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CLOUD COMPUTING AS AN AUGMENTED IDEA IN TECHNOLOGY: THE HASSLES IN SERVICE MODELS AND SERVICE PROVIDERS

[1]Rohit Raj, [2]Swati Kumari, [3]Nikhil Lakhani, [4]Gulson Kumar Singh, [5]Aparna Bisht

[1, 2, 3, 4, 5]Student

[1, 2, 3, 4, 5]School of Computer Science and Engineering, Lovely Professional University, Phagwara, India.

Abstract: Cloud computing is a concept that can provide computing services on the Internet on demand and allow pay-per-use to use a set of shared resources, such as networks, storage, servers, services, and applications, thereby restoring the value of control and benefit to the enterprise time. Come from different industries. For example, banking, healthcare, education, etc. Cloud computing might be a completely web-dependent technology wherever consumer knowledge is hold on and keep up inside the information focus of a cloud provider like Google cloud platform, Amazon web services, Salesforce, and Microsoft Azure, etc. Restricted administration over the information could bring different variety of the security issues and dangers that typify information run, shaky interface, sharing of assets, information accommodation. This analysis paper diagrams what distributed computing is, the various cloud models and This paper is trying to fulfil the overview of the solution in cloud security by analyzing the data privacy in the services of providers. It validates the challenges posed by cloud computing and provide best practices for service providers and companies that want to anchor their services in the cloud to improve their performance in this harsh, profitable climate.

Index Terms - **Security Issues, Cloud Security, Cloud Architecture, Data Protection, Cloud Platform, Grid Computing, distributed denial of service (DDoS).**

Introduction

Cloud computing is the availability of computer system resources when needed, especially data storage (cloud storage) and computing power, without the user's direct active control. This term is commonly used to describe data centers that many users can access through the Internet. Clouds that are popular today usually have functions that are distributed from a central server to multiple locations. If the connection to the user is relatively close, it can be called an edge server.[1] One example for defining success of cloud is cloud gaming where multi graphical mode with multi player is available with larger game file in 4k with 2160p resolution and that defines the success of cloud computing. Cloud computing arose as a business need, motivated by utilizing its administration foundation. Although at first the thought existed distinctly in the scholastic field, as of late, it was moved into the business by organizations, for example, Azure as a OneDrive, Amazon AWS, Google cloud, and Salesforce cloud make it simpler for new companies to enter the market, as the cost of the system is reduced. This allows engineers to focus on the company's reputation rather than financial considerations. Business Cloud customers gradually rent log capacity (virtual machine) or other storage space (virtual storage space) according to their business needs.

Inside models of cloud computing: Typically, cloud services can be divided into three categories.

Software as a service (SaaS): Think of it as a cycle in which application service providers (ASPs) deliver various programming applications over the Internet. This frees the client from having to enter the application and use it on its PC, and it also makes many ongoing high performance programming maintenances useless. Activities, well-being and support. Advertise with the SaaS provider and deliver the IT infrastructure and the cycle required to run and manage the complete patch. For example: Salesforce cloud, Google Apps.

Trait shows that the platform is highly differentiable.

- SaaS vendors provide users with software and applications via a subscription model.
- Users do not have to manage, install or upgrade software; SaaS providers manage this.
- Data is secure in the cloud; equipment failure does not result in loss of data.
- Applications are accessible from almost any internet-connected device, from virtually anywhere in the world.

Platform as a Service (PaaS): A cloud computing product that provides users with a cloud environment in which to develop, manage, and deploy applications. In addition to memory and other computing resources, users can also use many pre-built tools to develop, customize, and test their own applications. Examples: Google App Engine and Microsoft Azure.

Trait shows that the platform is highly differentiable.

- PaaS provides a platform with tools to test, develop, and host applications in the same environment.
- Enables organizations to focus on development without having to worry about underlying infrastructure.
- Providers manage security, operating systems, server software and backups.
- Facilitates collaborative work even if teams work remotely.

Infrastructure as a Service (IaaS): Cloud computing products enable suppliers to enable users to access computing resources such as storage, networks, and servers. The company uses its own platform. Applications and applications in the service provider's infrastructure. Therefore, it provides on-demand services for infrastructure and APIs (application programming interfaces) to interact with hosts, switches, and routers, as well as the possibility of introducing new application tools. Samples of IaaS embody: Amazon Elastic Cloud Computing (EC2), Amazon S3, Go Grid.

