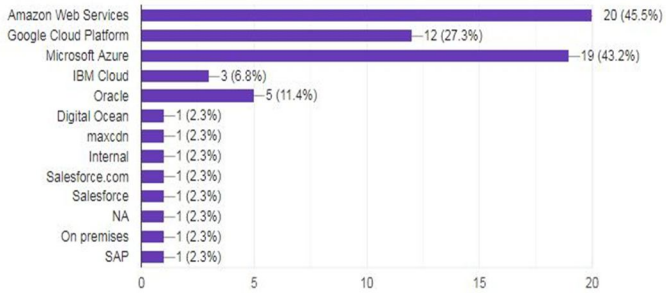

Figure 6: Cloud platforms being used

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Amazon Web Services & Microsoft Azure are predicted to gain market share versus Google Cloud Platform GCP at present, with AWS staying the clear market leader. The study found 45.5% of respondents are predicting AWS gains more market. Microsoft Azure is predicted to also gain ground according to 43.2% of the respondent base. GCP is predicted to acquire its market share with 27.3%.

There are numerous benefits associated with Cloud Computing Services like storage, simplicity, usability, efficient performance, etc.

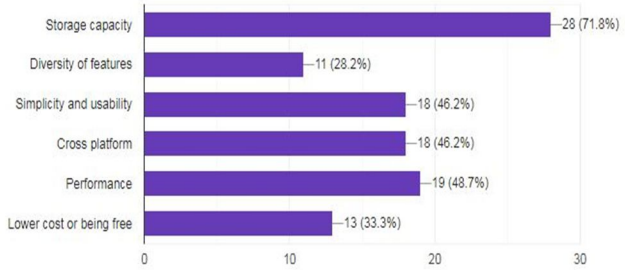

Figure 7: Features of Cloud Computing

Out of all the benefits, the organizations mostly opt cloud services for its huge storage capacity.

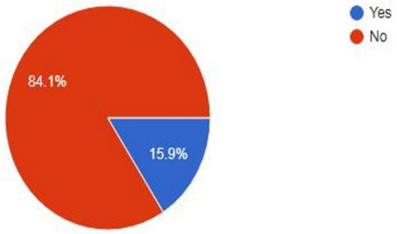

Figure 8: Is there any challenged with cloud services

As depicted in fig.2, 77% of organizations use cloud services, out of which 84.1% of them don't face any challenges in accessing the cloud services while others face a number of challenges while employing the cloud services among the organization.

Some of those challenges were mentioned by the respondents.

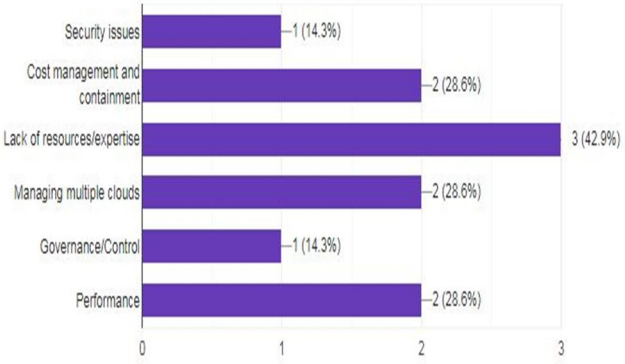

Figure 9: Challenges with Cloud services

42.9% of the professionals say overcoming the challenges of having staff that lacks cloud experience is their greatest concern in adopting an enterprise cloud computing strategy. Cloud platform and service providers will go on a buying spree in the future to strengthen and harden their platforms in this area.[3] Additional concerns include security(14.3%), governance and compliance goals on cloud-based platforms (14.3%), managing the cost incurred in setting up the cloud environment(28.6%), managing multiple clouds(28.6%) and some performance inefficiencies(47%).

Cloud computing is a big shift from the traditional way businesses think about IT resources. There is a large number of organizations turning towards cloud services.

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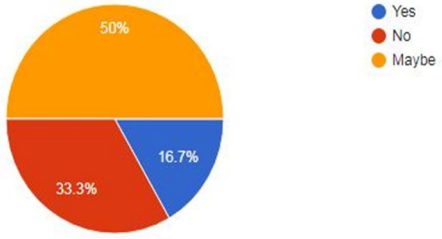

Figure 10: Organizations to adopt Cloud Services in future

Following stats show the preference of cloud services being adopted by different organizations:

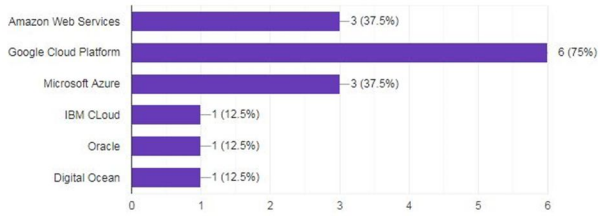

Figure 9: Cloud platforms to be adopted in future

The most preferred cloud platform is Google Cloud Platform GCP with 75% of responses in favor. Followed by Amazon Web Services and Microsoft Azure being the second choice of the enterprises.

