Asian Journal of Information Technology 14 (6): 231-238, 2015
ISSN: 1682-3915

Resource Management Improvement in Cloud Computing with Use of Migration Factors

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Abstract: Overall process of computation is in such a way that could be assumed as the 5th basic element after water, electricity, gas and telephone. In such situations, users try to access services based on their needs, regardless of their location and or how they are delivered. Cloud management software provides the ability of error management, configuration, accounting, performance and security. In this project, we want to evaluate types of security concepts in clouds computing, architecture of cloud management cloud challenges in related managerial-security problems and cloud security standards. Cloud computing supports effective strategies for IT services. It is not considered a new technology but it is a modern method to present computational resources and a model for service providing by internet. First, we present an overall introduction of cloud computing, service management and overview of the research then available problems and challenges and also importance of the research was realized. An integrated Fuzzy System is used and head clusters are determined based on a Fuzzy System so that our inputs cause improvement of cloud computing process using migration factors in a Fuzzy System including their traffic volume, processing power and bandwidth capacity for data processing. Finally, goals of the research were identified. In this thesis, we categorized new servers of cloud systems into 3 classes using immigration concepts: strong, medium and weak. Whenever immigration factors change in smart system, the server will change based on those features. Cloud computing servers share and connect information such as website traffic on entire network; sometimes it is introduced as an internet service. We found out that cloud computing costomers are not obliged to pay for management, installation and maintenance of their control traffic service but they must only invest on their time and cost for web development then they simply pay for resources required for the web. Cloud computing is responsible for system engineering in times of traffic peaks dividing it between several resources to perform ultimate speed and efficiency.

Key words: Cloud computing, fuzzy, migration factors, resource management, security concepts

INTRODUCTION

Cloud computing is an internet based computing. It is evolved from grid computing, utility computing, parallel computing, distributed computing and virtualization. It has more powerful computing infrastructure with a pool of thousands of computers and servers (Monikandan and Arockiam, 2015).

In recent years, cloud computing has raised a high popularity. This technology is the ongoing process of information technology that provides dynamic and cheap calculation. Meanwhile, putting data and application on cloud computing platform, a third person creates new security problems reducing confidence of move toward this new environment. As a result, many improvements are suggested to increase security and privacy of cloud computing and also to remove concerns about its application. Cloud computing presents many advantages such as saving money, since there is no need to basic installation of resources it provides accountability and flexibility cause users can increase or decrease number of services based on their need. Cost of maintenance is also much lower due to managing all resources by cloud providers. Cloud computing is one of the newest

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developments of information technology. From market perspective, understanding the effects of cloud balancing is important. The infrastructure of cloud computing is a completely automatic service provider allowing customers remote purchase dynamic measurability and system management (Behl, 2011).

Cloud computing is a model of service in which storage and computation facilities such as processor, memory, band width and several online software with rapid, easy and flexible access are provided for users. Some firms use this model to provide storage and computation facilities for users in broadly. Using these services, users need to save their data on the physical space of cloud computing service provider. Doing this users have no physical control on their data anymore and this is cloud computing service provider having these data under its control. In this condition, it is necessary for users to trust cloud computing service provider saving their data on database safely and use its services. Now, users should be aware about risks threatening their data to use services provided by service provider safely. Here there are risks that tarnish users' trust to cloud computing model. Also, cloud computing providers should be aware of these risks trying to decrease and even remove them and to attract users' trust to their services. Thus, this research extracts the most important factors influential on users'trust to cloud computing model, their definitions and presenting a model to evaluate level of users' trust based on these factors and the relationship between them and users' trust in cloud computing.

We can use hidden capabilities of virtual machines to meet security needs; important and efficient capabilities behind the virtual machines are: the feasibility to create, save, read, change, share, transform and backward of run mode. These flexible capabilities have a significant value in users and managers' perspective. Since, monitors of virtual machines simulate available hardware, users use this advantage in Operating Systems (DOS), programs and managerial tools; so that in most cases, servers and desktop computers are replaced with virtual environments. Unfortunately this ease of transform would be also deceptive meaning that weaknesses available in monitors of virtual machines are used in most of cloud threats (Frincu, 2014).

Generally, cloud computing is a computational model based on huge computer networks such as internet that presents a new pattern for supply, consumption and delivery of information technology services including hardware, information software and other computational shared resources it also suggests strategies to provide information technology with public services (water, electricity, gas and telephone). This means that access to information technology resources is sprovided by internet based on user's demand flexibly and comparable. In this research, we study resource management improvement in cloud computing with use of immigration factors (Membrey *et al*., 2012).

