Critical Evaluation of Cloud Computing Systemthrough Ontology

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Abstract : **Modern cloud computing resource users agreed to the pay-and-use model by having access to all the finest options offered by the providers, which was how they came to the decision. It operates on the principles of everywhere, total component, and always-on supplier for stop users. Each and every single area of search computing is playing a viral role, and its lookup is expanding in a very diverse way.Everyone is talking about the cutting-edge trends in cloud computing. The fundamental issue here is that there is no uniformity, thus not all people are entering a level playing field. Every human being has a unique definition of what cloud computing is. Cloud computing is now utilised in all branches of science.. There are numerous service options available to provide the service in various ways. The infrastructure provider sets up cloud structures and provides property for everyday usage using the capacity of the carriers. Now, time, money, and effort are all used effectively via cloud computing. is playing a significant function in this Internet era. Peer-to-peer networking, SOA, neural networks, grid computing, distributed computing, artificial intelligence (AI), virtualization, Internet of Things (IoT), and fog computing are the specific disciplines in which cloud computing is used.The researchers realise that the ontology concept is playing a significant role in the computing discipline as they improve each and every issue and all associated barriers. Ontologies have a key characteristic that supports knowledge-sharing activities and can provide a set of specifications to demonstrate how they are used in the computing industry. Ontology education is playing a crucial part in the computing and arithmetic of data centres' information. The chosen structure and options are communicated and offer the environment-friendly and amazing results to demonstrate how ontologies play a crucial role in computer systems.**

Keywords— High Performance Computing; Cloud Organizations; Computing Parameters; Cloud Services; Ontology System; Cloud Simulation

I. INTRODUCTION

The cloud computing environment is separated into distinct layers that are crucial to the development of computing. Functional Layer, Application Software System, Application Software Infrastructure, Internally Phase of Kernel, and the Exceptionally Superior Hardware with the Logic's are the methods by which computing is processed (Figure 1).The first layer is the utility layer, where abandoned consumers are crucial. In terms of user viewpoints, it's crucial. Customers must use the computing service in this case based on how the service is provided to them. Some of the services are accessible to the general public, whereas others require personal payment to the providers at the fee for that service's use. The concept of ontology is being developed with the wave of numerous software devices, which is the next layer to go. The functionality serves as the cornerstone for the organisation of this software. [1] [2]
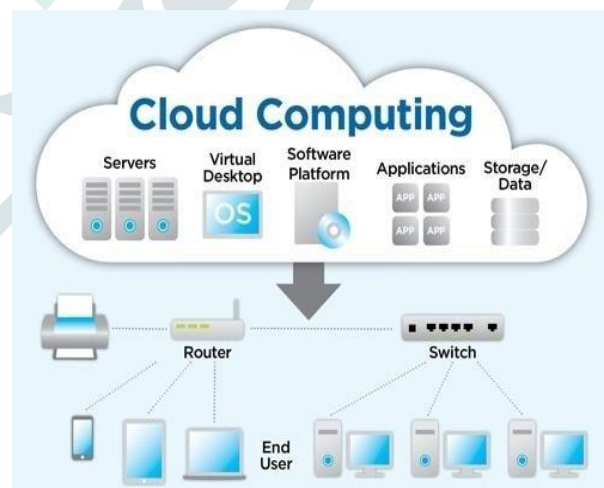

Fig. 1 Layered Structure of Cloud Computing.

The end users can utilise their concepts in this and create ontologies based on them. Users can run their applications on any platform that the producers of programming software have available. These software programmes have been designed to be accessible to and simple to use by all people worldwide. The third layer is the software infrastructure, which is made up of a lot of data or resources based on what the end users will find useful. The term "infrastructure" indicates that customers will receive everything needed to develop a structure from the supplier side [6][4][5]. The third layer focuses on the kernel's internal operations, where all of the data is kept on physical devices and servers that are managed by the service provider.

The kernel performs a necessary task since it helps the virtual machine and clustering structures function as centerware. The grid, which is still used today, was the first computing device. The disadvantage of this layer is load balancing, checkpoints, and migration for various causes. The final stage of the machine is the Hardware, which is rapidly surpassing the AI.The ontology tool acts as a backbone in the hardware. In this lookup, the clients are served more effectively thanks to the hardware and ontology. It is frequently referred to as HaaS (hardware as a service) in cloud computing [4][5][6].

