TEST Engineering & Management

January - February 2020
ISSN: 0193 - 4120 Page No. 3093 - 3103

A Cloud based Scalable Web Server for ISP using WEFGO Algorithm

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Article Info
Volume 82
Page Number: 3093 - 3103
Publication Issue:
January-February 2020

Abstract
The Internet increments violently, the Quality of Service, QoS support in web server is winding up increasingly significant. Be that as it may, the usage of a fine-grained QoS control model in the e-business servers is a difficult errand. The current looks into utilized just one line for all web demands, and a propelled planning guideline to separate administrations and improve by and large QoS. Many propelled booking standards have been created for generation arranging in the assembling area. The Best exertion model of a web server doesn't give QoS in light of the fact that the culmination time of a solicitation relies upon what number of solicitations are as of now in the line, and therefore can't be anticipated for practicality affirmation. Here in this examination, we will build up an instrument for a web server QoS models dependent on Service Level Agreement, SLA to give Quality of administration control. Like constant applications where jitter and postponement are basic to execution, practicality is additionally critical to web demands, particularly for some business sites where a late reaction may make customers go to opponent sites. Here we will utilize ideal administration planning calculation to control over-burdens in web servers. Weighted Fair Queue Grasshopper optimization algorithm (WeFGO) will be used for this task. Our proposed algorithm aggregates Priority queuing and Dynamic Fair Queuing scheduling algorithms. To ensure the security during transaction, we will use attribute based encryption technique. The violation of the SLA is a major aspect of web server and the violation leads to the reduction of user satisfaction level and further affects the cloud provider leading to penalty. Here the SLA violation is monitors by the violation agent and the violation agent provide the remedial measures for the SLA violation. In our proposed technique two types of remedial measures has to be taken for SLA violation which is penalty enforcement between parties and profit. With a plan to improve the consumer loyalty level and a successful use of assets over a predetermined due date and sharing of inactive assets which may affect on evasion of SLA infringement. The presentation of the proposed work is assessed by different execution measures

Article History

Article Received: *14 March 2019*
Revised: *27 May 2019*
Accepted: *16 October 2019*
Publication: *19 January 2020*

Keywords: *Weighted fair Queue, Web Server overload, Grasshopper optimization , Quality of Service, QoS.*

I. INTRODUCTION

An ISP is an Organization which offers administrations to getting to, using or partaking in the web.

There are three different major classifications of ISPs; they are Tier-1, Tier-2 and Tier-3. Tier -1 Owns and operates a network. They are capable of link Direct connect to the internet and may use other networks through a mutual agreement. Tier 2 - Owns a network, but pays to use the Tier 1 networks in part to expand services .Tier 3 - Owns no network. - 100% from either Tier 1 or Tier 2 all the time.

The Tier-1 ISP is a sort of ISP that specifically associates with the worldwideInternet. They are the spine in a particular region. The most noteworthy ISP class is the Tier 1 ISP, has its very own IP arrange in a specific region and they will go about as an essential Internet Service Provider for a specific area as well as at least one different areas. These sorts of ISP's are essential Internet spine for other level 1 ISP of same or distinctive districts. They keep up the whole directing table for the Internet in its area.

Normally, a level 1 ISP pitches data transfer capacity to level 2 and level 3 ISPs, which, thus, give Internet link to organizations and individual clients. Besides, a level 1 ISP ties a concurrence

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with another level 1 ISP for the free trade of activity and data.

Along these lines, an ISP can't be delegated level 1 in the event that it is required to pay peering charge to associate with a level 1 ISP in the equivalent worldwide region

Level 2 organisations is an Internet Service provider which takes part in the act of peering with different systems, yet which additionally buys IP travel to achieve some segment of the Internet.

Level 3 arrange is some of the time likewise used to depict systems who exclusively buy IP transportable from different systems to achieve the Internet.

In the current setup the top 10 challenges for Internet Service Providers are Network Security, Network Congestion, Network Connectivity, Peer-to-Peer Network Traffic, Video on Demand or Video Streaming, IP address transformation, Network Regulations and Uninterrupted Services to the Customers.

