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Load Prediction for Resource Management in Cloud Computing

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Abstract--- Cloud computing promises can have several attractive remunerations for business and end users with their future of Collaborative cloud computing. CCC platform interconnects physical resources then enable resource sharing connection between the clouds and provides an essential view of a tremendous amount of resources. If it has two main issues of resource & reputation management might be addressed together at that time they don't sufficiently efficient or effective. When the previous CCC platform enhances the "Harmony" Method it integrates the resource & reputation management in a partition mode within a single node or multiple nodes. Harmony corporate the key resource innovations, when this multi Qos demands might be time-consuming factors and it can raise some disturbances due to resource sharing time. We propose comprehensive solutions of resource sharing and integrated with log records in every node. By using load prediction algorithm We can explore optimal time period for every node, can store node reputations in virtual machines, calculates load factor and capacity of virtual machines. By using prediction algorithm we provide more security for user's data and captures future usage results of Virtual Machines.

Keywords--- Resource management, Reputation Management, Virtual Machine, Cloud Computing, Load Prediction Algorithm.

I. INTRODUCTION

Cloud computing is an emerging technology for remote servers hosted on the internet by managing, processing data. Cloud computing is a better way to run your business. It can access any data & application from any device. Most of the cloud providers offer scalable resources in excess of the internet to customers. Many clouds like Amazon [1] EC2 Google's AppEngine, IBM's Blue Cloud, and Microsoft's Azure. Cloud computing focuses on the shared resources which are shared by multiple users and somewhere vigorously reallocated as per the demand.

In some applications on demand for scalable resources has been increasing rapidly. Those are MediaFire [3], Rapidshare, Dropbox [2], Google Drive, SkyDrive, minus. MediaFire is one of the familiar desktop application most of the top companies are used for sharing resources. At present million of users are registering together, even a single cloud may not share sufficient resources for every application at that time some researchers have involved to build a virtual lab environment by connecting multiple clouds.

Collaborative cloud computing interconnects physical resources to enable resource sharing connection between multiple clouds. A collaboration cloud project starts with when one client makes the record or report and after that offers access to specific people. For example the project developer creates a project and shares a link to users that may allow others to view and edit particular project. Harmony method [5] enhances the resources from multiple clouds, but at the time of performance validation it can check for every node reputation so far it's a time consuming factor.

A. Resource and Reputation Management

Resource management [4] is an efficient deployment and allocation of organizational resources where and when they are needed. Most of the business organization's to invest the cloud resources effectively. In cloud computing operates in a large scale environment system i.e. Involving millions of resources to disparate geographical distributed areas and essential dynamic entities may enter or leave the system, resource utilization and availability are continuously changing [6][7].

The large scale environment system makes efficient resource management like resource location and resource utilization is in a non - trivial manner. Every node should maintain number of resources and provide different quality of services, sometimes a node provides low quality of services (QOS) why because there is system problems, and for example machines break down due to insufficient cooling at time nodes may be attacked viruses. Some clouds like Google, IBM [7], and Amazon maintain cloud security; security is most recognized manner for any cloud. Resource management (resMnt) needs to be reputation management (repMnt) to quantify resource procurement QOS for guiding resource provider selection [ref4]. As in AppEngine and BlueCloud computes repMnt system for each node's reputation value depends on others evaluation about its performance in order to provide guidance in selecting trustworthy resources.

B. Previous Methodologies

To ensure the successful deployment of Harmony system, the issues of multiple resMgt and repMgt must be combined together for both efficient and effective resource sharing.

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- Multi QOS oriented resources
- Trustworthy resource sharing utilization for partitioning nodes
- Nodes reputation is not stored in particular locations

These tasks must be executed in a partition manner since centralized methodologies are not suitable for integrated resources in the cloud. However the previously proposed methods shown in, Harmony method integrates [5] resource and reputation management in a harmonious manner, this system can calculate every node reputation by using Distributed Hash Tables. Previous methods should maintain DHT [9] for validation purpose, Distributed hash table network is a content addressable overlay network based on reliable hashing functions. DHT[8] load balancing is to balance the workload for every node based on their capacity & capability. Hash-based proximity approach classified DHT nodes are super-nodes and regular-nodes. Super-nodes are high capacity with fast connection; regular-nodes are low capacity with slower connections. In DHT super-node network is an auxiliary expressway for the fast routing system. Hash-based proximity clustering approach established two interconnections in between super-nodes and their associated regular-node with routing table.

