

IMPLEMENTATION OF MULTI AGENT STORAGE SYSTEM USING CLOUD COMPUTING STRATEGY

¹Ms. Lavanya Kandikunta, ²Mrs. B. Hari Chandana, ³Prof. T. Bhaskar Reddy

^{1, 2, 3}Department of Computer Science and Technology, Sri Krishnadevaraya University
Anantapur-515003, Andhra Pradesh, India.

ABSTRACT: Cloud computing is an emerging model of business computing. In cloud computing, client can use and retrieve the services anytime by using any smart devices to manage complex computing processes and to access very large data storage. The developers have recognized the required of a multi agent storage system that can help in utilizing the cloud power, enhancing its functionality and improve its performance. In this paper, we discuss the architecture of Multi-agent storage System which primarily focuses on the price negotiation mechanism between cloud users and providers. This system presents a perfect way for scalable and open systems that are changed dynamically. The model is based on cooperative and collaborative agents and is managed. Also this architecture is designed so that it can monitor the user's jobs while they are being processed.

KEY WORDS: —Cloud Computing, Multi-Agent System (MAS), Cloud Data Storage, Security Framework and Cloud Service Provider.

I.INTRODUCTION

Cloud computing is a rising registering stage and administration mode, which compose and plan benefit dependent on the Internet. Cloud storage is one of the administrations which give stockpiling asset and administration dependent on the remote storage servers dependent on cloud computing. cloud storage will most likely give storage administration at a lower cost and greater unwavering quality and security. Cloud storage system is a cooperation storage service system with multiple devices, many application domains, and many service forms. The development of cloud storage system is benefit from the broadband network, Web 2.0, storage virtualization, storage network, application

Storage integrated with servers and storage devices, Cluster technology, grid computing, distributed file system, content delivery Network, peer-to-peer, data compression, data encryption, etc.

cloud computing is a model for empowering ubiquitous, helpful, on-request organize access to a common pool of configurable figuring assets (e.g., systems, servers, stockpiling, applications, and administrations) that can be quickly provisioned and discharged with negligible administration exertion or specialist organization association. Cloud computing offers a cost-effective solution to manage the IT infrastructure in a flexible and scalable manner. Cloud computing enables software applications, deployment platforms, even the computing resources to be made available on-demand using a pay-as-you-go model. This has drawn a lot of attention towards the domain in recent years. Today a good number of organizations use the cloud for their day to day operations and the adoption rate by others are also high.

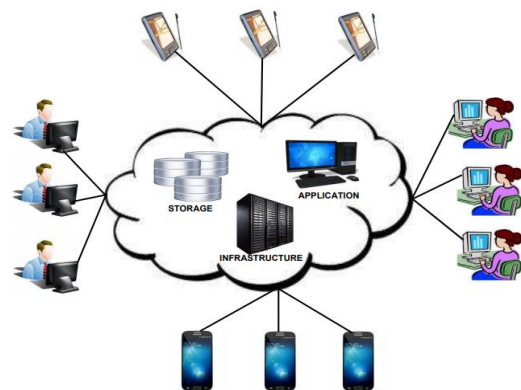


Fig. 1: BLOCK DIAGRAM OF CLOUD COMPUTING

Cloud computing allows a consumer to provision resources such as server, storage, network and the like as required without manual interaction with service providers. This facilitates quick deployment and provides the consumers flexibility to make any changes as they see fit. The services offered by the cloud are provided over the network using standard protocols so that the services can be easily accessed from a number of client devices such as workstations, laptops, tablets, and mobile phones. The cloud pursues a

multi-occupant display in which figuring assets are pooled and the assets are progressively assigned according to the need of the customers. This gives area freedom as the purchaser doesn't know about the correct physical area of an asset in the cloud. Despite the fact that the physical area from where the asset ought to dwell can be controlled at a higher deliberation level by determining certain topographical breaking points. As an example a consumer in some country can specify to keep its storage limited within physical infrastructure of the home country only.

Extra assets can be effectively provisioned or discharged according to the interest. In the cloud the asset accessibility show up basically boundless and assets can be asked for in any amount contingent on prerequisites. The cloud should deal with the scaling as required. So as to keep up a straightforward record of the asset use both for the suppliers and the shoppers the cloud frameworks frequently utilize a metering capacity relying upon the sort of administration being given. This helps numerous exercises, for example, charging, setting standards on asset utilization, and reviewing.