To overcome these problems we have designed, developed and proposed a new Algorithm using Weighted Fair Queuing embedded in Grasshopper Optimization with Oppositional method.

II. WEIGHTED FAIR QUEUE GRASSHOPPER OPTIMIZATION ALGORITHM (WEFGO):

The proposed Algorithm, Weighted Fair Queue Grasshopper Optimization Algorithm (WeFGO) is to select the optimal priority selection. Grasshopper Optimization calculation is one of the ongoing calculation for improvement. This calculation is swarm based nature motivated calculation which emulates and scientifically models the conduct of grasshopper swarm in nature. The WeFGO calculation deals with the conduct of grasshopper swarms. In this technique, a grasshopper is utilized to speak to the Process need it is spoken to by twofold esteem. The target capacity is characterized as the Maximize the Profit of each procedure.

III.RELATED WORK

Chang & et.al decided to solve problem of simultaneous access of same signal bands in unconditional manner. They utilized a methodology that successfully diminishes the self-interferencem impacts of the ideal channel. They receive MSME strategy for shaft shaping methodology. Additionally they exhibits their proposed strategy control in real 2 estimation strategies, one is novel channel estimation and another is commotion in addition to control impedance estimation philosophy which outflanks amazingly well in abusing the introduction highlight of IEEE 802.22 Wireless Regional Area Network.They build framework with the help of smart Grid & cloud computing infrastructure. They show their simulation results with respect to MSME beam former technique. Their promised methodologies shows significant improvements in system capacity & BER.

Xing He & et.al motivates the usage of data handling tools to overcome the difficulty in analyzing the intrinsic characteristic of data in all aspects such as volume, velocity, veracity, value & variety. Xing He & et.al adopts Random Matrix Theory (RMT) method that can perceive the Complex natured high dimensional data. This proposed architecture out performs well in analyzing much higher dimensional data details and provides fruitful results in anomaly detections. This architecture can also find/identity the correlations between data's in different dimensions. Xing He & et.al were successful in their first attempt to apply their proposed technique in Smart Grids. They approved their outcomes in different fields of intensity frameworks. This proposed work is perfect with square estimation, Regional Small database and furthermore goes about as best information driven answer for little circumstance mindfulness framework just as enormous scale interconnected frameworks.

Baek and et.al proposed profoundly verified distributed computing based enormous information data the board framework for Smart Grids. This various leveled structure gives huge administrations to data the board and huge information examination.

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This analysis outperforms extremely well in reliability, efficiency and sustainability of information. This proposed system can process huge amounts of data's received from savvy gadgets, for example, control resources and keen meters effectively. This proposed technique promises to provide high end secured framework i.e., Joonsang& et.al provides security solution along with proposed architecture to address critical. Issues which is based on, identity-based encryption technique. They also adopt signature and proxy re-encryption method to make their architectural framework highly secured.

Simmhan& et.al focuses their vision on building programming stage for brilliant digital network framework utilizing cloud advances. Their proposed work offers an intelligent information integration system for investigation complex intrinsic data that are dynamic in nature. This proposed pipeline serves as a repository for researchers to share knowledge. This knowledge can be used as experience to train machine learning models over massive datasets. This outperforms extremely in demand based forecasting, provides intelligent visual patterns. Their principle thought process is to explore the job of distributed computing and their utilization in brilliant framework digital physical framework.

Lithium & et.al concentrates on developing a system that can provide services to large scale infrastructures. Their work primarily centers around improving the exhibition and speed of figuring as indicated by the client and application needs. Their proposed multi-operator frameworks cooperates with specialists that have clever conduct. They strongly believe in getting high performance through integration of technologies. Therefore complex systems and intelligent applications gets benefited by flexible cloud computing technologies that are automatic and reliable even on scalable computing infrastructure that are made use by large scale applications.