The issues of resMnt and repMnt must be addressed together for a trustworthy resource sharing connections in few tasks

- Not efficiently capture the resource sharing results
- Integrated resource & reputation management component collects only available resources
- Avoiding future resource & reputation nodes

Data-centric Management Framework is a cloud orchestration programming & an execution framework [9][18]**.** It should maintain centralized data repositories for all resources are managed by including storage and network devices. These DMF resource objects are categorize into two copies those are the primary copy (physical layer), the secondary copy (logical layer). The physical layer is stored in physical devices, read and write operations are translated into the vendor specific API calls. Logical layer is an in-memory of physical layer. Disadvantage of this is highly sophisticated cloud services require a dynamic orchestration for their service abstraction.

Previous proposed method of Peer-to-Peer reputation systems are to evaluate trustworthy resources by participating peers and malicious peer behaviours. P2P systems are gained in large-scale distributed applications. Some of the previous systems are ignore the peer trust relationships. In this paper Trust Overlay Network method is used to overcome that problem. After identifying the eBay transaction having 1000's of users are involved at that time to discover a power law distribution to specify user's feedback. In this system dynamically or randomly selects power nodes and specifies distributed ranking. Power-Trust system introduce new concept that is Trust Overlay Network. It is built on top of all peers in a Peer 2Peer system. TON is virtual network for every node keeps feedback for its neighbours [13].

Previous resource management(resMnt) neglect resource heterogeneity by assigning node reputation value by providing all of its resources[10],[11] the node reputation is multifaceted and should be differentiated across multiple resources(Ex. CPU, Frequency, Memory). For example a student trusts a teacher for giving advice how to prepare an exam but not write an exam. Likewise, a node that performs well for computing resource sharing services but not necessarily perform well for storage services. Thus, previous repMgt systems are not well efficient to provide correct guidance for trustworthy individual node resource selection procedure.

Our Propose Method: By identifying and understanding previous problems for interdependencies between resMnt and repMnt, in Harmony system, we use load prediction algorithm to overcome these problems. In this algorithm is used to predict user data and also enhancing node performance for every new user entering time. It can achieve resource and reputation management in distributed systems, Harmony system [5] enables node connections by locating its desirable resources and also to find out reputations in particular located resources, using load prediction to capture performance of node reputations. The contribution of this work can be summarized as given below.

Feasibility study on real trace driven experimental results: we analyze the transaction and feedback rating of node reputation data we collected every merchandise specifications about node reputations, some of the sellers offers low Qos and buyers ask high reputed nodes. To verify importance of multi Qos demands and drawbacks of high reputed nodes

Multi Qos of resource & reputation management: Specifying virtual machine scheduler in Harmony method to capture load and capacity of nodes. It evaluates multiple resources by indexing the resource information in the same directory nodes, such directory nodes enables to access the information simultaneously.

Price assisted resource & reputation control: In resource transactions are conducted in a distributed manner. Harmony employs a trading model to specify individual node reputations. We enhance node capacity by using load prediction algorithm, to predict load and capacity of every individual node. It enables sharing connections between two nodes and adjusts its resource price to maximise profits, maintain a high reputation.

II. PRELIMNARY STUDY

The first and foremost strategy for development of a project starts from designing components of Harmony needed in each stage of resource marketing i.e. location, selection, transaction, performance for all business organizations. We describe below motivational components.

A. Multi Qos of Resource & Reputation Mnt

We first analyze whether the highest reputed nodes are measured based on resource provision services for all types of resources provides high QOS. We specify an online retail trading platform, whenever each seller sells a variety of their own retail systems. The sellers and retailers are estimates nodes and resources simultaneously.