RESEARCH BACKGROUND

Studied cloud computing in a research called 'security problems in cloud computing and role of organizations'. Cloud computing is simulated to industrial revolution and perceived equal to it. Yet it variable nature confronts with significant security threats. This research investigates about impact of official and non-official organizations on perception of security problems in cloud computing. It clarifies nature origin and logics of organizational changes in environment of cloud computing. Another goal of this research is to achieve correct understanding and insight of mechanisms and powers causing official changes in cloud industry. Specifically, formation of contradictions in several levels by technology, formation networks and compressed relations, dynamics of power exchange and their impact in official changes all are studied in this research. Since, current analysis considers mostly established and open industries and markets it is expected to provide a new vision towards achievements of emerging technology (Kshetri, 2012).

A research was conducted by entitled 'A New Research about Security Challenges of Cloud Computing: Approaches and Solutions'. The evolution of cloud computing caused a revolution in separation and application of remote infrastructures calculations. Now, the possibility of testing new ideas against initial cost is very low. Cloud computing is highly attended by firms and organizations since it removes the need to pre-programming and provides possibility of runtime with constrained resources and its gradual increase. There are also some challenges available in cloud computing application but they had created some opportunities of search in several dimensions of cloud computing. One of these main problems is security and privacy of data stored and processed on systems of cloud services. The initial goal of the research conducted was to provide a better understanding of security challenges in cloud computing and to identify approaches and strategies used by cloud services industry (Shahzad, 2014).

Has conducted a research entitled 'Practical Evaluation of Cloud Computing and its Security Framework'. Cloud computing is a growing pattern that supports effective strategies for IT services. This support is done through introduction of required services and

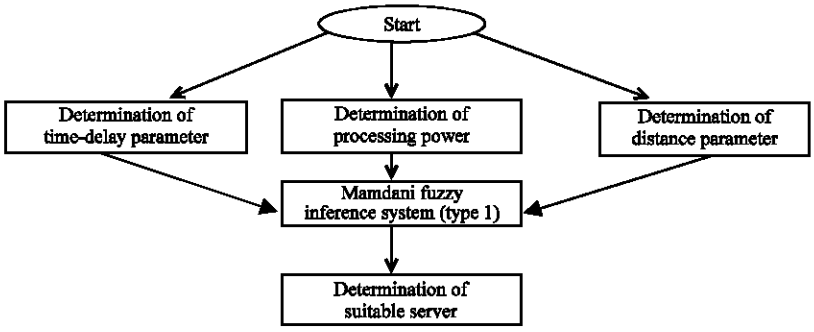

Fig. 1: Suggested algorithm

flexible computational resources. However, utilization of cloud services has faced with big challenges, i.e., security problems. In the previous research, a security monitoring network was suggested to prevent security barriers in line with strategy of relative activity. Although, a great deal of available texts are related with cloud computing but it could not present reports of real applications of monitoring networks designed in clouds computing environments. The exact application of ISGCLOUD introduces a real case study in a public test, Spain. It also deploys from storage services in security arrangement. The practical evaluation precedes an official process including definition of research questions. As discussed in the study, application of ISGCLOUD leads to achievement of organization's security goals, minimizing security risks and increasing security awareness among users (Rebollo *et al*., 2015).

According to Pur, cloud computing is not a new technology but it is a new method to present computational resources and a model for service providing by internet. It provides the capability of efficiency and savings in hardware resources and increase of computing power. In this regard, load balance is a significant problem of cloud computing that causes increase of speed and efficiency itself. But this issue confronts with challenges such as security and fault tolerance. There are several algorithms presented for load balance problem.

Has conducted a research entitled 'Security Challenges in Cloud Computing and Presenting a Strategy for Security Improvement Towards Electronic Government Public Services'. Cloud computing is a model that considers easy, distributed and universal access to aggregation and common computational resources. In cloud computing, capabilities based on information technology are presented as services that are accessible with least managerial attempt and without need to exact knowledge of infrastructure technologies. In this regard, one of important issues is focus of security challenges on new technologies. This study has an overview on issue of cloud computing and discusses about security challenges relative to this technology. Although, there were approaches available to improve security of cloud systems but there were no comprehensive approaches proper with cloud computing implementation in electronic government.