Juve& et.al focuses their research on public and private clouds. This work mainly portrays the usage of cyber-infrastructure in scientific applications. This work explores NASA's Keplor mission's data, analyses their complex data nature for the case study of astronomy application which clearly showcases the drawbacks of cloud and grid systems. Their main motive is to compute periodograms. This system determines the data as periodic workflow for modeling the periodogram using Pegasus and run this work on future grid scientific cloud test bed. Among this, their proposed work likewise involves and differentiate the foundation regarding parameters, for example, cost, arrangement, adaptability, asset accessibility and execution. This results are compared and analyzed in all infrastructures such as future grid, Amazon EC2 commercial cloud and Open Service Grid.

Thale& et.al developed Controlled Area Network for Micro grid. Micro grid is increasingly becoming important for large scale smart grids. This Smart Grid is associated with controls that are necessary for maintaining the Grid System with clean, reliable and uninterruptible power. This Controlled Area Network is synchronized with vigorous calculation that can permit smooth exchange of burden from secluded mode to Grid tied mode. This becomes challenging when availability of power grid is irregular and becomes more complex when power grid is weak. Therefore, the authors proposed Grid Synchronization technique based on network communication. This system is constrained by detecting three stage matrix voltages, inferring the stage point and transmitting the data from system to every small scale source. The receiver micro source receives the data with small time latencies. Therefore, the proposed work outperforms extremely well in limiting the time required for Grid Synchronization, energizing the power equally and then presenting all simulated results of entire micro grid system.

Zeng& et.al aims to develop cost efficient resource management cyber systems for medical applications. In recent years, more smart devices gets penetrated into human body to promote life easier. For growing healthcare trend and for high medical demand, cyber physical systems came into existence that can empower consistent savvy association between computational components and the restorative gadgets. This proposed system also

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overcomes the drawback of unstable long delay links between medical devices and cloud data center. This article successfully exposes promising solution with the help of mobile edge computing and fog computing. This work mainly concentrates on base station involvement in task distribution, association and virtual machine replacement in a cost efficient manner. This work was first formulated as mixed integer nonlinear program and then converted into linear mixed integer programming. This overcomes high cost significantly outperforms in providing optimal solution to address the computation complexity to greedy approach.

Feng& et.al proposed fault tolerant computer systems with the help of dynamic fault graphs. This work is mainly important for analyzing designing safety computer systems and extremely important for protection systems. Their proposed work concentrates on developing dynamic fault graphs. This DFG marks fault state sequences as events and represents them as dynamic behavior, calculates probabilistic measures at each timestamp whenever changes occurs. Therefore, this system outperforms well in dependability analysis. Along with this, it combines reliability analysis with system dynamics. The proposed work also combines phases of modelling, structural discovery and probability analysis for calculating overall system dependability. This overcomes software induced failures as well as hardware induced failures and operate successfully with safety at any active phase.

Rajan& et.al noticed the emerging demand for computing resources and network capacity. Thus provided solution for this challenging issue. Their proposed work concentrate on Utility Computing service. This paper showcases the ability of accessing computing services, business processes and applications from a network. This enables the customers to be aware of on demand provisioning of IT resources. It shows different ways in which the users can build, deploy and maintain large applications without investing and enables them to operate physical resources themselves. This paper mainly describes the approaches and challenges in building a computing platform. The proposed work concentrates on Utility Computing in web development. They addressed several issues like Application Distribution, Resource isolation, Resource Distribution and Request Distribution. This paper shows how Utility Computing overcomes all above said issues by managing them in a reliable, secured highly scalable environment by providing even Disaster Recovery options.

Iosup& et.al presents an overview of the most eminent characteristic of grid workload. Since assortment of lattices have been constructed worldwide for researchers, engineers, scholarly purposes and for general creation work, it becomes extremely important to understand grid workload. This is necessary to design and tune the future grid resources, manages and applications for commercial purposes. This paper mainly focuses on assigning the workloads efficiently to tasks so that only few parallel jobs will run where many single tasks are grouped into a bag of tasks. This paper describes how memory management, workload distribution and parallel processing can be done efficiently with the help of Controlled Indexing and Non-controlled Indexing approach. This work outperforms well in workload analyses, characterization and computing the number of parallel tasks.