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Dropbox [2] is one of the top online retail trading platforms in India similar to Google, eBay, etc. Dropbox specifies historical rating records for each transaction, to calculate the reputation record for each type of a seller's retail for multi Qos demands. We collected trace driven data, including some 100000 of transaction records Dropbox covered during the period of 2-12-2004 to 12-6-2006. In additionally overall reputation values of sellers, Dropbox provides the ratings within [0,150] for five QOS attributes for each transaction those are price, distance, quality, service and efficiency. If the highest reputed node is easily overload.

So as to group the transactions by various sorts of stock, we identify all transactions by 70 stock watchwords, and discovered 1,720 transactions of 60 sellers. The 60 retailers are the first 60 stocks of various brands in the Electronics classification, for example, "Samsung cellular telephone" and "Lenovo portable PC". For these exchanges, the exchanges of the same sort of stock of a vender are classier into a group.

The normal of five evaluations of every transaction is computed as the seller's Qos for this transaction. Accordingly, a seller's individual reputation can't reflect its Qos for each Qos attribute, which confirm the need to consider numerous Qos attributes in selecting assets. Taking into account this perception, Section 3.2 presents a multi-Qos-arranged asset determination, calculation that empowers clients choose resources based on their priority contemplations of the distinctive QoS attributes.

III. PROPOSED METHOD

In this paper, we extend Harmony method by using load prediction algorithm [12]. Load prediction algorithm analyzed every node reputation and captures the usage results, here mainly depends on virtual machine, i.e. every user register into their cloud servers at that time multiple virtual machines are clustered. Now we specify system architecture how it functional works together.

A. System Architecture

All the nodes in the cloud have a unique identifier. Unique identifier is must be useful for node reputation time. The proposed system simultaneously monitors the load of resources and makes decisions on nodes switching on or off to minimizing the overall consumption [14**].** In generally distributed method for resource location is to store particular directory nodes, but here proposing system every resource location is to store in specified directory nodes. They can provide security and do not corrupt any resource information. Here some of the modules can consider for designing the input those are:

Trust Manager: Trust management system deal with the trust relationships between business partners by keeping up the trust-level of the e-trade members and make them accessible to potential e-business clients when required. The trust level is derived from feedback ratings put together with the trading partners after the fruitful culmination of the transactions. Trust manager [15] analyze every trusted user for every time, then submit user files into cloud servers. This can provide security key for every new registered user by accessing their data; it works middleware between cloud servers, users, Dataowner.

Data Owner: Data owner access user data, in cloud most of the data owner works to provide high security of users because at present situations, multiple users are registered at that time a tremendous amount of data assigning each other. So Dataowner access user data and send into trust manager, it also provides virtual machine when the user wants to store large amount of data. Data owner is to detect vulnerabilities, who can enter into unauthorized users.

