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LOAD OPTIMIZATION TECHNIQUE FOR CONTENT CONTROLLING IN HYBRID CLOUDS TO MINIMIZE COST

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Abstract- Cloud computing is a technology which is most recently used for resources sharing for end users. Cloud providers provide services to end user like software, Application and Platform as services to complete their job. One of the objectives of cloud computing is load balancing. Our work will spotlight on cost minimization in migration concerning general application content distribution that is on basis of differentiated charging models concerning various data centres. We introduce general optimization structure for active, cost-minimizing relocation of the services concerning content distribution into hybrid cloud that consist of private cloud as well as public geo-distributed cloud applications. Our scheme will focus on minimization of recurring operational expenditure of content distribution scheme, not one-time costs in private cloud. To minimizing operational cost by using the Lyapunov optimization technique. A dynamic control algorithm is design for load balancing on cloud servers. A submit contents and dispatches requests on various data centers to minimize overall operational cost over time

Keywords: Content-Distribution; Dynamic Resource Allocation; Load Balancing; Dynamic Migration; Lyapunov Optimization theory..

1. INTRODUCTION

Cloud Computing means Storing and accessing data and programs over the internet instead of computers harddrive. Cloud computing system is divided into 2 sections: The first section is known as front-end and another section is the back-end. They are connected to each other by using network which is called as the Internet. The front-end contains the computer of client (or computer network) and the system application is required to retrieve the cloud computing data. At the back-end of the system there are the several computer systems, several server nodes and data storage systems that developed the cloud of the computing service. The central server's task is to administrating the system, monitoring trace and client demands ensure that everything runs very correctly or not. Load balancing is one of the main objectives of the cloud computing to manage the spaces on the servers. We used dynamic control algorithm to manage load balancing. In this algorithm we used concept hot spot and cold spot. Hot spot technique if user uploads data on respected server and if server full then migrated content on different servers and leave the respected server. When user is requesting to download file or data the user request is migrated on different server and dispatch from the data center. We used Lyapunov optimization theory [11] [12] to reduce operational cost. There is measure parameter are used to calculate updated cost is depend upon rating and time. Rating is parameter where numbers of user download a data or particular file with in time; cost is updated on this parameter. Threshold value is predefine if rating is above than threshold value then cost is increase with constant values. Same as if value is above threshold but long duration rating value is low, then cost is decreases with constant value. Using lyapunov optimization theory with dynamic control algorithm onto hybrid cloud is satisfactory reducing load balancing problem. Security is also one of measure issue in cloud computing in this paper we archiving load balancing as well as providing security.

Main objectives of this paper is as following

1. Cost is updated dynamically over time for cloud provider.
2. Achieving efficient Load balancing and providing high Security.

II. LITERATURER SURVEY

Siva Theja Maguluri, R. Srikant and Lei Ying[2] cloud computing is a omnipresent and to serve resources to various applications. Cloud computing, when jobs are arriving to process are request to resources (e.g. Memory, VM's, CPU, Bandwidth, Storage space etc.) there a problem of resources allocation such as load balancing problem, job scheduling problems, VM configuration. Stochastic model in cloud computing cluster is for load balancing and scheduling. Seematai S. Patil, koganti bhavani[3] cloud computing server there services to client/ users based on user need to complete their job. They are presenting a system that uses virtualization technique to allocation of data centers resources dynamically based on application demand. Proposed virtualization technology is to serve resource dynamically on the basis on necessity. Concept of skewness used to minimize server overload.

Utilization of virtual machine (VM) and maintain overload. Mayanka Katyal, Atul Mishra [7] now days there are increases the demand for cloud services. User wants to access services on the basis of their requirement. Resources are needed to serve more efficiently manner to user. Selective algorithm is used for serve cloud resource dynamically to user on-demand. Selective algorithm is based on min-max algorithm which reduces overall time of task on the machines and provides QoS. Tejinder Sharma and Vijay Kumar Banga [9] now a day's number of user accessing resources but there is one of challenge is resource scheduling problem. Load balancing is a technique to distribute workload on different

computers to achieve utilization minimum data processing time, minimum average response time, and avoid overload. Proposed efficient enhancing scheduling algorithm reduces load balancing. This algorithm is efficiently handling request to executing job and minimizing server overload. Shaolei Ren, Yuxiong He and Fei Xu[10]limited computational resources need to fairly allocated among different organization. Resources are allocated to end user on demand. Fei Xu. proposed the GreFar algorithm which is optimizing energy cost and farness among different organization. This algorithm is achieving energy cost, latency as well as fairness. Ninad Shinde and J. Ratnaraja Kumar [11] user send request on different Cloud services for accessing their resource. The Main challenges in cloud computing is to provide efficiently resources to end user. If respected resource is not available on the time then request is in longer delay. To eliminate longer delay problem have to us e optimization resource allocation techniques. Prabhjot Kaur and Dr. Pankaj Deep Kaur[12]user access cloud service and their services to client anytime and anywhere. Request is depend on need to complete their job. User only pays for those resources they want to be use. Now day's demands are rapidly increases so the need to creation of large scale data centers. Prabhjot Kaur and Dr. Pankaj Deep Kaur proposed a method to allocate resources efficiently based on load of virtual machine. This method is the solution of the problem of VM resource scheduling in cloud environment.