Cloud computing is a very novel computing technology, a distributed kind of internet based computing in which the resources like infrastructure, platform, software etc. are provided by the cloud service providers as a scalable, reliable, fault tolerant service to the customers on their request on a pay per usage basis and provides advantages like on demand access, broad network access, rapid elasticity etc. Cloud computing is inherited from distributed computing with virtualization as additional technique. With virtualization traditional data center is converted into cloud data center. 3 key characteristics of Cloud computing are virtualization, pay-on-demand, and scalability. It is also called as utility computing due to payment on incremental and request foundation model. Companies like Amazon Web Service (AWS), Google, Salesforce.com, IBM, Microsoft and Oracle have converted their traditional data center to cloud data center.

The goal of cloud computing is to allow users to take benefit from all these technologies. Many organizations are moving into cloud because it allows the users to store their data on

clouds and can access at anytime from anywhere. Data breaching is possible in cloud environment, since data from various users and business organizations lie together in cloud. By sending the data to the cloud, the data owners transfer the control of their data to a third person that may raise security problems. Now and then the Cloud Service Provider (CSP) itself will utilize/degenerate the information illicitly. Security and protection remains as significant impediment on distributed computing for example safeguarding secrecy, trustworthiness and accessibility of information. A basic arrangement is to encode the information before transferring it onto the cloud. This methodology guarantees that the information are not unmistakable to outer clients and cloud directors but rather has the confinement that plain content based looking calculation are not material.

II.RELATED WORK

In reality extensive number of on-request information clients and gigantic measure of information records in the cloud, this trouble is testing. It is basic for the chase office to allow multi watchword chase question and make accessible outcome correlation positioning to see the successful information recovery prerequisite. To build up the chase result precision just as to advance the client chasing background, it is additionally fundamental for such positioning framework to help various watchwords chase, as single catchphrase chase normally yields outrageous coarse outcomes. The chase capable encoded technique backings to give encoded information as reports and concurs a client to solidly chase over single catchphrase and recover records of concern.

cloud storage is one of the essential utilization of distributed computing. We can characterize distributed storage as capacity of the information online in the cloud. A distributed storage framework is considered as a dispersed server farms, which normally use distributed computing advancements and offers some sort of interface for putting away and getting to information. While putting away information on cloud, it shows up as though the information is put away in a specific place with explicit name. There are four main types of cloud storage:

Personal Cloud Storage:

It is otherwise called mobile cloud storage. In this sort storage, person's information is put away in the cloud, and he/she may get to the information from anyplace.

Public Cloud Storage:

In Public cloud storage the endeavor and capacity specialist organization are isolated and there aren't any cloud assets put away in the venture's server farm. The cloud storage supplier completely deals with the venture's open distributed storage.

Private Cloud Storage:

In Private Cloud Storage the endeavor and distributed storage supplier are coordinated in the undertaking's server farm. In private distributed storage, the capacity supplier has framework in the undertaking's server farm that is ordinarily overseen by the capacity supplier. Private distributed storage helps settle the potential for security and execution concerns while as yet offering the benefits of distributed storage.

Hybrid cloud storage:

It is combination of open and private distributed storage where some basic information lives in the endeavor's private cloud while other information is put away and available from an open distributed storage supplier. distributed computing is a Web-based model, where cloud clients can supply their information into the cloud. By stacking information into the cloud, the data owners stay unbound after the limit of limit. Thusly, to secure fragile information dependability is a key task. To safeguard information security in the cloud, the data owner must be redistributed in the encoded system to individuals all in all cloud and the data movement is set up on plaintext catchphrase pursue. We select the profitable extent of "encourage organizing". Orchestrate planning is used to measure the parallel entirety. Encourage planning gets the importance of data records to the pursuit question watchwords.

The detection office and security guarded over encoded cloud data are major. In case we look at immense proportion of data reports and data customers in the cloud, it is hard for the necessities of execution, usability, notwithstanding flexibility. Stressed to encounter

the certifiable data recovery, the gigantic proportion of data reports in the cloud server achieve to result essential position rather than returning undistinguishable outcomes. Positioning plan minds different watchword chase to recoup the chase accuracy. The present Google organize chase gadgets, information clients offer arrangement of catchphrases rather than one of a kind watchword chase significance to recover the greatest noteworthy information. Facilitate coordinating is a synchronize matching of question catchphrases which are significance to that record to the inquiry.