Sulieman& et.al proposed intelligent system for inter domain analysis of Grid System to identify the dependencies among them. The primary thought of this paper is to beaten the absence of normal vision and comprehension of Smart Grid reference design. This Smart Grid understanding knowledge is insufficient because of development of numerous Smart Grid independent architectures. Therefore, there is lack of dependencies in understanding business and technical domains with Smart Grid infrastructure. Therefore, inter domain analysis for complex dependencies is being proposed to analyze Smart Grid architecture using domain-link matrices. This proposed system clarifies the doubt and bridges technical architecture. Therefore, it becomes easy to provide solutions to the problem raised in business domain from technical domain. This work greatly

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enhances and refines Smart Grid references architecture.

III.PROPOSED WORK & RESULTS

The proposed architecture is designed to handle the existing anomalous data traffic and the future expansion, growing in geometric progression.

To design and develop a new Web Server based on the Cloud Computing environment, popular scheduling algorithms, Weighted Fair Queuing embedded in Grasshopper Optimization with one new scheduling method, oppositional is used to reschedule the user requests to do the server scalable and highly secured by end to end encryption of the users request. By employing these two algorithms , we have coined a new Algorithm known as Weighted Fair Queue Grasshopper Optimization Algorithm, (WeFGO).

As the Internet is swelling in multi dimension the QoS support in web server is winding up noteworthy. In any case, the usage of a fine-grained QoS control model in the e-business servers is a difficult assignment. Weighted Fair Queue Grasshopper Optimization Algorithm, WeFGO will be used for this task. Our proposed algorithm aggregates Priority queuing and Dynamic Fair Queuing scheduling algorithms.

Service Level Agreement (SLA) turns into a key factor in the specialist organization's contributions. SLA the executives will permit specialist organizations to offer various degrees of administration ensures and to separate them from its rivals. By this way the SLA will improve their customer satisfactions and expectations. In this way various activities are right now attempted to determine SLAs and to recognize the new difficulties for the supplier's administration and system the board.

The infringement of the Service Level Agreement (SLA) is a noteworthy part of this web server and the infringement prompts the decrease of client fulfillment level and further influences the cloud supplier prompting punishment. Here the SLA violation is monitored by the violation agent and the violation agent provide the remedial measures for the SLA violation. In our proposed technique two types of remedial measures has to be taken for SLA violation which is penalty enforcement between parties and profit. With an aim to improve the customer satisfaction level and an effective utilization of resources over a specified deadline and sharing of idle resources which may impact on avoidance of SLA violation. The performance of the proposed work is evaluated by various performance measures.