Trait shows that the platform is highly differentiable.

- Instead of purchasing hardware outright, users pay for IaaS on demand.
- Infrastructure is scalable depending on processing and storage needs.
- Saves enterprises the costs of buying and maintaining their own hardware.
- Enables the virtualization of administrative tasks, freeing up time for other work.

How Everything Switches to SaaS and Open Source.

Previously, when android was introduced commercially then at that time phase, open source and commercially licenced softwares are in the beginning phase of this above risen data (inner circle). The security was just introduced in these services and challenges was in the role with spotting issues, hassles. One of the important benefits, which was directly profited to customer, was data control on them and as soon as SaaS came into the role where everything of software data used to be in the cloud and suppliers of the SaaS put the deal and Service level Agreements (SLA) in front of the customer in which data was/is/will never be compromised. But one problem like many other in industry level is always there that from what source these providers get the profit since they provide the facilities to customer and return, they charge for that but that might not be sufficient for the big/small company So, they deal the data of customer with the third parties. We have also been watching since this revolution started like internet, cloud, and networks and through these challenges got increased and is increasing day by day. The migration of the data of customer has also been very challenging through this revolution.[2]
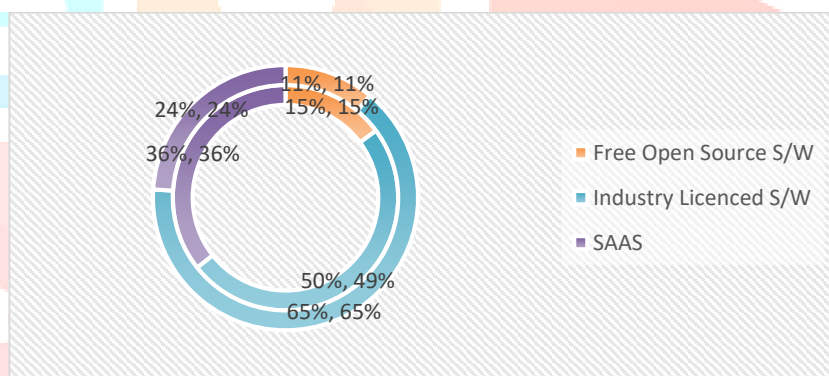
Figure 1. Shifting into SaaS, Open Source, Licensed S/W

Now, we can see through SaaS and other services as well that all data going to be localized and by this effect researcher predict that vendor will be vanished by the time and possibly, they are about to leaving their customer stuck with the dead-end application where customer or user would have no choice except getting dumped.

There also are different cloud preparation models known as:

Private Cloud: A private cloud is widely defined as a cloud environment dedicated to an end user or group, which usually runs behind that user or firewall group. When the underlying IT infrastructure is assigned to a single client with completely isolated access rights, all clouds will become private clouds. However, the private cloud no longer has to come from the local IT infrastructure. The company is currently building a private cloud in a leased data center owned by an off-site vendor, thereby eliminating the need for any hosting and ownership strategies.

Public Cloud: Public cloud is a cloud environment that is usually based on the IT infrastructure of non-end users. The largest public cloud providers include Alibaba Cloud, Amazon Web Services (AWS), Google Cloud, IBM Cloud and Microsoft Azure. Outside the company, but today's public cloud providers provide cloud services in customers' local data centres, thereby eliminating the need for location and ownership differences. Since some cloud providers (for example, Massachusetts Open Cloud) allow tenants to use their clouds for free, public cloud functions are no longer required. The entire IT infrastructure used by public cloud providers can also be abstracted as IaaS and sold or developed on a cloud platform marketed by PaaS.

Hybrid cloud: Hybrid cloud is a seemingly unique IT environment consisting of multiple environments connected via local area network (LAN), WAN (wide area network), virtual private network (VPN) and/or API. Hybrid clouds have complex attributes, and requirements may vary depending on the questioner. For example, a hybrid cloud can include the following:

- At least 1 private cloud and at least 1 public cloud
- 2 or more private clouds
- 2 or more public clouds
- A bare-metal or virtual environment connected to at least 1 public cloud or private cloud.

However, every IT system becomes a hybrid cloud, in which applications can enter and exit multiple separate but related environments. These environments must come from integrated IT resources that can be expanded as needed, and all these environments must be managed as an environment using an integrated management and orchestration platform.

