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Improved Performance of cloud services using Artificial Neural Network

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Abstract :- The machines that operate in a virtual environment are deployed on the cloud. The load of work is distinguished for each application. Bandwidth, need of network, load & other superiorities for assessment of load of work rely on various attributes of application. Variegated resources that are needed by the websites formulated on the category of e-business can be accumulated by the providers of cloud. The goal of this stratagem is to figure out the number of resources that are needed for management of load of work in an efficient manner. A model formulated on Neural Network is suggested by this thesis to assess the load of work of a website of e business that t puts on a cloud. The tools of matlab & data of amazon will help to perform simulation that will be deployed as sample of model.

Keywords - E-Business, ANN, Matlab Toolbox, IaaS & Simulation.

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I.   INTRODUCTION

The latest innovations in cloud computing are making our business applications even more mobile and collaborative, similar to popular consumer apps like Facebook and Twitter. As consumers, we now expect that the information we care about will be pushed to us in real time, and business applications in the cloud are heading in that direction as well. There are continuously been some advancements in the technology of cloud computing. In the structure that describes the cloud & client relationship, the applications that are being executed on a device connected to internet are termed as client, while the batch of applications that are accumulated on a platform of cloud designed to be scalable is called server. Cloud operates as a system to support several clients at an instance. The client side might be constituted solely an application but the rising popularity of browser is more towards desktop & mobiles.

The hard wearing abilities, rising cost & need of networks, management of bandwidth in order to deduce the capacity consumption & computing are the main concerns. Though, the raise in needs of users for the applications puts a load on server for computations & storage.

A grouping of networks ployed to furnish architecture for support of file, data, storage & applications maintenance in either public or private mode is called as cloud computing. This technology has also deduced the cost associated with the delivering, hosting, maintaining & storage purposes.

It is a direct approach to attain benefits in terms of prices & has the capability to manipulate the environment from the cost intensive to variable pricing system.

This terminology is formulated on the concept of reusability. The cloud computing gives an extension to limits to structure in contrast to distributed, grid & autonomic computing.

As per Forrester definition of cloud computing is:
"A structure that is scalable abstracted & managed compute that hosts & provide support on customer end & is charged as per consumption."
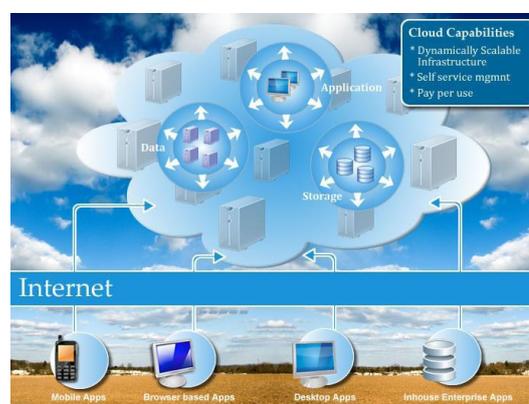

Fig 1: Conceptual View of Cloud Computing

II.   DESIGN DESCRIPTION

Cloud popularity is due to ability to self-host different services. Different applications require different services. According to His Research [1] there are number of features of cloud services.

1. Standardization: Services provided by cloud computing can be used by many users without much need of customization.
2. Flexible costing: In cloud based environment user has to pay for only that services that are used by them. They need not to pay for entire infrastructure and services provided by cloud service providers.
3. Self-service: Since cloud is based on high degree of automation user can use cloud service without much knowledge of deployment and configuration.
4. This Thesis considers e-business websites like retail shopping in which computing load varies according to different seasons in years. Websites on cloud environment have changing requirements like during holiday time or festival time requirements will be high. So in this thesis three time periods will be consider with low, normal and high workloads. According to Almedia success of any website depends on three factors: Availability, Efficiency and scalability. The website must be able to meet

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expanding requirements of different customers in cost efficient manner. For this capacity planning of web sites are required. Almedia provide overview of different steps required for capacity planning of web site and analyzing its requirements. Cloud computing provides unlimited resources but this entire infrastructure is not required. Hence user has to pay for only those resources that they use.

This thesis aims to propose model for predicting workload of cloud. In the next session overview of related work is given and then model is proposed for workload prediction.

Cloud computing is new technology hence very less literature is available. Some work is done in field of capacity planning and efficient resource allocation, which is discussed in this session. Almedia has discussed about different steps in capacity planning for web sites by proposing different steps and techniques involved in capacity planning. Menasce [2] discusses different methods involved in workload characterization of different ecommerce website. Raquel [4] presents planning of long-term service contracts of web applications for getting IaaS services from cloud providers. This thesis presents theoretical model based on mathematical formulas. Rao [5] discusses neural network for capacity planning of IAAS providers. Wang [6] discusses different problems related to ecommerce development in the cloud computing environment. Choi [7] has presented survey about different cloud computing services such as Amazon, Google etc. In this thesis ,we compared different features like computing architecture, virtualization, load balancing, fault tolerant, storage etc. of different cloud services. In the next session workload prediction model based on ANN is discussed.

Let λ be mean arrival value of web application client. Let s be a mean service rate. $\mu = \frac{1}{s}$ be a service rate of single cloud. Then according to queuing theory $\lambda < N.U$ [4]where N is Number of instances.