According to rapid growth of demand for implementing cloud computing resources by huge datacenters caused high energy consumption and as a result increase in operational cost and carbon dioxide extraction. Integrity of cloud resources provides the possibility of suspension of unemployed datacenters, transferring their loads to qualified datacenters and eventually saving energy. In this study, an exploratory algorithm is presented that attends to previous behavior, heterogeneity of the existing flows on hosts and number of competitors trying to achieve it; we compare our improved algorithm with famous ones such as ABFD, BFD and FFD base on two criteria of energy consumption and user satisfaction.

Also, the 'cloudsim' famous simulator was used for implementation and evaluation of algorithm. Results obtained by this research showed a significant improvement.

SUGGESTED ALGORITHM

Thus, cloud computing provides the condition to increase datacenter efficiency. Using virtualization you can do more with less software this advantage caused rapid development of applications and internet services and as a result development of electronic trade and many innovations of the field (Fig. 1).

VIRTUALIZATION

In fact, establishing a virtual space to share different hardware resources, storage media, network resources and. Is for optimum use of all resources. I big organizations and datacenters, lots of money is spent for

equipment, hardware resources and so on. Also lost of energy wastes for installation and use of this equipment much space is needed for its maintenance and consequently many people are employed who are responsible for maintenance and management of these servers and hardware resources. Use of virtual technologies caused removal of all mentioned constraints.

Virtualization is a technology that provides possibility of running multiple services and operation systems on a single server. Another facility of this technology is to focus on software and even users' operational systems here saving in employing expert informatics personnel, maintenance cost of networks and clients and updating software has increased. Here, management of the entire system will perform centrally and integrated.

Goal of server integration is to minimize number of physical servers required for hosting a group of virtual machines. This could be perceived as 'multi-dimensional packaging' problem; goal of this problem is to draw some items so that each item, single or multiple shows the least number as possible with specific dimensions. we ourselves consider each virtual machine as a single item and its dimensions as its capacities; again, the goal is to minimize number of physical servers that must place all virtual machines in the location due to physical servers' capacity. This is a NP-complete problem which is usually solved by Linear Programming (LP).

Virtual machine migration is full transfer of a virtual machine from a physical infrastructure to another machine. Migration of operational systems among different physical machines is a suitable tool for management of datacenters, computer clusters and cloud computing platforms. This feasibility allows full separation of operational system from hardware and provides facilities for error management, load distribution and system maintenance. Full migration of operational system along with all its programs as a unit allows prevention of many complexities of process migration strategies. One of the most important complexities is 'residual dependency' problem in which initial host machine should keep its maintained activity and network communications to response systemic calls and even migration process whereas with virtual machine migration, initial host can be discharged upon completion of the migration. This is specifically significant when migration performs with aim of maintenance and fault tolerance. Furthermore, migration in total surface of virtual machine means that all in memory modes including nucleolus modes (e.g., TCP control block for an active relation) and program modes are somehow transferable (Nyre and Jaatun, 2011).

In this part, an integrated Fuzzy System is used and head clusters are determined based on a Fuzzy System so that our inputs cause improvement of cloud computing process using migration factors in a Fuzzy System including their traffic volume, processing power and bandwidth capacity for data processing.

FUZZY SYSTEM INPUTS

First input of Fuzzy System is traffic volume: This criterion can be effective in determining head cluster of node due to its energy amount. In this simulation, we assume 0.5 for initial energy thus the node's energy closer to 0.5, the better (Fig. 2-4).

At first this criterion is zero. It considers zero for S.G value in a period of 20 time units. This criterion also can be used for head cluster determination since the node not selected in previous periods is now prone to selection. As a result, the lower and more negative the node, the more appropriate is option for head cluster selection (Fig. 5-7).

The proposed algorithm uses the following results for the total energy of a random graph consider with the following characteristics and compare algorithms. Algorithm of the overall thesis has shown in Fig. 8.

In the simulation assuming 10 clients and 3 servers are as follows. In the simulation situation of clients are random and situation of servers are constant that to determine efficiency is considered to be random and data transmission is done in 20 stages. In this simulation are 10 active clients at any stage 20 clients are fixed. In this simulation, the choice for server is three that the best server is selected. Fuzzy algorithm with random server selection algorithm were compared. In this case, the following results were obtained by running simulations (Fig. 8).