Haitao Li, Lili Zhong,, Jiangchuan Liu, Bo Li, Ke Xu[13] clients are demanding foe VoD (Video on Demand) service rapidly increases with the time in one day period. VoD providers are pay by bytes for bandwidth resources, potentially leading to saving a cost if the unit rate to rent a machine from a cloud provider is higher than the rate to own one. They are take a challenges to design and predictable benefits in migrating VoD service onto hybrid cloud-assisted deployment, where usersend a requests are partly served by the self-owned servers and partly served by the cloud. Xu Cheng, Jiangchuan Liu[14]Social networking applications are more powerful and popular but they also have one challenge is huge demand of bandwidth as well as storage. They are practiced, formulated the problem as a constrained k-medoids clustering problem, and proposed wPAM algorithm, which decreases the deviation of access in each cluster, and flexibly preserves the social relationship.

M. Pathan, J. Broberg, and R. Buyya[16] In content delivery cloud e.g. MetaCDN it provide content delivery service to end users. Using MetaCDN measure utility of content delivery capture system-specific perceived. Using this utility for request redirection policy is to improve the performances of content delivery. There also one prediction for content provider having the benefits from MetaCDN based on user prehension performances. Conducting test bed experiment is proof-of-concept for MetaCDN to demonstrate the performance and disclose the observation on MetaCDN utility Mohamed Esam Elsaid, Christoph Meinel[17]cloud computing provide service as a platform as a service, Infrastructure as a service and Software as a services on demand with low cost and scalability to improve performance of application . In data center virtualization have a most important feature is live migration. Failure recovery, load balancing, dynamic resource allocation, power saving is all depending on live migration for VM. Resource management technique is improving utilization of resources, less cost and high availability. Using mathematical formulation to predicates the live migration, power consumption, and network throughput before taking the decision of live migration. Network admin can be alerted with estimated overhead to confirm the live migration request or to postpone it to another optimum time for minimum interruption on the running applications. L. Dhivya, Ms. K. Padmaveni[18] cloud computing providing services to end users as well as it also handle big data specially for business customer. Virtualization is one of the powerful techniques for cloud computing which is physically infrastructure, it is easy to use and handle. Virtualization is allocated on the need of end user requirements and support green computing. Skewness is minimizing to combine different workload to improve utilization of server. Maintain overload avoidance as well as achieve better performances.

III. RELATED WORK

Private cloud is more secure than public cloud. Normally private cloud is owned by enterprise or business for internally used, where public cloud is used by individuals or an organization based upon their requirements and necessities e.g. Drop box, GoDaddy. Private cloud kept the original copy of file or data and send replicate copy to end user. Hybrid cloud is allowing business to manage some resource internally within organization and some externally. Content distribution (is also called as content delivery or content distribution delivery) applications is service of copying the contents of files and send to end users. The components of Content Distribution application are

1) Back-end storage of the contents.
2) Front-end web service that serves users' requests for contents.

As we say at least one data center is place is in each region. The data centers are place in multiple geographically regions. Content replicas are established in different physical location of multiple clouds.

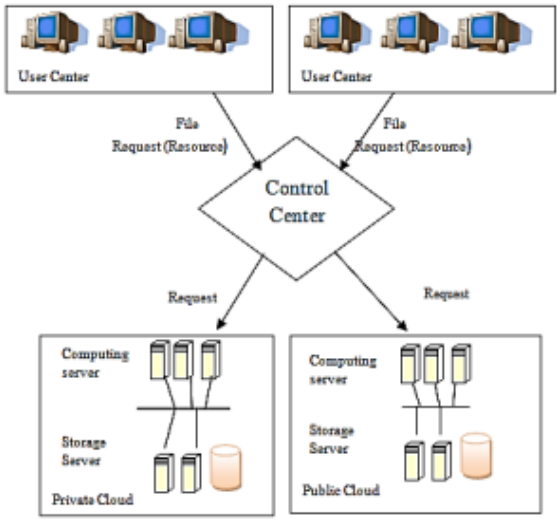

Figure 1: System Architecture

In Fig 1. In data center two inter connected servers are:

1) Computing Server-There multiple virtual machines are running and provisioning.
2)

2) Storage Server- Storage server is used for data storage. Data center can communicate with each other via Data Center Network (DCN). When user requesting for data then application provider migrate services where content can be replicated in storage server in cloud and dispatch the services from web services on VMs on computing servers

IV. PROPOSED WORK

In proposed system we used on techniques is Lyapunov optimization technique to minimization of cost. Their need to update cost dynamically when number of user request from the cloud server. Main goal of proposed system to minimization of operational cost over time for cloud provider as well as achieving load balancing and provide security. To provide security we used cipher text policy algorithm. Appling authentication technique to verify the user authentication. If user is authorized to access services then and only then send configuration key to use. User can access or used only key access pages. User cannot access or use other pages. Employing of the technique of optimization, we design active control to place contents as well as send out requests in hybrid cloud infrastructure, which reduces overall functioning price above time. Our work spotlight on cost minimization in migration concerning general application content distribution that is on basis of differentiated charging models concerning various data centres. It may not be tough to propose effortless heuristic intended for energetic content placement in addition to load distribution within hybrid cloud in contrast, proposing of a solution assuring of cost optimality is an intriguing challenge. We make a consideration of content distribution application that provides collection of contents, to users spreading above numerous geographical regions. There is a private cloud that is owned by content distribution provider that store up actual contents copies. The private cloud contains general upload bandwidth for serving the user contents. There is public cloud that includes data centres that are located in numerous geographical regions. There are two interconnected servers in each of the data storage servers in support of data storage, as well as computing servers that support provisioning of virtual machines. Servers inside the same data centre can access each other via a certain Data Centre Network. The contributor of content distribution application provides its service by means of exploiting hybrid cloud structural design that includes geo-distributed public cloud as well as private cloud.

The most important components concerning content distribution application will comprise back-end storage of contents as well as front-end service that provides user requests for contents. Application provider might move about service components into public cloud. Contents are replicated within storage servers of cloud, whereas requests are send out to web services [5]. Our system model was shown in fig1. We provide a general optimization structure for active, costminimizing relocation of the services concerning content distribution into hybrid cloud that consist of private cloud as well as public geo-distributed cloud applications. Our system will focus on minimization of recurring operational expenditure of content distribution scheme, not one-time costs in private cloud. Our design is rooted in the theory of optimization in which minimization of cost as well as response time guarantee are achieved at the same time by efficient development of content migration as well as request dispatching between data centres. Lyapunov optimization will present a structure for scheming of algorithm by means of performance randomly close towards best possible performance over long run of system, devoid of requirement for upcoming information. Our dynamic approach is to be organized by means of application provider to distribute content distribution service towards hybrid cloud. The application provider deploys one or multiple web servers providing portal service of the content distribution application, in a centralized or distributed fashion. The portal combines user requests as well as send gathered request data towards a control centre that implements our system at regular intervals [6].

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V METHODOLOGY

Hybrid Cloud Hybrid cloud is a cloud computing environment which uses a mix of on-premises, private cloud & public

cloud services. By allowing task (workloads) to move between private and public clouds as computing needs and costs change. Combine the best characteristics of public cloud and private cloud computing, virtualization and a dedicated hardware to build the most effective solution with the flexibility to scale according to demand. Hybrid gives greater flexibility and more data deployment options.

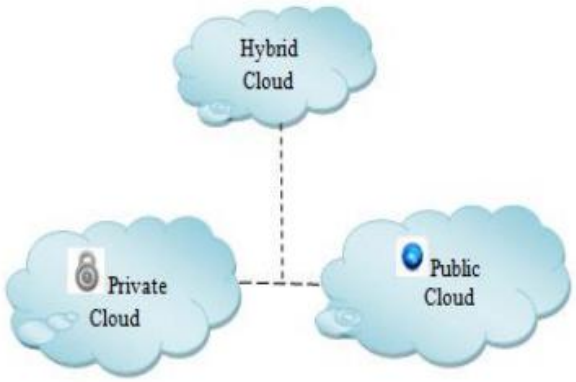

Figure 2: Hybrid Cloud

Dynamic Migration

Users upload data on respected server. Server has a capacity or space with giga byte or tera byte. In some case there is problem with space on server e.g. if user upload data 3 GB, total space on server A is 10 GB and server B is 10 GB, but server A has 99% full then migrate the content of data on server B. When contents are migrated from server A to server B is needed to check space availability on server B. If space is available on server B then migrates content from server A to server B this process called hot spot.