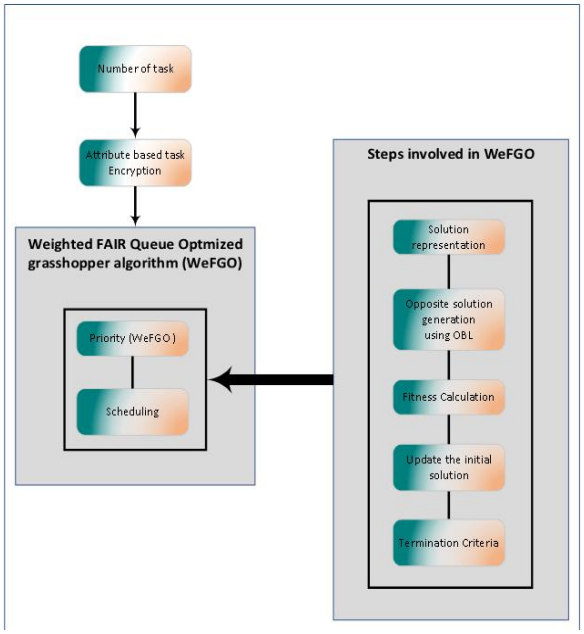

Fig1. Flow of WeFGO

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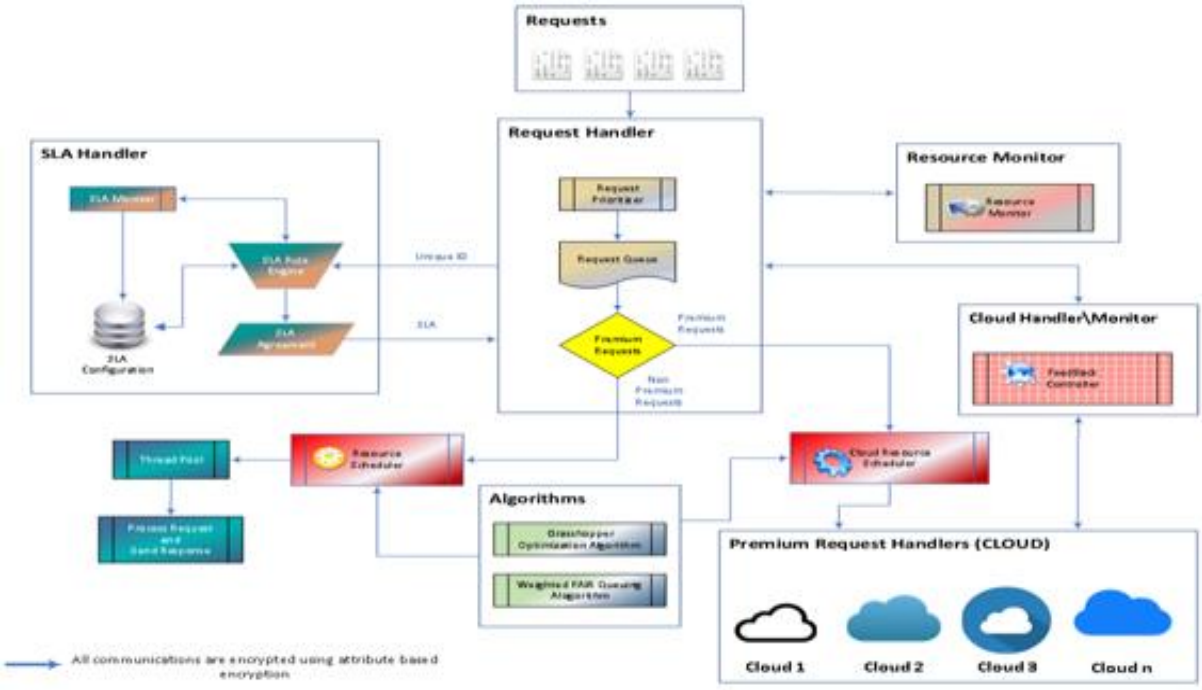

Fig 2. Overview SISSA Web SeRver

IV.WEIGHTED FAIR QUEUE GRASSHOPPER OPTIMIZATION ALGORITHM (WEFGO)

The proposed technique, Weighted Fair Queue Grasshopper Optimization Algorithm is to select the optimal priority selection. Grasshopper Optimization Algorithm is one of the ongoingcalculation for streamlining. The grasshopper algorithm is modified by means of a strategy Problem Based Learning, which is increase the searching ability. The WeFGO algorithm works based on the behaviour of grasshopper swarms. In this method, Weighted Fair Queue is embedded in Grasshopper Optimization with a new scheduling method, oppositional is used to reschedule the user requests to do the server scalable and highly secured by end to end encryption of the users request. By employing these two algorithms and we have coined a new Algorithm known as Weighted Fair Queue Grasshopper Optimization Algorithm, (WeFGO).The grasshopper is utilized to speak to the Process priority it is represented by binary value. The objective function is defined as the Maximize the Profit of each process.

The accompanying advances are utilized to choose the ideal Priority timetable dependent on benefit. The numerical model utilized to reproduce the swarming conduct of oppositional grasshoppers is exhibited as pursues,

Step 1: Solution representation

To improve the Process plan, GOA calculation at first makes subjective populace of arrangement. Arrangement creation is a significant advance of improvement calculation that distinguishes the ideal arrangement rapidly. In GOA, we arbitrarily instate the situation everything being equal. Here, every person in the swarm is treated as a grasshopper in a D-dimensional hunt space.