II STATE-OF-ART

According to a survey of early 1990s computing agreements, computation at the time was extremely sluggish and concentrated in a very limited space. Just the local systems are functioning. The user must install all the applications at that time. The hardware is expensive and very expensive. The utilities are quite expensive and vast in size when it comes to storing data. In actuality, computing was made available to the general public in 1961 as utilities for the internet. Early in the 20th century, computing services enter the scene.The idea of cloud computing is rapidly evolving in the twenty-first century. Moreover, the cluster and grid begin operating. In the technological realm of cloud computing, virtualization is, on the other hand, playing a crucial role. With its advancement, there are many aspects of computers that are now taken into account. P2P computing, Grid computing, cluster computing, SOA, Cloud computing, Fog computing, IoT, and many other technologies are currently in use.The sharing of resources and direct communication between them are central to the PP philosophy. For the storage of information or data, the resources and services switch out the stages and processing, storage management, cache memory, etc. P-p carries out tasks to compute connectivity, power, storage, and to benefit the end users. The connections between clients and servers are the most reliable. These systems produce and consume data; initialisation must be done at any moment; information is stored in a dispersed manner; and each node has the option of being connected to any networked [1][2][8] system.

For the loosely coupled, standard-based, rule-free distributed computing system, service oriented architectures, or SOA, are a key concern at the moment. The partnership with software and hardware is increasing quickly, according to internet statistics. The futures of service consumers (end users), service providers, and the conduit for communication between them are all addressed by the SOA. As grids and clusters advance, daily computing growth accelerates. The electricity system on demand is highlighted by the grid idea. Large-scale systems like the Earth Grid System, Open Science Grid, Terabyte Grid, and Data and Software Grid are used by researchers. OGF, OASIS, and other organisations are among those engaged in the grid concept. The idea of clustering is focused on categorising resources based on their

characteristics [7][8]. Discussing the idea of ontology and how it is founded on conceptualisation is also crucial. It's a word from philosophy. Ontology is the area of AI where it asserts the existence of anything that can be represented. the 1992 launch of the knowledge standardised view and interoperability of the knowledge views. There are no knowledge systems communicating from the beginning. As the sharing of knowledge and communication began, certain agreements should be kept. The ontology functions like a computer programme that creates the knowledge system. It's a pretty comprehensive approach of handling the knowledge system that enables the online libraries [9][10].

RESEARCH CHALLENGES

The majority of researchers work on cloud computing product and service development. They are generally well knowledgeable about the services and parameters. The attitude of various services based on rules informs the system's point of view. Users of the cloud create the requested apps based on some unique features from suppliers. The following are the criteria by which services are provided, according to the researchers: [6] [7][8]

- **Imitability:** How dependable are cloud service providers? When should these services be trusted? How are the service qualities maintained? Out of all the services offered by the companies, which is the best? What standard of performance should each service meet?
- **Protection:** Can any data or information be guaranteed to be accurate in the network? What amount of security will be offered by them, and how will that security be provided?
- **Time and expenses:** How much should the service cost? How do prices vary depending on the level of service? How do computer service providers decide how much a service will cost? How long should it take to deliver the service to the customers? How do the providers determine the passing of time? What are the factors that will affect the duration and price of the service?
- **Cpu Usage:** On what does the CPU Utilization depend? What elements are influencing it? How can I tell what the system's features are? What should the system configuration be?
- **Storage Administration:** What method is used to store the data? How are the data stored? What procedure is used to store the data? Who has access to the data that has been stored? , How is the data accessible?
- **Virtualization:** Which sort of virtualization should indeed be performed? What steps make up the process? , How are users able to act in such a way if they are businesspeople?
- **Paradigms:** What function does this idea serve? How does it relate to computers as a system? Which software categories go under this? How does one comprehend how it functions? What is the procedure for dealing with computer programmes?
- **Proximity:** What kind of technology will be applied to deliver services to customers? How should the connection be made? What kind of equipment are capable of making these connections? It is required to indent paragraphs. All paragraphs must be justified, meaning they must be aligned both left and right.

IV. COMPUTING PARADIGMS

"Cloud Computing is internet-based technology utilised in the computer system, in which it dynamically changes its structure and perspectives of resources that are being supplied as a service to the users over the internet," according to the concept's recent rapid development. The users lack expertise, awareness of such concepts, and control over the cloud-based technology that they employ, according to Wikipedia. The idea of cloud computing is concerned with offering application services globally.The data centres are in charge of offering the hardware services. The three most crucial and fundamental cloud computing services are IaaS, PaaS, and SaaS. Cloud computing is now considered to be one of a person's five most essential needs in daily life. Cloud computing has completely transformed the IT sector and IT hardware. The creators of cloud computing turn it into a cutting-edge product for users [4][5].

