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Cloud Service Selection and Experimentation: EAGLTS

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Abstract

Cloud computing technology has captured the market these days. Cloud resources are offered as services and the payment is based on their per usage consumption. The increasing number of cloud vendors offers different services having different parameters and with varied quality. Cloud users according to the requirement rents the services which can fulfills their application demands. The challenge arises how to select the services which can meet the criteria of the user. In this paper we present the cloud service ranking algorithm which show the process of effective ranking of cloud services.

Keywords: Cloud computing, Multi-Objective Optimization, Quality of service (QoS).

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INTRODUCTION

Cloud computing offers the resources which can be accessed through internet and no extra infrastructure is required to access the resources [1]. Cloud model offers the accessibility of the required resources as an when required to its user in the flexible and scalable manner [2]. Cloud computing technology is dependent on service oriented architecture and virtualization technology [3]. The resources related to hardware, software, storage, network, database taken by the cloud user is offered by the provider in the form of "as a service" model [4]. Due to the increase in services offered by the provider these days , it becomes difficult for the cloud user to select the services which can fit into their resources and applications requirement in terms of quality [5]. Due to the diversity of services offered by the provider increases the complexity and challenge for the cloud user in identifying and selecting the cloud service for their requirement based on the quality of service. Therefore in order to assist user to in identifying services as per their requirement from the huge list of available services, different ranking techniques, algorithms, frameworks for the selection of cloud services are proposed and designed [6,7].

The cloud computing provides a dynamic environment in which if the services are not selected properly it can lead to poor results in terms of resource consumptions, cost etc. Therefore the services offered through provider should meet the QoS requirements of the user. The raking of the services can be done through the metrics associated with these services [8].In order to ensure flexibility, reliability of both objective and subjective attributes [9] the requirements of the customers should be satisfied. Cloud service ranking can be classified into 5 stages : receiving the requirements from the users. Evaluation of different QoS parameters through some benchmarking tools [10], selection of the services through the users ranking, final ranking services as per evaluation[11] and checking the accuracy of the computed ranking.The user of cloud services have different requirements, which can be classified into crucial requirements and are important for ranking the services and other are non crucial requirements which are not of high significance and in their absence it will not impact the service ranking [12].

The paper proposes the flowchart for ranking all types of cloud service. The purpose of the framework is to rank cloud services based on QoSattributes and will consider both objective and subjective attributes. The application of the proposed framework and the limitation of proposed framework is identified and discussed.

In Section 2 gives an overview of cloud service selection, objective and subjective attributes, critical and non critical requirements. Section 3 exploits the existing cloud service ranking framework given by different authors, the limitations are also mentioned in this section. The proposed cloud service ranking framework is discussed in section 4.The comparison between the existing framework and the proposed framework is discussed in section 5. The conclusion and future research in the area discussed in section 6.

CLOUD SERVICE SELECTIONATTRIBUTES

Cloud service selection is based on the user requirement for the services. The main objective of cloud service selection is the selection and ranking of the service which can meet the requirement of cloud user by meeting the quality of service demands. The output of the service selection shows the user customized requirements.

The important issue related to the service selection is finding out the criteria for the service selection and whether the ranked services can satisfy the need of the customers. There are various QoS parameters discussed in various service models in the literature. The globally acknowledged model for cloud services is service measurement index (SMI) proposed in [13] where the attributes are divided into seven categories [4]. The attributes discussed in SMI model are accountability, agility, assurance, financial, performance, security and usability.

RELATED WORK RELATED TO CLOUD SERVICE SELECTION

The cloud computing services are evaluated and compared by many researchers through various benchmark and measurement tools [14]. Some of the tools used the comparison of the services and some tools tank the services. The tools are uses various quality of service parameters values then compare and rank the services according to user requirements.

Cloud Sleuth monitoring tool [15] is developed by the company Compuware which identified the problem related with the cloud provider in terms of reliability and consistency for both the IaaS and PaaS [16] provider.

Cloud Harmony [17] is another tool for evaluating cloud service performance. The measurement tool helps in measuring which can be accessed by the cloud user through internet. The evaluation of the services are represented in form of graph and tables which facilitates the comparison when the user select the single attribute for several services.

Yuchen Pan [18], proposed trust enhanced similarity cloud service selection model based on QoS analysis. The author developed the complete model through steps, in step 1 the author divided the trust degree into three parts direct, indirect and hybrid. The trust degrees of all the three parts are measured by analyzing the number of times of their interaction frequencies.

Elmubarak et.al. in [19] proposed the performance based ranking model for SaaS cloud services for helping users for selecting the cloud providers on the basis of measuring performance attributes. The author used cloud service ranking method which arranges and classifies various cloud services of cloud and then computes the ranking of the services as per the requirement of the customers. The proposed model mixes the attributes from two different fields one is cloud computing and other is from software engineering.