There are five attributes of cloud computing. The first is on-request self-benefit, where a shopper of administrations is given the required assets without human intercession and association with cloud supplier. The second trademark is expansive system get to, which implies assets can be gotten to from anyplace through a standard component by thin or thick customer stages such cell phone, PC, and personal computer. Asset pooling is another trademark, which implies the assets are pooled with the end goal for multitenant to share the assets. In the multi-occupant display, assets are allocated powerfully to a shopper and after the buyer completes it, it tends to be doled out to another to react to high asset request. Regardless of whether the assets are allotted to clients on interest, they don't have the foggiest idea about the area of these doled out assets.

III. MODULES IN MULTI AGENT STORAGE SYSTEM

Cloud computing enables the clients to store their information on the capacity area kept up by an outsider. When the information is transferred into the cloud the client loses its power over the information and the information can be altered by the assailants. The aggressor might be an outside. Unapproved get to is additionally a typical practice because of feeble access control. From figure (2) we can observe the block diagram of modules used in multi agent storage system. Our multi agent storage system system consists of the following modules:

- Data Owner Module
- File Upload Module with Encoded
- File Download Module with Decryption

- Rank Hunt Module

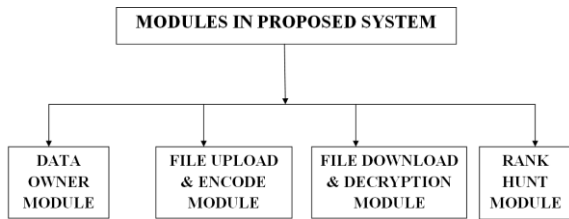


FIG. 2: MODULES IN MULTIAGENT STORAGE SYSTEM

Data Owner Module

In this module, the information proprietors ought to probably transfer the documents. The documents are encoded before the records are transferred to the cloud. The information proprietors are given an alternative to enter the watchwords for the record that are transferred to the server. These watchwords are utilized for the ordering reason which enables the chase to return esteems very rapidly. These documents when once accessible on the cloud, the information clients should be capable chase utilizing the catchphrases. The information proprietors will likewise be given a demand endorsement screen so they can favor or reject the demand that is gotten by the information clients.

File Upload & Encoded Module

In this module, the information proprietors ought to most likely transfer the documents. The records are encoded before the documents are transferred to the cloud. The information proprietors are given an alternative to enter the catchphrases for the record that are transferred to the server. These catchphrases are utilized for the ordering reason which enables the chase to return esteems very rapidly. These documents when once accessible on the cloud, the information clients ought to most likely chase utilizing catchphrases. The information proprietors will likewise be given a demand endorsement screen so they can favor or reject the demand that are gotten by the information clients. The record before transfer should be encoded with a key so the information clients can't simply download it without this key. This key will be asked for by the information clients through the trapdoor. The encoded of these documents utilizes RSA calculation so unapproved clients won't most likely download these records.

File Download & Decryption Module

Information clients are clients on this framework, will's identity ready to download records from the cloud that are transferred by the information proprietors. Since the documents put away on the cloud server could be in enormous numbers, there is a chase office given to the client. The client ought to most likely complete a multi-catchphrase chase on the cloud server. Once, the outcome shows up for the particular chase, the clients ought to most likely send a demand to the separate information proprietors of the record through the framework (additionally called snare entryway ask for) for downloading these documents. The information clients will likewise be given a demand endorsement screen, where it will tell if the information proprietor has acknowledged or dismissed the demand. On the off chance that the demand has been endorsed, the clients ought to most likely download the unscrambled record. The file before download will have to be decrypted with a key. This key will be requested by the data users through the trap-door request. Once the key is provided during the download, the data users will be able to download the file and use them.

Rank-Hunt Module

This module allows the data users to hunt the files with multi-keyword rank hunting. This model uses the frequently used rank hunting algorithm for present the output for multi-keywords. "Coordinate Matching" principle will be adopted for the multikeyword hunting. This module also takes care of creating an index for faster hunt.