Models/ Accessor	Ruled by	Provided H/W
Private	Cloud Service provider and Internal org.	Yes
Public	Cloud Service provider	No
Hybrid	Mixed	Depends on service provider

figure 2. cloud model classifications[3]

Cloud Computing Source

Data privacy should be the real concern of everyone's life as we already invest for anything which is needed in our life then invest for our data big thing. To store the data, we need storage which is common now a days but what if it gets damaged or for some reason it stopped working, in that case what would you do? To resolve this main issue, which is really cost beneficial as our physical storage, the cloud storage described in today's generation which is accessible by internet.

There are many cloud suppliers are available in the market through which customer can avail that service to store their data in cloud which is accessible online. Basically, In the market of cloud, there are service broker and service reseller that are becoming new supplier/dealer of cloud era which run as a business, but there are mainly two entities in market firm of cloud 1. Supplier 2. Buyer.

Based on the result of analysis, Buyer wants fast access to their services, save time, and money but to take service, Buyers always should apply their interest to buy services. Cloud services also gives the freedom to providers to achieve better, reliable and fully documented decisions resulting in fully accessible the buyer's data. To provide fully flexible service, providers stand their own data centre where they build infrastructure to maintain the data reliably and with this infrastructure, they provide many services in fashion, for platform, for building another infrastructure and in functioning many services over it, also since these are totally different areas but still, they provide services to buyer, broker, and resellers. So, every business can have their benefit from more than one or Single toned thought which creates moment that picking a distributed computing specialist is to do what's needed exploration to comprehend business prerequisites and discover suppliers who can offer wanted cloud arrangements that will work totally dependent on the necessities.[4], [5]

The cloud investments are increasing as users need it most as some set of budgets of total IT budget use to allocated to cloud computing and Average cloud investment from US is around $73.8 million but for other countries it varies as they required as per their need and access for their people and services. [6]
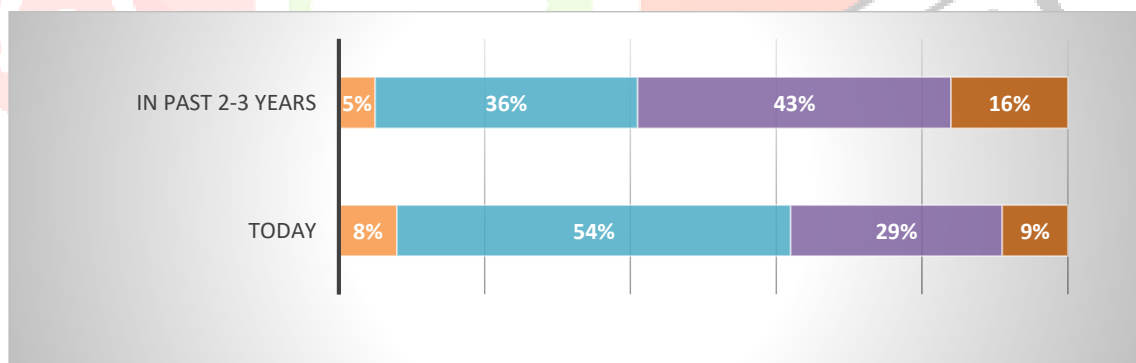

figure 3. cloud shifting in last and running years.