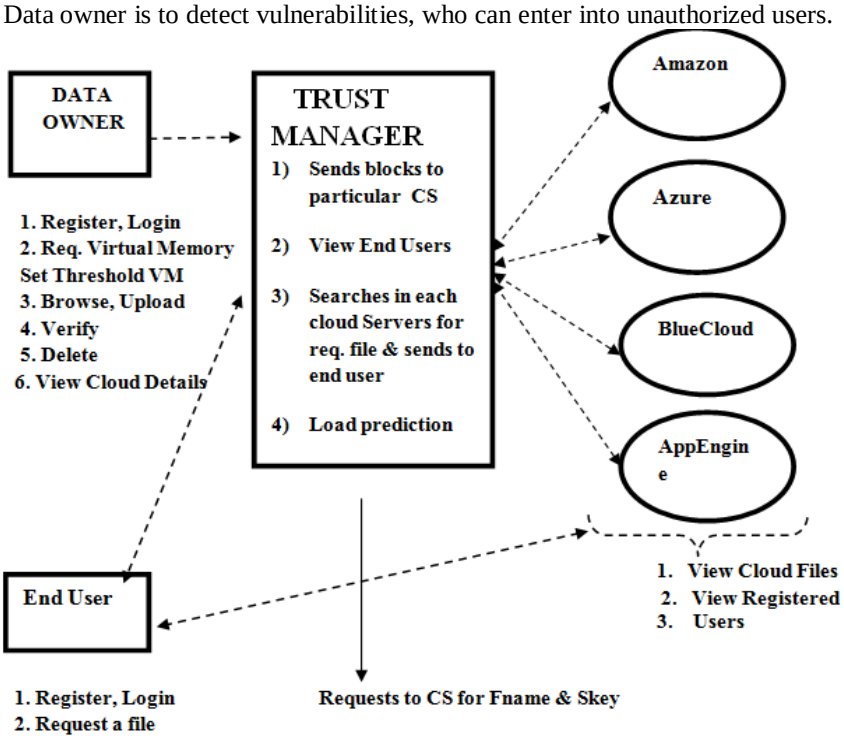

Fig .1 System Architecture

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Cloud servers: In this paper we are using four cloud servers those are Amazon, BlueCloud, Microsoft Azure, and Google AppEngine. Cloud servers work similarly as physical servers however the capacities they provide can be very different. At the point when opting on cloud hosting, clients are renting virtual server space as opposed to renting or obtaining physical servers. They are frequently paid for by the hour, relying upon the capacity required at a specific time. The Trust manager sends user data into cloud server, cloud servers hosting users' information and it works internally.

B. System Performance

This system works sequenctially, before entering the system first register whatever the cloud server they want then data owner involve after entering the end-users. Data owner works who are authorized users or unauthorized users they check them when authorized users are entered into the system data owner send a message to create a virtual machine memory, user can create virtual machine memory after creating memory data owner again send message create threshold memory. Threshold memory is more important when you create threshold memory it must be careful, threshold memory always less than a virtual machine memory see in fig3.1

For example, if a user creates virtual machine memory with 12400 bytes and threshold memory creates 12500 bytes at that time threshold violation occurs, it cannot assign any user files and also virtual machine corrupted. User can take care for assigning threshold memory its almost less size of VM file size. Data owner assigns virtual machines, then send a user request to a trust manager. The Trust manager creates files into blocks and then sends request files into the Cloud servers. Next whatever the files are sent users that can be shown into users, if any user wants to see their file at that time user to send requests into trust manager. Trust manager accepts request and send this request into a cloud server overall the performance generate load prediction algorithm we can see how it works in section 4.

IV. PREDICTION ALGORITHM

A. Load Prediction Algorithm

A Load prediction algorithm is used to predict load and capacity of Virtual machine. In this paper load prediction works to cloud system that have the additional devices to give responsible for predicting the incoming load as well as devices that examines the current performance of system and all the available cloud resource nodes. The following steps are organised how to work load prediction algorithm.

Steps for Load Prediction:

INPUT: P, VMS, M

OUTPUT: Future resource demand and load of VMS

STEP1: Multiplexing of virtual machines to physical machine.

STEP2: Node contains local node manager which captures usage results of each VM in the node.

STEP3: VM usage results are forwarded to the central controller of VM scheduler.

STEP4: VM scheduler receives resource demand of VMS capacity and load of VMS.

STEP6: Load predictor computes the future resource demand load of a PM by aggregating the resource usage of its VMS.

We mainly focus on the Virtual Machine, Physical Machine memory when the load prediction algorithm works with virtual machines. The goal of this algorithm is to ensure the incoming requests are properly served to their clients and to determine node reputations efficiently.

B. Virtual Machine

Virtual Machine is the users own operating system and it is a software implementation of the machine. It can easily move, copied, reassigned between host servers to optimize hardware resource utilizations because of it consume physical hosts to unequal resource quantities. The Virtual machine is an imitating of a specific PC framework. Virtual machines work in light of the computer architecture and functions of a genuine or speculative computer and their usage may include particular hardware, software, or a mix of both. The above architecture system of the virtual machine is used for storing resources, user data and maintaining load capacity.

C. Physical Machine

Physical Machine is a hardware based computer, sometimes this can be derived for differentiate between software-based as well as hardware-based computer i.e.(VM). It specifies personal computer and it refers to an independent server. In this paper, we convert virtual machine to physical machine i.e multiplexing to each other. First we identify the source virtual machine to wander then to identify it can be original virtual machine or copied version, if it is original to initialize where the directory is available. Next to identify the target physical machine to wander them and specify all the hardware components into their target machine. Identify which driver you need to converting VM to PM, after identifying directory to register where the VM to PM converting location is available in that particular location user files stored.