IV. MULTIAGENT STORAGE SYSTEM

Given that agent technology has the potential to be integrated into the framework of autonomic computing and can be envisioned to develop autonomic systems, multi agent technology may be used to implement an intelligent system and more precisely an autonomic Cloud. This claim is based on a series of arguments that highlight that the semantic distance between multi agent systems and autonomic systems is close. While autonomic computing is a quite new revolutionary move to the discipline of computing, unfortunately there is not a successful solution to autonomic computing that can be applied on a significant scale.

Multi agent computing main aim is to develop computer systems capable of self-management, to overcome the rapidly growing complexity of computing systems management, and to reduce the barrier that complexity poses to further growth. It is now widely accepted that the construction of reliable, maintainable, and extensible systems that conform to their specifications requires the use of design methodologies and modeling techniques that support adequate mechanisms for managing their inherent complexity.

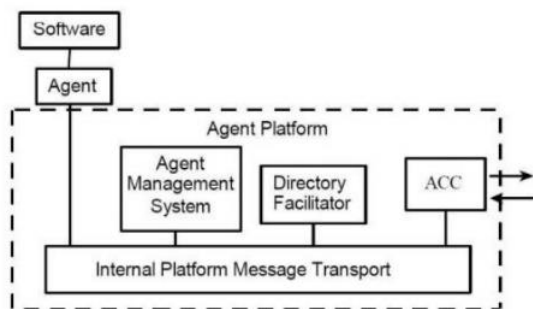


FIG. 3: FIPA MODEL OF AN AGENT PLATFORM

The above figure (3) shows the agent platform architecture using FIPA model. The Foundation for Intelligent Physical Agents (FIPA) is worldwide associations that are sharing the endeavors to make attributes for basic operator advancements. The FIPA qualities forms rely upon two key explanations. The first is the expected time to get an assertion. The second explanation is just about the outside activities of framework parts which are referred to the execution data and inside plans ought to move engineers' stage.

In the operational stage, complex tasks are separated into smaller undertakings and conveyed to various capable specialists at the lower levels. Cooperation among specialists in a MAS is for correspondence of acknowledge methods. The specialist order of our multi agent storage system depends upon few supervisory spaces specialists like event open space, the gathering space, the group space and individual space. Each supervisory space operator speaks with four specialists: the supervisory agent of the actors, the supervisory agent of the activities, the supervisory agent of the resources and finally the supervisory agent of the tools. Every single one of these four specialists can administer different operators of lower chain of importance.

The cloud computing is distributed framework with an intricate accumulation of processing assets from various areas with various authoritative arrangements. this will increase the storage of cloud computing. In a multi-space condition, cloud has a large number of administration occurrences, finding cloud administrations are a big task owing to the way that there are countless administrations from various suppliers. This methodology utilized the utilization of self-sorting out operators for robotizing and organizing asset the board with promising profoundly powerful practices. The below figure (4) shows the architecture of multi agent storage system architecture.

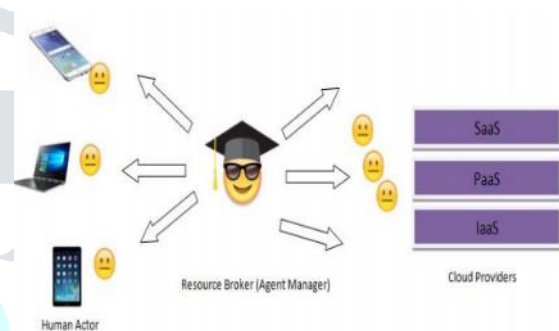


Fig. 4: MULTIAGENT STORAGE SYSTEM ARCHITECTURE

The multi agent cloud computing is considered as the core of the cloud framework. It has the capacity to interface with operators that follow up for the benefit of the customers and suppliers. The intermediary is a specialist trough independent from anyone else; it facilitates the collaborations between the customers and suppliers operators, screens the running employments and stays up with the latest with the running procedure as shown in figure (4).