V. CONCLUSIONS

Cloud Computing is the newest emerging technology, which every organization these days wants to adapt for its business to increase the profitability and scalability. This research paper defined cloud computing, highlighted all the service models of cloud computing, and compared on-premise and public cloud based on various parameters.

With the help of a public survey carried out by the author, some real facts and data was analyzed based on the responses given by the survey takers. Also, cloud security issues were raised and discussed.

Though there are various challenges in setting up the cloud computing system in an organization/ enterprise but the benefits that come along cloud services blur all those challenges and make Cloud computing services as the most preferred services for the enterprises at present. The adoption of cloud computing services is expected to burgeon further in the future.

VI. ACKNOWLEDGEMENT

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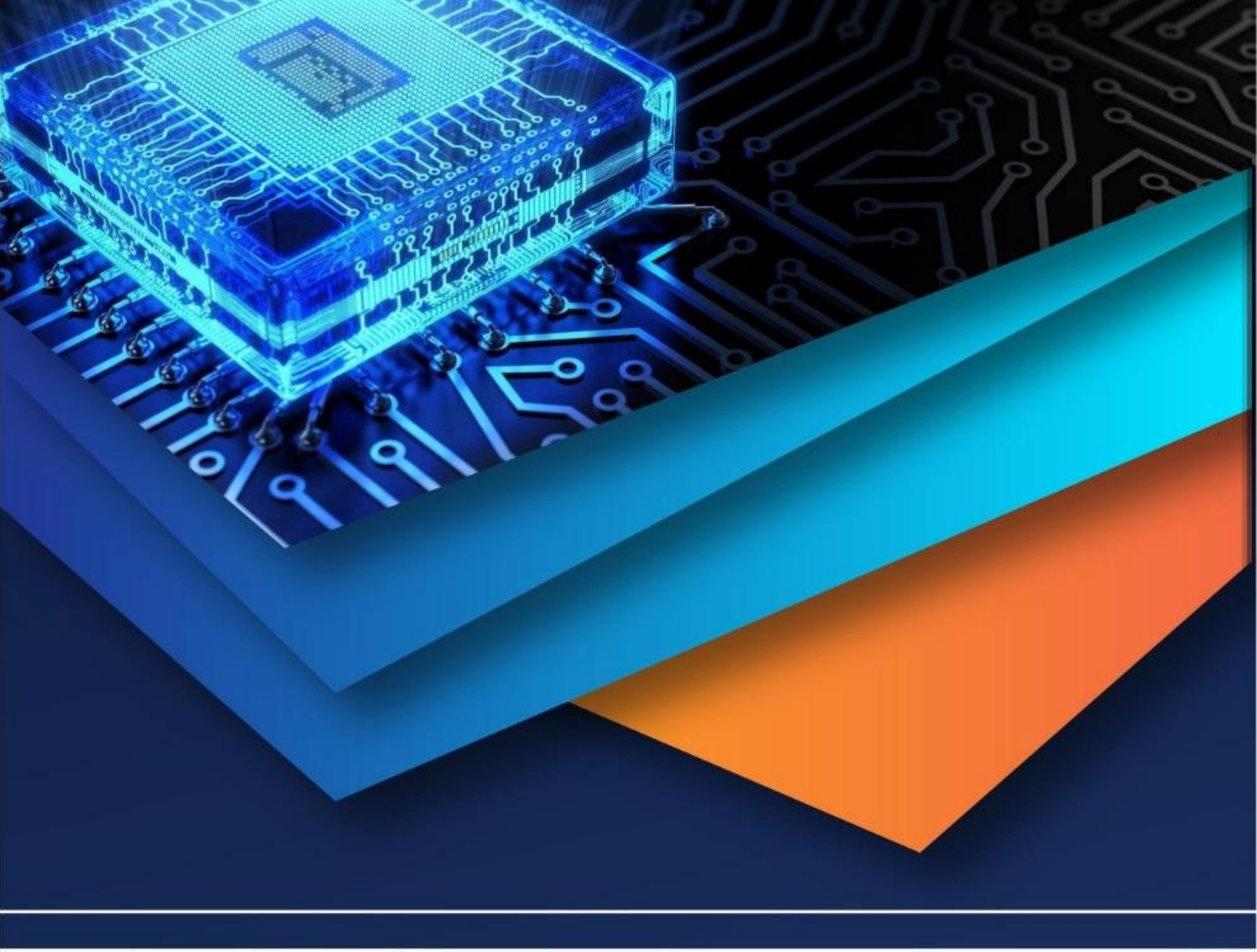

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