D. Virtual Machine Scheduler:

VMS controls the multi-level programming and it allows an enterprise for sharing resources. VM scheduling is used to schedule the Virtual Machine requests to the Physical Machine within a particular Data Center as per retailer's requirement fulfilled with their requested resources such as Bandwidth, Memory, and CPU. VMS works on three levels.

Arrange VMs and find the suitable Physical Machine

Find out the accurate provisioning scheme for these Virtual Machines

Scheduling the responsibilities of Virtual Machines.

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V. EXPERIMENTAL ANALAYSIS

We specify load prediction algorithm in above section 4. In the algorithm input is given by Virtual Machine and Physical Machine memory why because we calculate load and capacity of virtual machines. Some of the steps are mentioned above, these steps are used to work sequentially. In the first step we determine multiplexing VM to PM then next step specify every node contains local node manager because of to capturing the usage results of each Virtual Machine i.e. for suppose user wants high reputed nodes due to their retailers at that time this algorithm calculate and capture the usage results to display the users. These usage results forwarded to the central controller of VM Scheduler then VM scheduler receives resource demand of VMS capacity and load of VMS. Finally Load predictor computes the future resource demand load of a PM and aggregating the resource usage of its VMS.

Now we determine how to work Load prediction algorithm. Load prediction analyzes particular resources which cloud server user wants, by predicting future load of each Physical machine. It can predict first on demand resources of each Virtual Machine. This prediction is done using the following equation.

$E(t) = \propto * E(t-1) + (1- \propto) * O(t)$, $0 \leq \propto \leq 1$

Here E(t) is derived by estimated time, O(t) is derived by Observed load time and $\propto$ is a constant in between stability and responsiveness.

The design of the algorithm specifies the above formula to predicate the CPU load. They can measure the load and capacity for every time and then predict the load, capacity to the next minute. Estimated time can calculate by node reputation performance time, which one is higher than another. Observed time specifies to observe predicting nodes. For example, we can take O(t) has 10,20,30,40 is in a sequence, then the next value automatically predict 50, sometimes unfortunately $\propto$ value is in between 0 & 1 the predicted value is always in between in the observed value to show fig 6. At that time acceleration reflect & set in $\propto$ value is negative.

After so many observations they set the value of $\propto$ is 0.85, $\propto$ value cannot be changed every time because it can consist constant or default value. By using this formula we can analyze resources efficiently and we do not use another equation for capturing the usage results. This algorithm for predicate the future resource demands of Virtual Machines for avoiding the system overloading functions and also provides best quality of services to their clients. Suppose the user wants highest reputed node, this system check when and where highest reputed nodes are available those nodes only selected by displaying requested users.

Analysis of results load prediction algorithm is high efficiency when compare to other existing method why because it can provide on demand resources, multi quality of services and security should be mentioned for every new user register into the system. The following results analysis can be clearly mentioned here.

VI. ALGORITHM RESULTS

Here, the load prediction performance can be measured by using node reputation in fig.2 Load prediction algorithm can analyze every 50 seconds of load factor. In 10 seconds of time, we can take 10kb of load at that time Qos will be increase in 10% and the node reputation is specified by 2. Next 50 seconds of time, we can take 10Mb of load at that time QoS will be increase in 50 % and the node reputation is specified by 6. Finally 100 seconds of time, we can take 500Mb of load at that time QoS will be increase in 90 % and the node reputation is specified by 10. The following table is represented by load factor values.