•   Organization Cloud: Several conventional firms are actively contributing to the growth and advancement of the IT sector. There are several service level agreements between these organisations. They are offering the specifications and services on the basis of the SLA. These are a few of the well-known cloud companies and the providers who work for them: [13] [15][17]
• Cloud Security Alliance (CSA): In this group, security is the primary service that CSA handles. The CSA offers a wide range of security-related services. The primary goals of this organisation are proper capacity development, rigors research to identify the best option, and raising user knowledge of cloud security.
• National Institute of Standards and Technology (NIST): Its major objective is to ensure that services are properly standardised and competitive. To comprehend the appropriate concept of cloud computing, it deals with standardisation, measures, science, and technology.
• Open - source cloud Consortium : This organisation focuses on the creation of frameworks that can be used with different clouds. It also functions with many services.
• Available- Forum : This platform supports open communities and distributed computing. It adheres to SOA principles for maximum computing performance.
• Vertical Industries Communities: It also works with the standardisation of services to ensure that the level of service is maintained.
• Amazon and Disk space: These two sources are the only ones that can provide software and communication equipment. These companies also offer storage devices and web services. These businesses function as e-commerce services.
Here are a few of the several top service providers: IBM, Oracle, Microsoft, SAP, Cisco, Citrix, Google, and so on [15][17].

B. Cloud Properties

In the field of cloud computing, the best users receive the service based on the cloud's criteria. There will be discussions over a few of the parameters. The first one is resource computation, in which virtual machines play a significant part in providing services to the top users. The VMs' code is fully accessible throughout this time. Information Storage Management, which allows data to be stored everywhere at anytime,follows.

Usually, it goes by the name DaaS. Moreover, it preserves the user's data and expertise while also providing the system with incredibly high levels of comfort, dependability, efficiency, replication, and information consistency as needed. The Communication, which may be a service offered to users

regarding the requirements of their services, is the subsequent parameter. The primary goals of CaaS include providing appropriate network security, resource provisioning in a very dynamic manner, traffic management, improving the information measure, message latency, secure communication, and network observance. There may be an illusion of every aspect of computing in the concept of virtualization. Nonetheless, it is beginning to play a significant part in how computers operate. It functions for resource provisioning, knowledge computation, and storage. It is compatible with all locations where the systems are being created, configured, initialised, migrated, stopped, maintained, and isolated. Another great measure for determining how information is handled is observation. It chooses the offerings that will best satisfy the most demanding customers.

The security feature is quite important everywhere in the computer system. Information centres, hardware, software, platforms, infrastructure, etc. are all covered. This includes guarding crucial data from theft, information loss, and deletion. Cloud security doesn't change how security is managed from preventing to investigating and taking corrective action [4][5][15].

C. Cloud Services

The services offered through the cloud are those that are currently most in demand around the world. It is provided by the vendors of the company or institution. This is kept up in a way that it needs to be active, marketable, and easy to grasp in order to be supplied within the apps. These resources and services must be managed by the vendors. To quickly satisfy customer expectations, cloud services are continually evolving. The finest example is the cloud services, which include mailing services, computer workplaces and files, storing information management and its recovery, looking out of knowledge, and controlling all the services.The most fundamental services that are offered by the majority of suppliers are as follows:

• Complete a self and Stretchability: These features are based on what consumers want or need. If a tip user wants a service, they will demand it; if not, they will stop receiving it. The services must be paid for under the assumption that users will pay for them.

• SaaS (software as a service): This Circle Determine the service where software packages are provided to carry out various duties. The network system consumers who use this service are promptly compensated by CSPs. such as Microsoft Office 365 and Google Apps, among many others. The advantages of SaaS include easy updates for any software or application, support for services on a regular basis, no hardware requirements, etc. These services are referred to as hosted software or on-demand software.
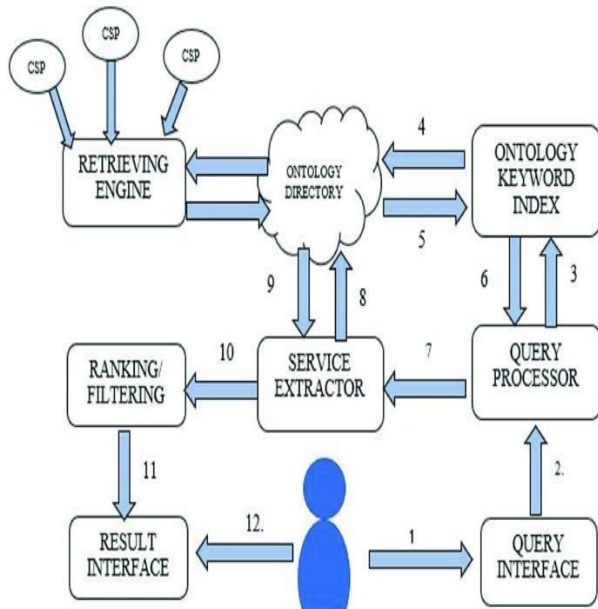
Fig. 2 Diagram of flow of data for the Cloud Ontology System.