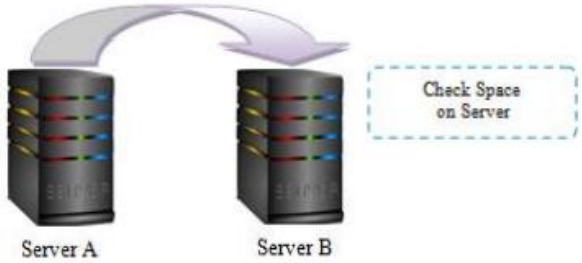

Figure 3: Hot spot

Service Migration

When user is upload a data (file) on server. If user want to search a file then user send request. If file is found on CDN (Content Distribution Network) cloud provider send file to user. If file is not found then send request to DCN (Data Center Network).Data center receive request and apply Authentication technique to verify a user authentication.

Figure 4. Service Migration

If user is authorized to access services then and only then send configuration key to use. User can receive only key access pages. User cannot access or use other pages.

Cost-Minimizing Service Migration

User submits a request with respective cost of that file (data). Cost updating is depending on time and rating. Rating value is varies with respect to number if user questing that file. Threshold value is constant; if rating value is higher than threshold value then cost is increases. If value is above threshold but long time rating is low, then cost is decreases with constant value. Cost updating is a process of increases or decrease cost depends on time and rating values It will focus on minimization of recurring operational expenditure of content distribution scheme, not one-time costs in private cloud. Our design is based on optimization in which minimization of cost as well as response time guarantee are achieved at the same time by efficient development of content migration as well as. request dispatching between data centres. The Lyapunov optimization system was developed from stochastic networks theory and was functional in routing as well as channel allotment in wireless networks, in addition to few networks types that include peer-to-peer networks.

VI. RESULT AND DISCUSSIONS

Fig. 5. Home Page Showing User Activities

Fig.6. User Activities

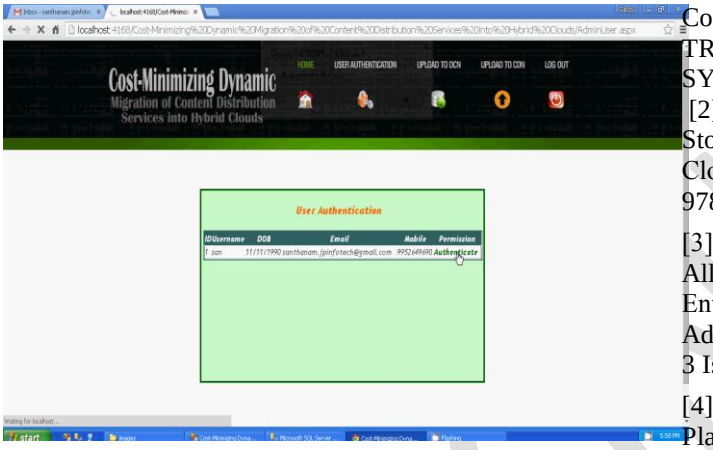

Fig 7: User Authentication

The duration of a time slot is 10 seconds. The duration of a time slot is set based on the following practical considerations: On one hand, running the optimization solver too frequently is too costly, and since file migration is involved, it is unlikely to be done in a time scale smaller than a few seconds; on the other hand, the duration of a time slot should not be too long, as otherwise queuing delays experienced by requests tend to be too long. After some trials, we find 10-seconds is an appropriate value.

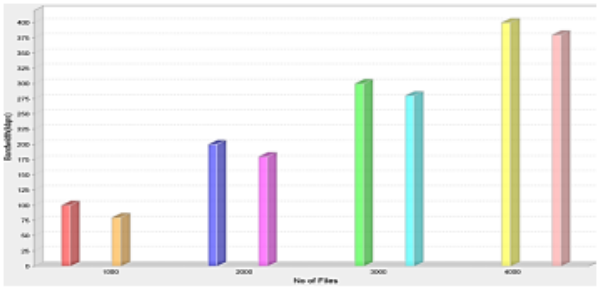

Fig. 8. Key generation time with different attributes #. 5 Authorities

V.CONCLUSION

We conclude that from survey we studied various techniques and algorithms for utilization of resources in proper ways such as load balancing, job scheduling. Virtualization techniques is a powerful feature in cloud computing. A live migration is to increases performance and availability. In this paper, optimal migration of a content distribution service into a hybrid cloud consisting of a private cloud and public cloud services. We are using the Lyapunov optimization theory which is minimizes the operational cost of the application with Quality of service guarantees. Also achieving efficient load balancing and provide high security

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