Table 1. Load Factor

Time	Load	QoS	Reputation
10	0.1	0.2	0.3
50	0.2	0.38	0.45
100	0.3	0.45	0.5

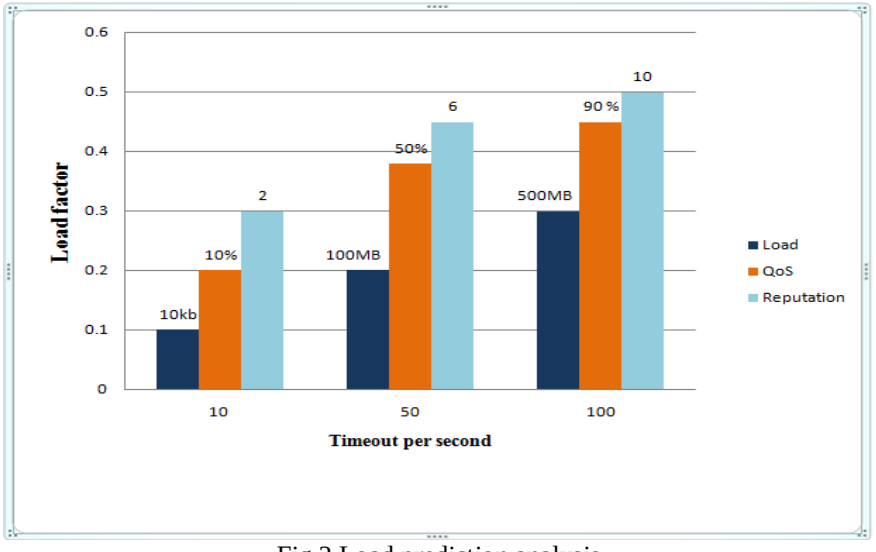

Fig.2 Load prediction analysis

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In Fig.3 represents the performance of the node reputation in Cloud Servers for 20 seconds. Every Cloud server nodes are starting in 1 reputation for every 10 seconds of time it will change their positions. See in below graph, BlueCloud server of one node is start in 1 reputation then after 20 seconds of time, it will increase in 4 and after 30 seconds of time it will increase in 4.5. Similarly all cloud servers nodes are working this process. Finally all nodes are specified by 6 reputations. The following table is represented by node reputations for every Cloud Server.

Table 3. Node Reputations for Cloud Servers

Time	Amazon	Azure	AppEngine	BlueCloud
10	1	1	1	1
20	2.5	3	3.5	4
30	3	3.5	4	4.5
40	3	5.5	4.2	4.8
50	5	4.5	6	5.5
60	6	6	6	6

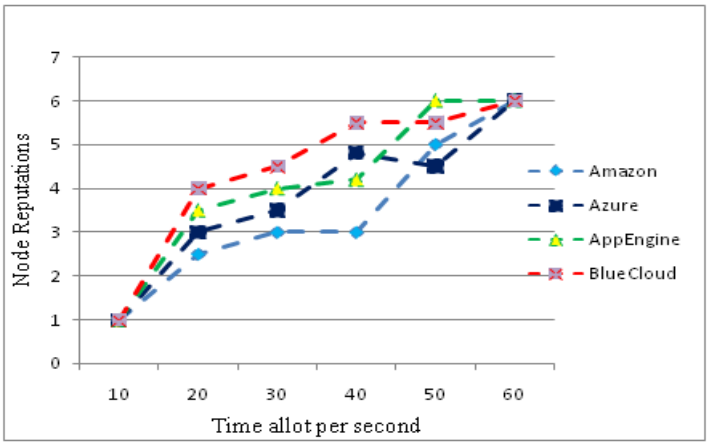

Fig.3 Node Reputations for Cloud Servers

Finally performance of Load prediction is very high. It can avoid time consuming factor and unauthorized users. Node reputations are calculated efficiently when compare to other methods. It can reduce the performance time. See in Fig.4

Table 4. Load Prediction Efficiency

Success rate	Harmony Method	Load Prediction
1	20	50
2	40	80
3	50	90
4	60	100
5	70	120
6	70	120
7	60	110
8	70	130