In simulation assuming 20 clients and 3 server is as follows. In the simulation situation of clients are random and situation of servers are constant that to determine

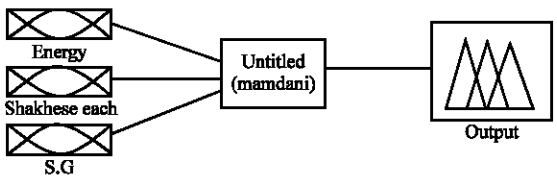

Fig. 2: Fuzzy System suggested

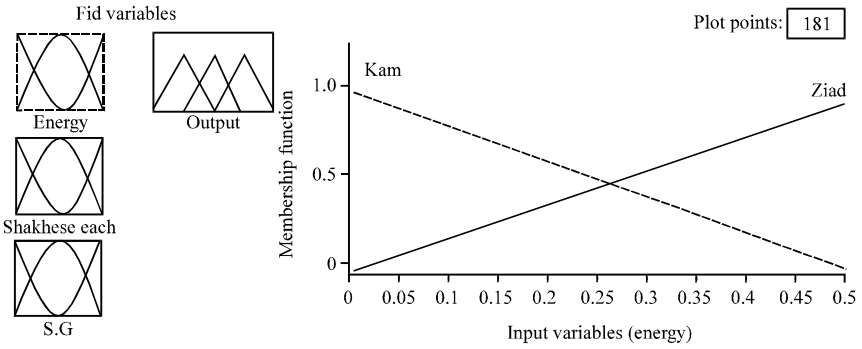

Fig. 3: Second input of Fuzzy System is processing power

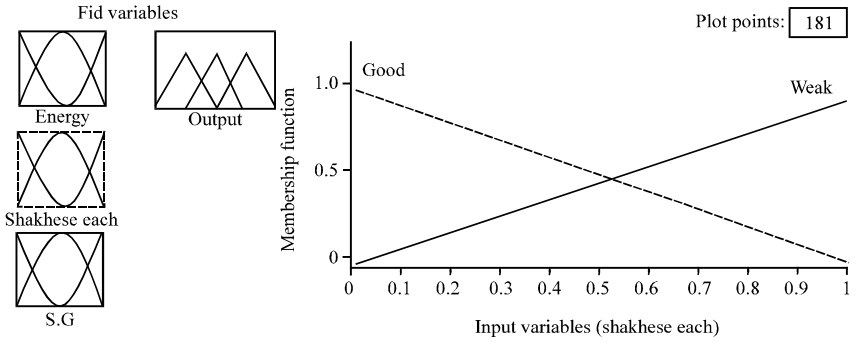

Fig. 4: Third input selected for Fuzzy System is proportional distribution criterion