As we analyzed that many services are getting shifted to SaaS and Open-source Software where the comparison with the commercially licensed software which is about 65% of the total share in the software services is not defining the other software services like free open software with 11% share and SaaS with 24% and the shift continues to cloud in the market of providers and users. we can see through this graph, all on premises of last years is hold up to 5% of the Organization's total IT environment like infrastructure, applications, Data analytics, etc. After that some cloud, mostly on-premises is about 36% and 54% in running year where 1000 plus user's views got reviewed and taken into account which result in more than 54% and 50% approx. for less than 1000 user's view. 43% said some on premises and mostly cloud users in last year's whereas in running years, it is 29% on the same premises and mostly cloud users. Then there is 16% and 9% for last years and in running year respectively for all cloud users.
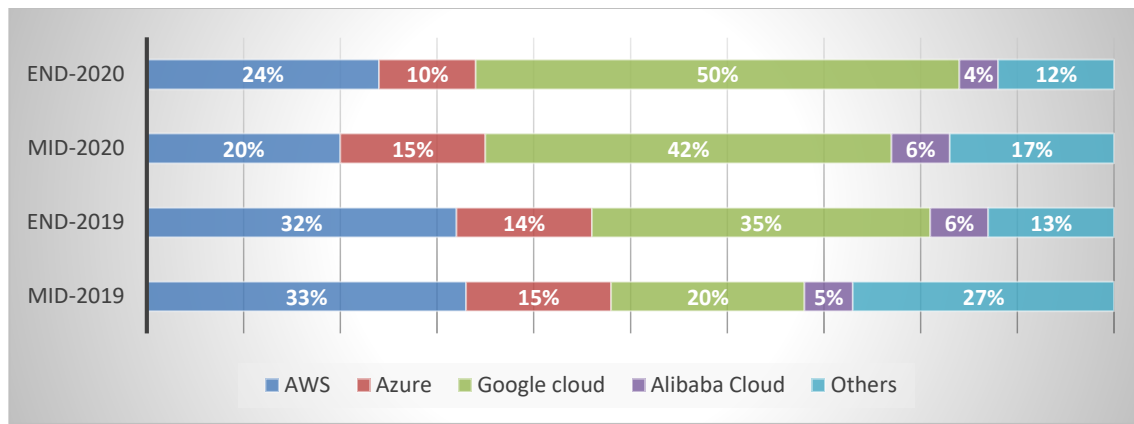
figure 4. cloud infrastructure services spend.

After reviewing the market of cloud, we got to know that there are top 4 providers account for 62% of cloud spend and seen the percentage are 33%, 32%, 20% and 24% in Mid-2019, End 2019, Mid 2020, End 2020 respectively for AWS which of course is not leading in this but there 20%, 35%, 42%, and 50% in Mid-2019, End 2019, Mid 2020, End 2020 for Google and so on for others, Azure, Alibaba. The worldwide infrastructure of cloud services spending costs in respective Quarters like in Mid-2019, End 2019, Mid 2020, End 2020 are US $23.1 billion, and Growth was 40%, $ 30.2 billion and Growth was 37.2%, $31.0 billion and Growth was 34.5%, $35 billion and Growth was 35.5% respectively.

At the same time, the challenges in cloud services are increased with providing agility, scalability, and future potential for upcoming adding features. Theses world top level providers have faced different challenges in various field which is visible in graph where remining % are with agility, scalability, and potential of the services. The Major challenges and Minor issues according to RightScale's annual state of cloud survey, they asked from different employee of different section about the acquired cloud IaaS service then they got to know that 80% aspirants said that security risk is above one level concern and building cloud privately is going to be the main concern, challenges for that is on the top priority and the layer for cloud software has to be the order of network addresses like IP address, Virtual Mac address which definitely plays important role but when we concern about network then we should talk about the limited set of address as there are billions of devices which required address in the era of IOT(Internet of thing) which is also moving towards cloud computing services and set up virtual addresses will lead to the solution of limitation of network address and set up a virtual local area network(VLAN), keeping the cloud server in the load balancer of the developed module of the cloud feature, keeping up the cloud server in the local and global firewall rule set for the some kind of addresses like IPv4, IPv6. The Layer must load correct state of Red hat Enterprise Linux which definitely help in finding bugs and security issues and fix that issues using some set of protocol, reinforce the server softwares whenever needed and has to keep side over the server or place directly server into the backup queue.[3]

Some set of data stated in managing cloud features like migration, control on different servers and the Cloud infrastructure performance that 95% of the industries or organization are moving their softwares, products to the cloud so that they can access later when some sort of natural issues comes but to get the full access on it then Managing clouds, check performance time to time leads to healthy long run of data centers which 68% managing clouds facing major and minor challenges and issues respectively and Some challenges are cited which commonly defined for cloud security or other challenges faced during storing the data in the cloud system.

1. Extensive Troubleshooting.
2. Security Challenges.
3. Slow Data Migrations.
4. Migration providers.
5. Cutover Complexity.
6. Application Downtime.