Table 1: Initial solution format

No	PD^1	PD^2	PD^3	...	PD^{ij}
A_{11}	1	0	1	...	1
...	...	...	...	...	...
A_{ij}	0	1	1	...	0

Table 1 shows the initial solution format. Here, each process has its own priority based on time, cost and memory. Among them we select the

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optimal Process priority. In Table 1, the value "1" represent the corresponding process is selected and "0" represents the process is not selected.

Step 2: Opposite solution generation

After the underlying arrangement age, we make a contrary arrangement .

condition (4.1). Here, each arrangement A_{ij} has a remarkable inverse $^{A'ij}$ arrangement.

The contrary arrangement OP ($^{A'}_{11}$, $^{A'}_{12}$, $^{A'}_{13}$,.... $^{A'}_{1n}$) is determined dependent on the condition.

$$A_{ij}^{'} = L_{W_i} + U_{P_i} - A_{ij} \quad (4.1)$$

Where, L_{W_i} speaks to the lower bound coefficient, U_{P_i} speaks to the upper bound coefficient, Aij speaks to the old arrangement. At that point, we join the underlying and inverse answer for further preparing.

Step 3: Fitness calculation

In the wake of creating the underlying arrangement Aij, the wellness of the arrangement is assessed. The determination of the wellness is an essential perspective in GOA calculation. It is utilized to assess the bent (goodness) of applicant arrangements. Here, mistake worth is the principle criteria used to plan a wellness work. The wellness calculation is executed for every arrangement. For every emphasis, the wellness is determined utilizing condition (4.2),

$$\text{Fitness} = Max\,\text{Pr}\,ofit \quad (4.2)$$

Step 4: Updation using grasshopper optimization

In the wake of, figuring the wellness esteem, we update the arrangement dependent on grasshopper advancement calculation. The Updation condition is given in condition (4.3).

$$A_i = S_i + G_i + W_i \quad (4.3)$$

Where, Ai represents the position of the ith grasshopper, Si is the social interaction, Gi is the gravity force on the ith grasshopper and Wi shows the wind advection.

$$S_i = \sum_{\substack{j=1 \\ j \neq i}}^{N} s(d_{ij})\hat{d}_{ij} \quad (4.4)$$

$$d_{ij} = |A_j - A_i| \quad (4.5)$$

$$\hat{d}_{ij} = \frac{A_j - A_i}{d_{ij}} \quad (4.6)$$

where, d_{ij} is the separation between the ith and the jth grasshopper and s is a quality of social power. The gravity power (G_i) is determined utilizing condition (4.7).

$$G_i = -g\hat{e}_g \quad (4.7)$$

Where, g is the gravitational constant and $\hat{e}_g$ shows a unity vector towards the center of earth. The wind advection W_i is calculated using equation (4.8).

$$W_i = u\hat{e}_w \quad (4.8)$$

Where, u is the constant drift and $\hat{e}_w$ is a unity vector in the direction of wind. The substituting values S, G and A in equation (4.9).

$$A_i = \sum_{\substack{j=1 \\ j \neq i}}^{N} s(|A_j - A_i|)\frac{A_j - A_i}{d_{ij}} - g\hat{e}_g + u\hat{e}_w \quad (4.9)$$

Where, $s(r) = f e^{\frac{-r}{l}} - e^{-r}$ and N is the number of grasshopper. Using equation (4.9), we can update the solution.

By utilizing the above condition, grasshoppers rapidly arrive at the safe place and the swarm doesn't join to a predetermined procedure. So as to survive this issue a modified version of this equation is described below,

$$A_i = C\left(\sum_{\substack{j=1 \\ j \neq i}}^{N} C\frac{U_P - L_W}{2} s(|A_j - A_i|)\frac{A_j - A_i}{d_{ij}}\right) + T \quad (4.10)$$

Where T speaks to the objective or best arrangement.c is a diminishing coefficient to contract the safe place, aversion zone, and fascination zone. The coefficient C lessens the

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safe place corresponding to the quantity of emphasess and is determined as pursues,

$$C = C_{\max} - t\frac{C_{\max} - C_{\min}}{t_{\max}} \qquad (4.11)$$

Where $C_{\max}$ represents the maximum value and $C_{\min}$ represents the minimum value. And t represents the current iteration and $t_{\max}$ represents the maximum iteration.