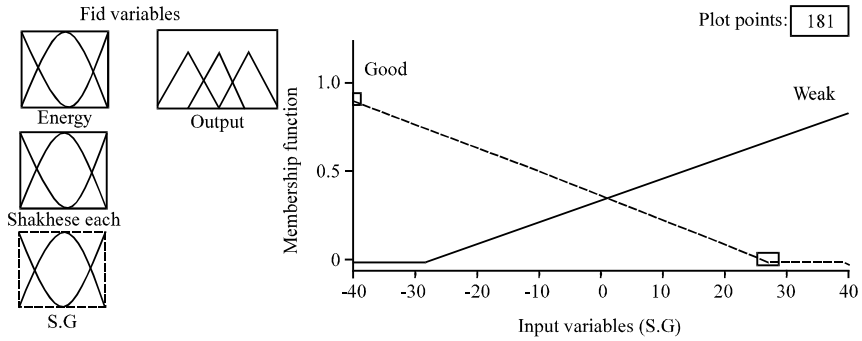

Fig. 5: Now, we obtain Fuzzy System rules

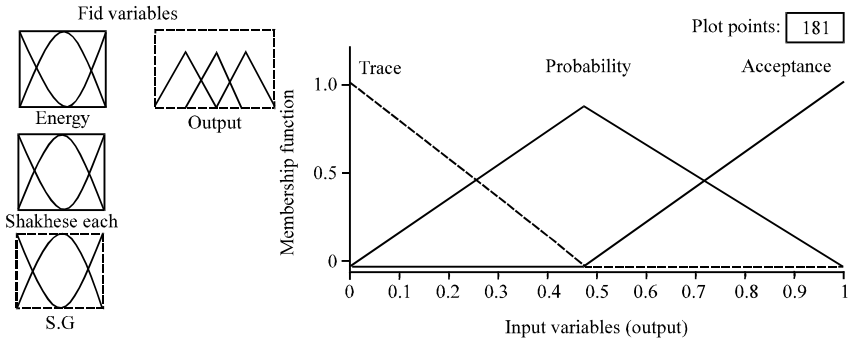

Fig. 6: Output membership function of the Fuzzy System

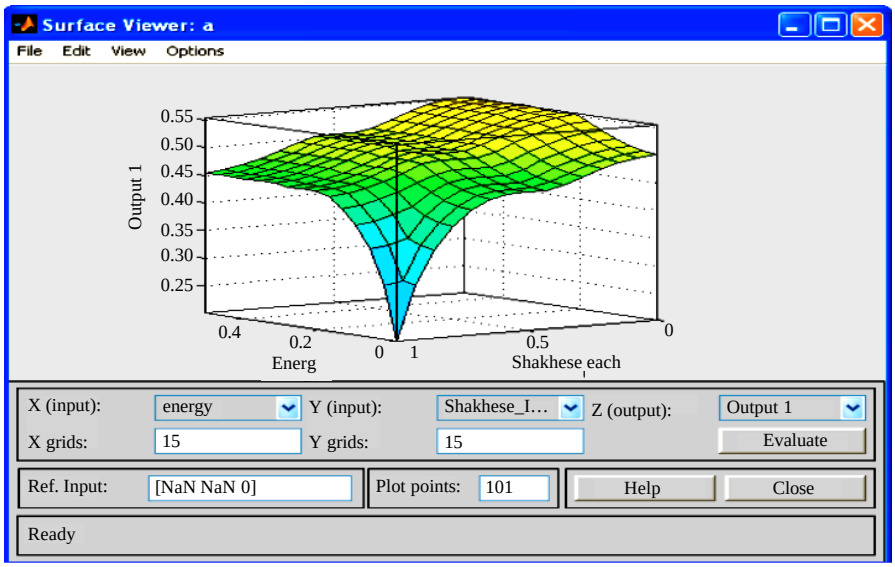

Fig. 7: Graph Fuzzy System from different directions

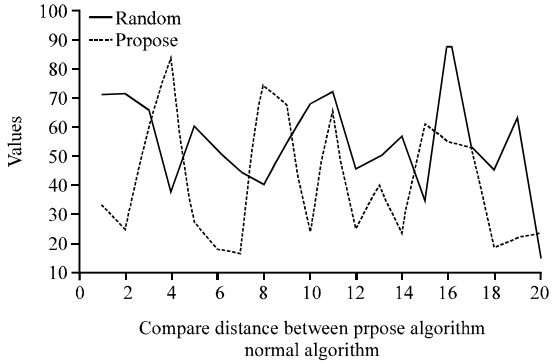

Fig. 8: The total distances of the two algorithms for ten clients and three fixed servers. Propose = 1.0922e = 003; random = 813.7373

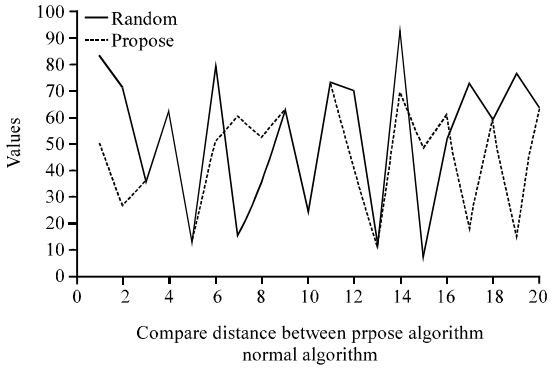

Fig. 10: The total distances of the two algorithms maximum for ten clients and two servers. Propose = 895.3699; random = 1.0565e+003

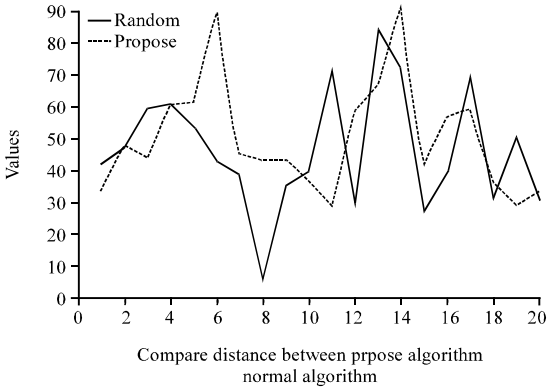

Fig. 9: The total distances of the two algorithms for twenty client and three fixed servers. Propose = 897.8715; random = 974.1929

efficiency is considered to be random and data transmission is done in 20 stages. In this simulation are 10 active clients at any stage 20 clients are fixed.