EGALT is the educational learning tool for genetic algorithm and is developed by Liao and Sun . The tool has various parameters and eleven testing functions which help in evaluating the performance at various levels. This tools helps in discovering the results for various application domains.

EXPERIMENTS ON VARIOUS PARAMETERS THROUGH EGALT

We will discuss various cases in the experiments to identify the results

Case 1:

Selection – Elitist Preservative

Crossover- Single Point

Crossover Rate:- 0.6

Mutation – None

Mutation Rate – 0.01

De John's Test Function (DJTF) 4

Generation Number -100

Time - In sec

Speed – Generations/Sec

Table 1: Experimental Results with Single Point Crossover

Pop Size	DJTF 4 For Generation 100	Time (Sec)	Speed (Gen/ Sec)
100	100	0	0
200	100	1	52
300	100	1	47
400	100	1	49
500	100	2	47

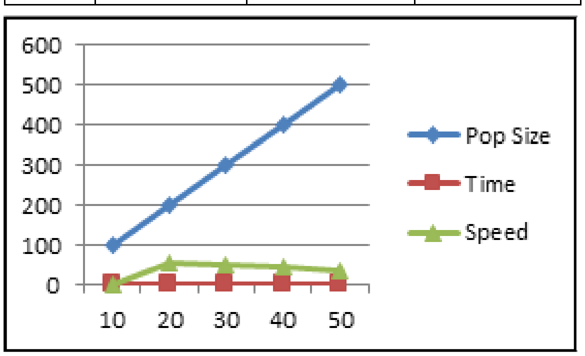

Figure 1: Obtained Result of Speed, Time and Population with Single Point Crossover

Case 2:

Selection – Elitist Preservative

Crossover- Two Point

Crossover Rate:- 0.6

Mutation – None

Mutation Rate – 0.01

De John's Test Function (DJTF) - 4

Generation Number -100

Time - In sec

Speed – Generations/Sec

Table 2: Experimental Results with Single Point Crossover

Pop Size	DJTF 4 (For Generation= 100)	Time (Sec)	Speed (Gen/ Sec)
100	100	1	87
200	100	1	77
300	100	1	63
400	100	1	62
500	100	2	36

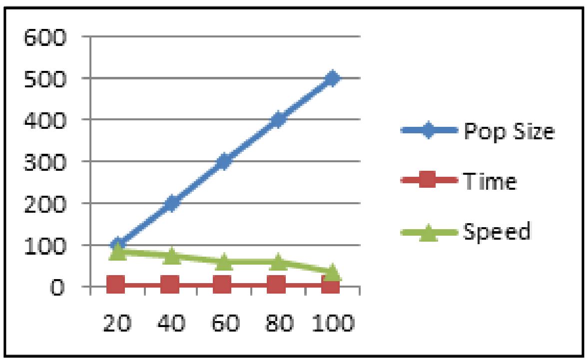

Figure 2: Obtained Result of Speed, Time and Population with Double Point Crossover

CASE 3:

Selection – Elitist Preservative

Crossover- Two Point

Crossover Rate:- 0.6

Mutation – None

Mutation Rate – 0.01

De John's Test Function (DJTF) - 4

Generation Number -100 -500

Time - In sec

Table 3: Experimental Results with Change in Generation

Pop Size	DJTF 4	Time (Sec)	Speed (Gen/ Sec)
100	100	0	0
100	200	1	34
100	300	1	61
100	400	1	128
100	500	2	271

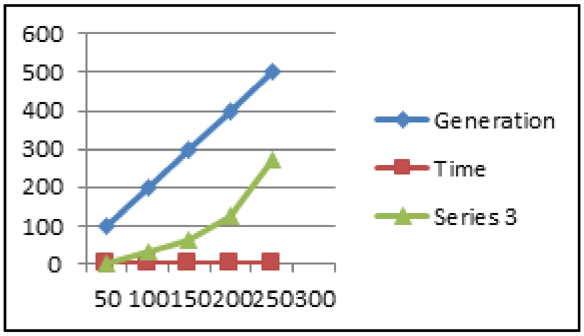

Figure 3: Obtained Result of Speed, Time and Generation when the Population Size is Fixed and Single Point Crossover

RESULT

Using EGALTS for the result analysis tool shows that in case 1 and case 2 all the parameters are kept same except the crossover operator which is changed from single point to two point. The change in the crossover will impact the speed parameters and the change is visible from case 1 to case 2. In case 3 , the population size is kept constant and the number of generation keeps on increasing from 100 generations till 500 generations, the speed (gen/sec) is seen increasing.

CONCLUSION AND FUTURE RESEARCH

There exists various service selection techniques, algorithms and toolswhich work on different quality of service and have different constrains. The literature shows that these algorithms have high computational complexity and lacks the elitism approach. In future the limitation of the existing algorithms should be removed and an efficient algorithm can be designed which can resolve the problem of complexity, preserving good solutions in case of multi-objective approach also meeting the demand of the users.

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