- PaaS, or platform as a service, is effective for software system services. This may make it possible to create any application on any computing platform. a few of the major computing platforms, including the sales division app, Microsoft Azure Services, and Amazon Internet Services
  - Infrastructure as a Service (IaaS): It makes use of server installation, computer networking, and information storage. Hardware, ICs, and other devices are made available to users for use in the operation. You may also hear it referred to as HaaS. By delivering these services, service providers also keep an eye on the guidelines for tip users. Its primary features include network property, platform virtualization, dynamic scalability, and body service automation.
- Usage Services: There are multiple businesses that store data across various locations. They are creating virtual machines for their customers to use.
- Managed Services: A number of system-created applications used in computing are in charge of overseeing cloud services for suppliers.
- Service Commerce: This crucial application offers services that cover the full spectrum of services. Also, it offers the organisation the equipment in accordance with their needs.
- Amazon Internet Services: From a broader standpoint, this service is growing. The processing, storage, and information measurement resources included in the Amazon AWS package are both marketable and virtually limitless.

D. The Cloud Merchant

The crucial person or entity that is connected to both sides is the cloud broker. This can make the process of choosing cloud resources between the two easier. A cloud broker serves as a middleman for transactions between the two. They are occasionally referred to as cloud agents. They look after both sides. To keep the balance between them, they each have their own set of rules. They include their key goals, including terms and conditions, service development and specifics, cost and timing, etc. [13][14][15].

V. ORGANIZATION OF ONTOLOGIES

The knowledge-based mathematical structure based on the domain is known as an ontology system. The idea of knowledge is used by researchers in cloud computing to create the ontologies for the services. The ontologies are stored on many ontology servers. Ontology servers come in a variety of configurations and with various features. Ontology Agents (OA) look for servers and their distinctive services frequently. These OA can talk to the service providers. These OA are carrying out a variety of tasks, such as creating and updating ontologies, assisting FIPA agents in locating shared ontologies, translating functions and expressions, answering queries from the agents, and exploring both public and private conceptual models of various domains[6][7].

A. Ontology Organization

Organizations that are organised and run to fulfil a need or work towards common objectives for ontologies and computing systems. The FIPA (Foundation for Intelligent Physical Agents), which is made up of knowledgeable people working with information that is useful in many applications, performs the initialisation of the ontology system. FIPA creates its workflow before applying the finishing touches. FIPA interacts with members in either an individual or a group setting. Any provider who fully complies with its agreements is granted membership [6][7][8].

B. Parameters for Ontology

The wonderful concept of ontology emphasises how important parameters are. Its criteria are designed by FIPA and similar organisations. In offering the services based on these standards, the OA play a significant role. Some of the services include public ontology search, information set up and maintenance, expression translations, request and response to all queries, identification of each ontology, etc. [6][7][8].

Agents that are accessing the services are the primary role parameters of the ontology:
• The agents who offer these services.
• Agents that make it possible to communicate between ontologies.
• Registrations for Ontology Agents on the provider side.
• Tracking and looking up ontologies that will interact with one another.
• Ontology mapping between two ontology expressions.
• Consensus on a common language for ontology communication

VI. CONCLUSIONS

Several simulators are used to model the cloud algorithms. These simulators have important components that are crucial to the design of the graphs and output. There are several simulators in the cloud, but each has a different viewpoint. These are the main characteristics: [11]

- Simple for programmers: The algorithms should run quickly and easily to produce the desired results. Everything in the output should be simple to grasp.
- Flexibility: Every aspect of the algorithms and the result can be changed with ease. The parameters should adapt to the simulation with ease. Being too adaptable, though, might not be a good thing.
- Configuration: The application should be simple to use. A configuration in the context of computers and computer networks frequently refers to the precise hardware and software details in terms of the devices connected, the capacity or capability, and the components that make up the system.
- File Types: There are several extensions of files so that

there should be no complexity in designing any file type.

VII. CONCLUSION

The analysis in this work focuses on cloud computing services. These services played a crucial part in the creation of the system. A unit tonne of parameters are present. Ontologies also had a significant part in the creation of the system. The analysis styles the computing system with these last. The simulators that produce the useful results are using the analysis. The Clouds convey more information about vision, design and technology, security, business and computing models, data models, applications, and abstractions. The study of the selected analysis reveals a number of issues and subjects for the researchers' further investigation.

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