These experiences extended the difficulty for IT to give the organization, consistence, perils and data quality organization required. To ease the various risks and weaknesses in advancing to the cloud, IT ought to change its traditional IT organization and control cycles to fuse the cloud. With this effect, the piece of central IT bunches in the cloud has been creating throughout the two or three years. Close by claim to fame units, central IT is logically accepting a section in picking, taking care of, and managing cloud organizations. On top of this untouchable circulated registering the cloud service providers are ceaselessly giving organization support and best practices. Apart from the US Patriot Act, the protection guidelines discussed in this document overlap in many aspects or can be incorporated under different names. [6], [7] It goes without saying that these standards are regarded as protection standards throughout the world. Therefore, these standards represent the opposite protection directive standards, and therefore, the Cloud Service Provider (CSP) Association is legally obliged to agree to their implementation. These associations are trustworthy and are responsible for maintaining consistency. If the subcontractor violates the law, the association shall be liable. It is not clear whether CSP is considered legally equivalent to a subcontractor. There is currently no law on this subject. CSP can be regarded as a subcontractor legally, which means that the association must ensure that the CSP complies with applicable safety regulations. It is believed that Ward will compromise the security of cloud commuting in many cases.[5]
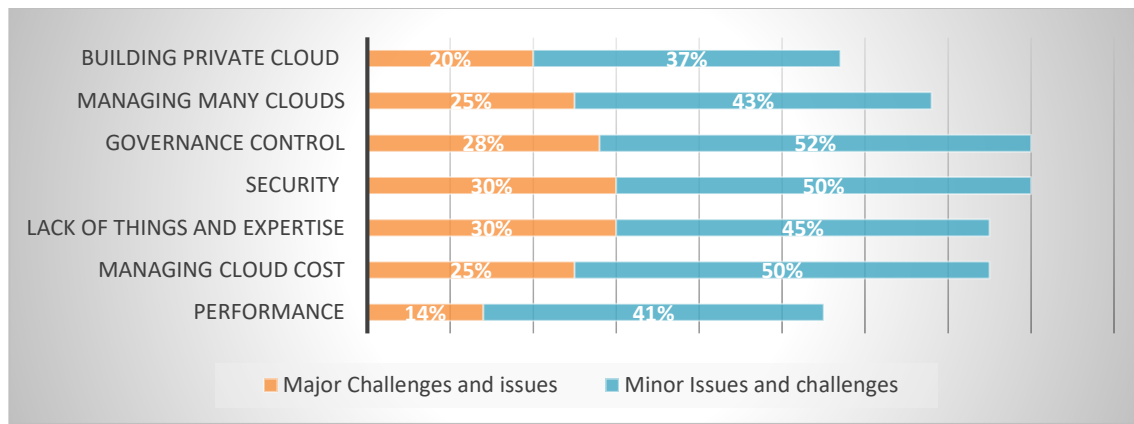
figure 6. challenges and issues from the beginning.

Below stated data according to report by Canalys shows that in Q4, 2020, AWS cloud grew by 28% and Azure, Google, and Alibaba clouds grew 50%, 58%, and 54% respectively. As of this report, AWS has 31% of total cloud market share followed by Azure, Google, and Alibaba that have 20%, 7%, and 6% respectively. And the top cloud service providers (CSPs) accounted for 65% of toral cloud spend in Q4 of 2020. The leaders in cloud service providers, the Amazon, Google, Microsoft along with the new emerging adobe creative will be on top and Alibaba, Oracle, IBM are the niche Players of this filed but time is not for top leaders as per different time of years, sometimes niche players will be perhaps on the top in services.
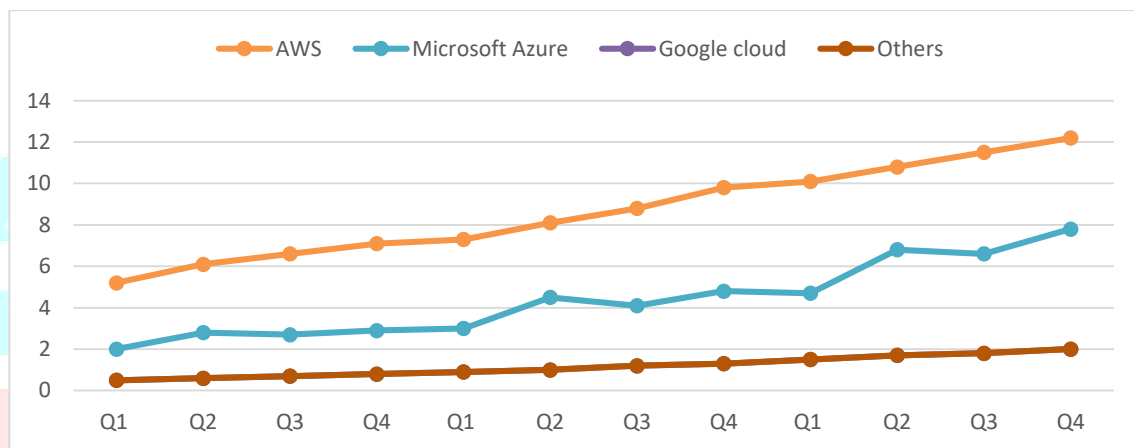

figure 5. values of top 3 and other csps in world.