Step 5: Termination criteria

The algorithm stops its implementation only if maximum number of iterations is attained and the solution which is containing the best fitness value is chosen as the optimal process schedule.

The server offloading thread-based model Scalable Internet Server System Architecture (SISSA) for enhancing the web server was designed to provide a high performance lightweight user level threading system trying to overcome the previous drawbacks of similar threading packages. It scales well up to 100 thousands threads also it is an easy integration with existing applications. It also features cooperative scheduling, asynchronous I/O operations and resource aware scheduling. Most of these features are available via code Analysis and automatic source changes. The SISSA server system comes to prove that the model is adequate for high performance computing (in this case of internet services) but the problem that prevented its high scale usage is the poor implementation of current threading packages. By reducing the common operations in the scheduler and minimizing the number of context switches and additional kernel crossing it can match the performance of event based systems. The linear control flow introduced by threads is not regarded as a limitation but a natural way of thinking and easier programming. Our effort is to enhance the adaptability of the server framework by utilizing both server offloading and advancement grasshopper calculation. This should be possible by deploying in cloud with schedule planning. The Resource scheduler is intended to extricate data about the stream of control inside a program with the end goal to settle on planning choices dependent on anticipated asset use.

The calculation stops its usage just if greatest number of emphases are accomplished and the arrangement which is containing the best wellness worth is picked as the ideal procedure plan.

V.CONCLUSION

From the statistics provided above, we can now see that by deploying the web server as per our proposed design, a great level of performance can be achieved and much of static website content delivery is offloaded to the other cloud nodes in the system. The web server would now be scalable to service a huge load as most of work is offloaded to cloud nodes and the server now concentrates only on critical transactions, authorization and accounting.

Denial of Service is avoided due to cloud deployment. All other Dos attacks (Ex. TCP Syn flood attack) will be handled by the firewall in Load Balancer. Overload protection is handled by replicating the website at multiple geos. Admin access is enabled even during heavy load through a reserved pool thread.

The QoS Based Scalable Server framework gives exact proof that settling string bundles is a reasonable Solution to the issue of building Scalable, high-simultaneous Internet Servers. It mostly controls the over-burden Web page assurance utilizing a multithread. By decoupling the string implementation from the working System itself, it can exploit New I/O instruments and compiler Support.

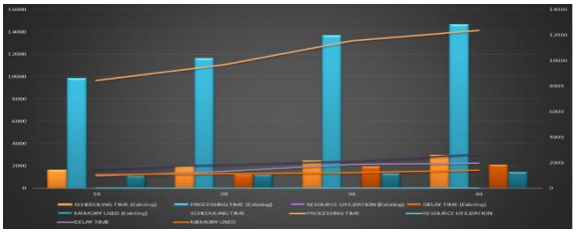

Fig 3. Performance analysis of SISSA Web Server

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VI FUTURE WORK

In near future by 2020 the next generation 5G will come out. Industry people predicted that around 1.5 GB data will be consumed by a person per day during 2020.

There is no clear picture about what the future Internet will look like. It is predicted that more than half of the world's population now lives in cities. Today, around 55 per cent of the world's population are living in urban area or city. United Nations says that two-thirds of global population will live in cities by 2050, i.e. by mid of this century this figure could reach 68%.

By 2020 it is estimated that around 50 billion devices will be connected to the Internet. During that time we can see interrelated computing devices, digital machines, objects, animals and people will be given a unique identifier.

The Internet of Things (IoT) is a network of Internet connected objects able to collect and exchange data by itself, they can transfer data over a network without requiring human to human or human to computer interaction.

In such a situation the existing scheduling algorithms will be obsolete or inadequate. In this critical position to handle the abundant data, a new system has to be developed. Hence the researchers has to develop a new computing/re-scheduling methods which will be going to store and process the abundant data partially by centralized system and partially by decentralized distributed infrastructure. For this purpose the proposed web server will be enhanced to resolve in new dimension manner with more about data centric and may evolve with latest technology.

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