In the simulation assuming 10 clients and 2 servers are as follows. In the simulation situation of clients and servers to determine efficiency are considered to be random and data transmission is done in 20 stages. In this simulation maximum active clients are ten and at any data transmission stage maximum 10 clients are changed. In this simulation, the choice for server is two that the best server is selected. Fuzzy algorithm with random server selection algorithm were compared. In this case, the following results were obtained by running simulations (Fig. 9 and 10). Simulation for twenty clients and 4 servers are done as follows (Fig. 11). Simulation for forty clients and 8 servers are done as follows (Fig. 12-14).

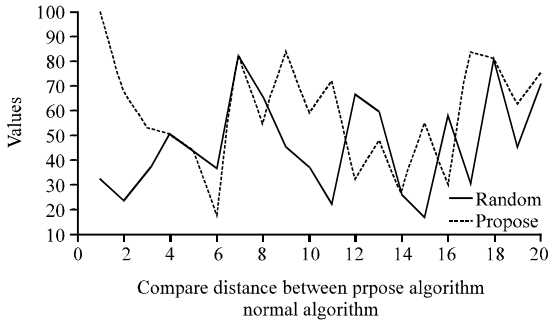

Fig. 11: The total distances of the two proposed and random algorithms maximum for twenty clients and four servers. Propose = 927.7268; random = 1.1774+003

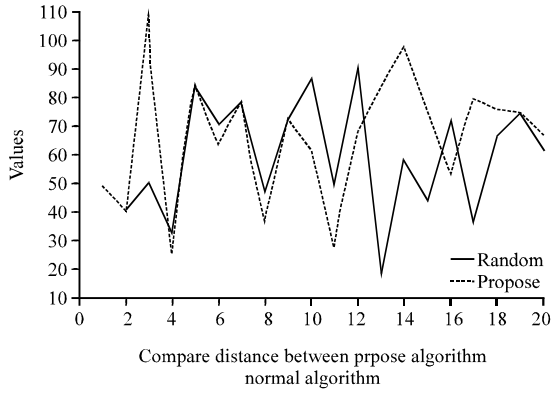

Fig. 12: The total distances of the two proposed and random algorithms maximum for forty clients and eight servers. Propose = 1.803e+003; random = 1.3204e+003

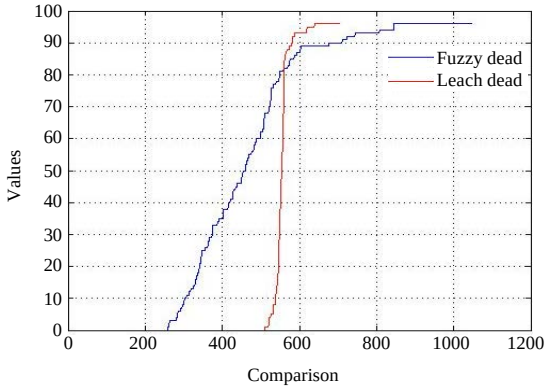

Fig. 13: Comparison of energy consumption in rotor network using suggested algorithm

CONCLUSION

Since, finding servers is typically based on one parameter, we determine a server using different parameters such as processing power, distance and also server traffic. Today, Fuzzy theory is applied in a wide spectrum of sciences ranging from control, image processing, signal processing, communications, integrated circuit manufacturing and expert system to trade, medicine, social sciences and so on. Fuzzy theory means all theories that use basic concepts of Fuzzy sets or dependent functions. In this thesis, we classified new servers of cloud systems into 3 groups using immigration concepts: strong, medium and weak. Whenever immigration factors change in smart system, the server will change based on those features. Cloud computing servers share and connect information such as website traffic on entire network; sometimes it is introduced as an internet service. It is not necessary for cloud computing customers to pay for management, installation and maintenance of their control traffic service. Customers should only invest on their time and cost for web development then they simply pay for resources required for the web. Cloud computing is responsible for system engineering in times of traffic peaks dividing it between several resources to perform ultimate speed and efficiency.

SUGGESTIONS

Since, designing a smart system is a new idea to determine servers, we express suggestions below:

- Designing system based on Fuzzy type-2
- Optimization of Fuzzy System
- Entering other inductive parameters
- Using data mining algorithms

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