Some Other aspects of cloud Computing and Service Providers:

Contrary to mainly cloud-based external targets (such as botnets or zombie nebulae), it is possible to trigger attacks from the cloud. Two types of cloud robot attacks are distributed denial of service (DDoS) attacks and click fraud attacks. These attacks were started and will be completed sooner or later. They cost about one hundred euros. Each attack has powerful functions for its specific purpose. In addition, no attacks through cloud service providers were detected or closed. Attackers who usually perform botnet attacks aim to publish scams. While creating files to obtain cloud revenue, fake call statistics and Visa statistics were applied in this way to make it easier to track attendance. The thief may want to submit the development of the twelve Robot Nebulae, which may be in different CSPs. When one cloud was finally detected and shut down, the next cloud was sent, and so on, this was about a continuous and important attack. Once all customers start to use the cloud, CSP does not have a lot of incentive pressure to show them the screen. The current method is to resist the victims of the attack until they come into contact with a reliable CSP. Therefore, everything is important when considering the movement introduced to prevent aggression. Due to the long distance, CSP must take all the methods and problems to identify and evacuate cloud bots. In any case, professional robots will continue to move their retaliatory sports events to the cloud, and robot fog will continue to develop. Prevent robot fog and move the appropriate rollback reputation structure to the cloud.[3]

Conclusion:

Distributed computing is likely to provide the ability to constantly change the configuration of counting assets, which is a hobby that can track the increase or decrease in the number of things. Customer service providers (CSP) should be willing to provide this hobby. Since the CSP refuses to pursue this hobby, the CSP may be under pressure to adjust the level of statistics according to the CSP change itself, thereby exacerbating the above-mentioned regional security problems. As a result, the impact of security metrics between external cloud computing and traditional IT is staggering. It can report various vulnerabilities related to the consistency of security indicators. As a result, the current security indicators are obviously not enough to solve all the identified security issues in cloud computing. Take the first step to solve this problem. While contrasting the consistency between cloud computing and security performance, security can be regarded as the main challenge in transitioning cloud computing. Few organizations are fully aware of the security of cloud computing. [3]

Cloud computing has augmented research about security and the most important future work would be securing it and would be faster over the internet. The highly integrated large safety stresses with the allotted computing version are that the sharing of assets. Cloud manger's or owner's carriers should be confined to recommend their customers approximately the sum concerning safety that

they deliver on their cloud. at some point of this paper, we are able to in fashionable introductory referenced shifted fashions of allotted computing, safety problems and research demanding situations in allotted computing. statistics safety is a good-sized difficulty for Cloud Computing. There are the numerous safety demanding situations in conjunction with safety elements of agency and virtualization. This paper has featured those problems with allotted computing. we are able to in fashionable be given that gratitude to the character of the cloud, it'll be renowned begin to complete safety. New safety approaches should be confined to be created and greater mounted safety techniques had to be profoundly modified to be organized to paintings with the clouds plan. for the reason that development of allotted computing innovation maintains on being at A starting phase, we are able to in fashionable expectation our paintings can provide a greater robust comprehension of the arranging problems of allotted computing and clean the manner for greater research at some point of this space.

Further studies:

Of course, this is not limited set of studies as many different technologies will come and some other challenges will also come into the role as the security and some other aspects will also come along with this.

So, we think that the existence of the privacy legislation leads to the many and different research fields but the benefits for cloud model will be on the top where issues will be resolved possibly if the next generation researcher will try to get the gap according the pattern of new technology and Therefore, we agree that if future analysts can conduct more context-sensitive research on the policies, laws, and guidelines that can reflect different situations and provide models for operating distributed computing, then research on security and cloud computing will be very useful . Ensure that the association complies with safety guidelines.

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