Different inputs to neural network are as follow:
1. Maximum number of demand instances.
2. Mean service rate
3. Arrival rate
4. Time for which e-business application

The output is number of instances of cloud computing required to manage load. Matlab toolbox is used for simulation. Two layer feed-forward network with sigmoid hidden neuron and Levenberg-Marquardt training algorithm is used for training. In this algorithm training will stop automatically when improvement is stopped in generalization. Sample data is taken from Amazon website. Raquel [4] also uses this data for efficient long-term contract. There are ten inputs and one output to neural network. There are ten hidden neurons. Performance plot of neural network is trained in 6 epochs. Best validation Performance is obtained at epoch 3. Performa nce of model set seems to be satisfactory. Network is trained to predict workload. 3 extra epochs are used by network for validations. The blue, green & red bars are the

representations for training, validating & testing of information respectively, as is on -1.662 and it is shown in regression graph represents different training data sample plots. Since it seems to be very little variation between training set and targets so training seems to be correct. Model is working accurately. If data is accurate we can get results close to target outputs. In this case target results and output are closer so network is working correctly.

III. PROBLEM STATEMENT

According to the base design Neural Network is apply only for 10*2 system . That means the neural network contain the 10 neurons and 2 layer .But the output graphs is not touching to the desire position of 1 . we have a point of unit response but the output graph is not touching to the 1 position . For improve the performance of the system we can use neural network 20*2 and 25*5. That means we can improve the performance of the system by increase the total number of layers with neurons .

IV. PROPOSED METHODLGY

In the basic model , we can increase the total number of neurons and layer so that our system can touch to the desire position .We are proposing two system one for 20*2 . In this 20 neurons attached will be by two layers . The design system is able to improve the performance of the cloud computing system but not able to touch the desire position . So we are increasing the system neurons . We are improving it by 25*5. In this 25 neurons and 5 layers are attached together .Proposed system is able to touch the system of the unit response .

V. RESULTS

According to the base paper system is design by 10 neurons with 2 layers . According to the given matlab design , we design three neural network . in the last we have design for the base paper in which 10*2 layers and neurons are using . In the middle, proposed design is showing which is 20*2 neurons and layers . In the top last proposed design is showing , In which we use 25*5 neurons and layers used .
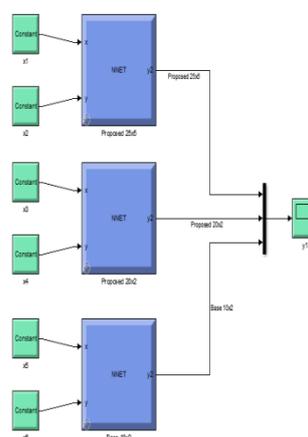

Fig 2 :- Neural network Design

As the output graph is hsowing the three graphs for the output waveform . The first graph from the below (Blue colur) is

showing the output of the neural network by 10*2 . that menan it have 10 neurons and 2 layers . Second graph which is showing by pink colur is showing the output of the 20*2 that means 20 neurons and 2 layer . Last one graphs is shwing the out put of the 25*5 .It is the graph of the proposed 25*5 neural network . It is near about to the 1 . That menas the output is stable and relible for the proposed design 25*5 neural network .
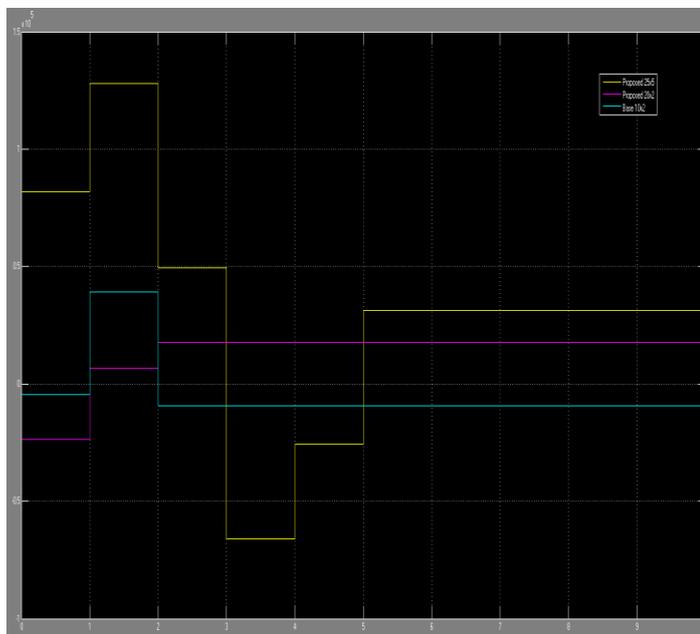

Fig 3 :- Output waveform

VI.   CONCLUSION AND FUTURE SCOPE

Cloud computing is an emerging technology and workload prediction depends on many factors. In this paper e-business website is considered. The proposed model based on ANN is able to predict workload of e-business website on cloud environment. The number of cloud instances can be found using this model. The result indicates that if sample data provided is accurate and reliable then the proposed model can work as good tool for workload prediction.

This thesis provides a base of workload prediction for e-business application on cloud computing using ANN techniques. Similar work can be done on other applications on cloud environment. Also in this multilayer feed forward algorithm is used for predictions, other algorithms can be used for this work and comparison can be done.

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