The intermediary goes about as an open or a private cloud administration. It fills in as center application or a PC between the cloud customers and the cloud suppliers. Typically the representative is considered as a database focus to the clients and the suppliers in the cloud condition. By and large it is a facilitator between at least two members to discover and choose the best assets to fit the customers' employments. This is done when the cloud customers send their info documents which incorporate the sets of expectations to the agent. The specialist sends these documents to the best cloud suppliers, screens employments running, recovers the outcomes and sends it back to the customers.

In this paper, the multi agent cloud computing system has been moved from going about as a database putting away the suppliers' details, taking care of the customers' business to the suppliers and the occupations results from suppliers to the customers into a specialist chief that can control occasion creation; enrolling and evacuating every operator in the framework. The primary player charmed in cloud framework tasks is typically individuals who look in the cloud supplier's site and pick the agents (on the off chance that these buys are appropriate). This issue is happened due to the short on a method for

Supporting arrangement interfaces by means of existing cloud suppliers to manage it powerfully. The proposed framework is a multi-operator framework that intends to communicate with the cloud condition in favor of cloud customers in order to get the records of all accessible cloud suppliers who can satisfy the client's determinations and to pick the best suppliers between them. Likewise, this framework plans to screen the occupations achievement and to give the operator trough (intermediary) with the correct criticisms about the activity procedure.

Cloud client portray their employments by decide the required equipment and programming particulars to achieve their occupations. The cloud supplier acquires the sets of expectations (demands) from customers, and contrasts the demand and the enlisted cloud suppliers and picks the most ideally equipped provider(s) for the activity. The dealer deals with the decisions that were obtained in second step and picks the best ones between them. This kind of arranging is finished by the exchange time and cost. From that point forward, the representative contacts the operators that are in charge of the association between the dealer and the suppliers to ensure that the suppliers are accessible to get the new occupations. The specialist may have the benefits to part benefits between different specialist organizations to diminish the expense and accelerate the activity. The multi-agent storage system work builds up a structure that encourages the cooperation and coordination between the specialist organization and agent operators through the distributed computing condition.

V.RESULTS

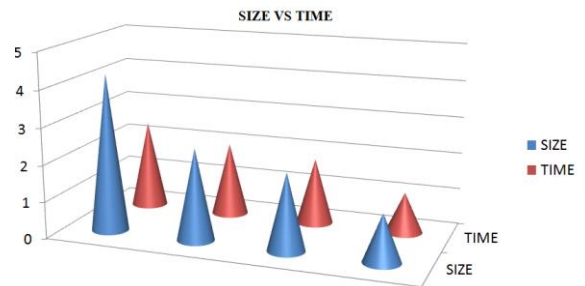


FIG. 4: SIZE VS TIME

VI.CONCLUSION

Cloud computing enables users to store their data in remote storage location. But data security is the major threat in cloud computing. we proposed a security structure and MAS design to encourage security of cloud data storage. This security system comprises of two fundamental layers as agent layer and cloud data storage layer. So as to encourage the tremendous measure of security, our MAS design offered eleven security properties produced from four principle security strategies of correctness, integrity, confidentiality and availability of users' data in the cloud.

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Dr.T.BhaskaraReddy is a Professor in the department of Computer Science and Technology at S.K University, Anantapur A.P. He holds the post of Deputy Director of Distance education at S.K.University and He also the

CSE Coordinator of Engineering at S.K.University. He has completed his M.Sc and Ph.D in computer science from S.K.University.He has acquired M.Tech from Nagarjuna University. He has been continuously imparting his knowledge to several students from the last 17 years. He has published 55 National and International publications. 10 International conferences. 13 National conferences. One UGC Major Research Project. Attended several seminars in 3 countries. He has completed major research project (UGC).

E-Mail: bhaskarreddy_sku@yahoo.co.in

Authors



Ms.K.Lavanya is research scholar in the department of Computer Science Technology at S.K.University, Anantapur. She acquired M.Sc in Computer Science from S.V. University, Tirupathi. She has 2 years of experience in teaching .Her research interest is in the field of Image Processing.

E-Mail: kandikuntalavanya@gmail.com



Mrs.B.Harichandana is research scholar in the department of Computer Science Technology at S.K.University, Anantapur. She acquired M.Sc.in Computer Science from S.K. University, Anantapur. She has 10 years of experience in teaching. Her research interest is in the field of Image Processing.

E-Mail: harichandana1983@gmail.com