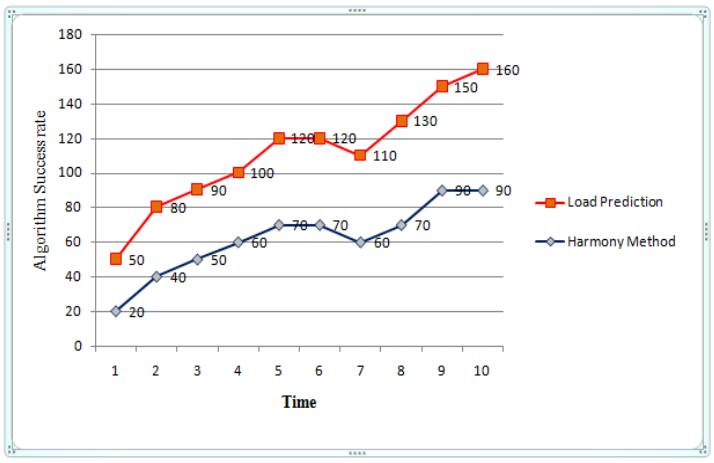

Fig.4. Load prediction Efficiency

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VII. CONCLUSION

In this paper, we enhance Harmony method by using load prediction algorithm. Organizing the interdependencies between resource and reputation management, Load prediction algorithm works in Virtual Machines, here every end user can have multiple VM, why because to store a large amount of data at that time this algorithm assigns VMs. This algorithm incorporates three tasks to enhance their cooperative interactions for efficient resource sharing among the clouds. Virtual Machine migrates Physical Machine by collecting information about available resources and reputations of service providers they provide the type of resources. Virtual Machine scheduler helps requester choose which service provider provides highest Qos attributes and it also helps to avoid overloading for resource allocation time. Finally, load prediction algorithm is used to save resource allocations and also capture usage results based on demand load & capacity of VMs.

REFRENCES

[1] Amazon Elastic Compute Cloud (EC2), http://www.amazon.com,2015.

[2] Dropbox,www.dropbox.com,2015

[3] MediaFire https://www.mediafire.com/

[4] Vivek Bongale,Kumar H.R and Uma Ishwaragouda Guranagoudr " *Co-Operative Resource Sharing Platform for an Efficient and Trustworthy Colloborative Cloud Computing",* Volume 5, Issue5,MAY,2015

[5] Guoxin Liu and Haiying Shen "*An Efficient and Trustworthy Resource Sharing Platform for Collaborative Cloud Computing*" IEEE Transactions on parallel and distributed systems, Vol.25, april 2014.

[6] J. Li, B. Li, Z. Du, and L. Meng, "*CloudVO: Building a Secure Virtual Organization for Multiple Clouds Collaboration*," Proc. 11th ACIS Int'l Conf. Software Eng. Artificial IIntelligence Networking and Parallel/Distributed Computing (SNPD), 2010.

[7] IBM Red Boo. Fundamentals of Grid Computing, Technical Report REDP-3613-00 2000.

[8] Kamal Sheel Mishra*"Some Issues, Challenges and Problems of Distributed Software System*"International Journal of Computer Science and Information Technologies, Vol. 5 (4) , 2014.

[9] H. Shen and C. Xu, "*Hash-based Proximity Clustering for Load Balancing in Heterogeneous DHT Networks,"* Proc. of International Parallel and Distributed Processing Symposium (IPDPS), 2006.

[10] R. Zhou and K. Hwang, "*Gossip-Based Reputation Management for Unstructured Peer-to-Peer Networks,"* IEEE Trans. Knowledge and Data Eng., 200 [11] R. Zhou and K. Hwang, "*PowerTrust: A Robust and Scalable Reputation System for Trusted Peer-to-Peer Computing,"* IEEE Trans. Parallel and Distributed Systems, vol. 18, no. 4, pp. 460473, 2008.

[12] L. Xiong and L. Liu, "*Peertrust: Supporting Reputation-Based Trust for Peer-to-Peer Electronic Communities,"* IEEE Trans. Knowledge and Data Eng., vol. 16, no. 7, pp. 843-857, July 2004.

[13] M. Srivatsa, L. Xiong, and L. Liu, "*Trustguard: Countering Vulnerabilities in Reputation Management for Decentralized Overlay Networks,"* Proc. World Wide Web Conf., 2005.

[14] V.SAROJA and V.M SIVAGAMI "*Dynamic Resource Management Using Skewness and Load Prediction Algorithm for Cloud Computing",* International Journal on Recent and Innovation Trends in Computing and Communication,Vol 2, issue 4,2015.

[15] Mohamed Firdhous, Osman Ghazali and Suhaidi Hassan "*Trust Management in Cloud Computing: A Critical Review",*International Journal on Advances in ICT for Emerging Regions,2011.

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