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A Framework for Selecting Suitable Software as a Service

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Abstract: Cloud computing is tremendously attractive as it enables a fundamental shift from capital intensive focus to a flexible operational management model. It is typically characterized by on-demand computing paradigm based on pay per use pricing model. SaaS is delivered over the internet where the software is hosted by someone else's system and delivered via web, on consumer's demand. These days, many service providers are available to serve SaaS services. Customers need to choose the appropriate SaaS provider for fulfilling their requirements. It is difficult to adopt appropriate SaaS service for a consumer. This paper aims to design a framework named ASMAN framework, enables a SaaS consumer to adopt appropriate Software as a Service (SaaS) by comparing various parameters of different SaaS providers.

Keywords: Cloud computing, software as a service, cloud service provider, users, parameters.

I. INTRODUCTION

The software as a service (SaaS) model is a way of providing the same software to different customers via a network, usually the Internet. In other words, the software is not hosted on the customer's individual computers. Under the SaaS model, a vendor is responsible for the creation, updating, and maintenance of software. Customers buy a subscription to access it, which includes a separate license, or seat, for each person that will use the software. [1] SaaS shifts software deployment and maintenance burdens to the service provider, freeing up resources for other projects. IT is at the mercy of the provider for availability, data security, regulatory compliance, and other key issues. [2] The basic idea behind Software as a Service (SaaS) is simple with SaaS, an entire finished application can be available on-demand from some SaaS vendor. The application exists in the cloud (not in an on-premise datacenter) and can be consumed from any browser. Therefore, the customer of a SaaS vendor is the end user. [3]

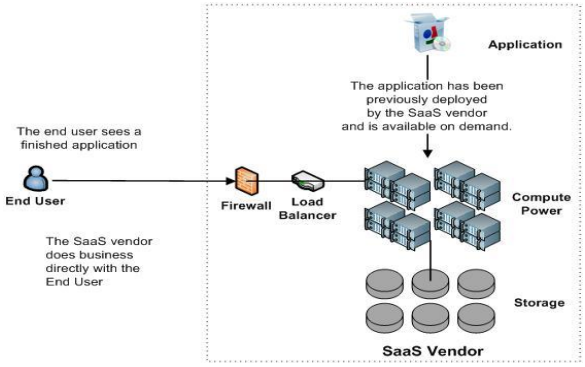

Figure 1 – Software as a Service [3]

There is a broad spectrum of different types of software solutions offered by a third party provider, available on demand, usually accessible via Internet, e. g. office (Zoho Office, Google Aps), CRM (Saleforce.com), ERP (Workday), and HRM services (Human Wave). [4]

This is shown in Figure 1. Here we see that the SAAS vendor is not only offering an entire application to the end user but that the SAAS vendor is also responsible for providing the compute power, storage, and networking infrastructure necessary to run the application. [3]

II. RELATED WORK

Manish Godse adopted AHP [Analytical Hierarchy Process] method to understand the parameters satisfying the application requirements. These parameters are discussed with the experts and, hierarchy is developed. The survey instruments of AHP are developed from this hierarchy, which allows assigning weights to attributes in view of the interdependencies among them. This work suggests the use of AHP as the quantitative technique to address this issue. They have used AHP to calculate weights of selection parameters and scores for products. These weights and scores are more rational than subjective opinions. [5]

Elarbi Badidi proposed a framework for SLA-based service provisioning. The main components of the framework are: Service consumers (SCs), Cloud Service Broker (CSB), Measurement Services, and SAAS Providers (CSPs). The framework relies on a cloud service broker, which is in charge of mediating between service

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customers and SAAS providers and negotiating the SLA terms. The proposed SAAS providers selection algorithm uses a linear aggregate utility function, which assumes that the various QOS parameters are independent, to rank the potential SAAS offering by matching them against the quality requirement of the service consumer. [6] A. Li et al. [7] [8] [9] developed CloudCmp a promising system for comparing offers from cloud providers in terms of performance and cost.

J.Jagadeesh Babu and Mr.P.Saikiran reviewed the technical service aspects of different Cloud providers and presented the comparisons of these selected services offerings in cloud computing. By this User can have good understanding regarding the services which are- provided to avoid bottlenecks and obstacles that could limit the growth. This comparison of cloud service providers serve as a starting point for user who is looking for a service and provide a wide range of SaaS providers for selecting the best one for their need into cloud environment. [10]
Mehul Maharishi proposed a scheduling algorithm for Cloud Broker, which exists between the CSPs and Users. The user/tenant need not to identify the service requirements before submitting their job to the cloud. This is the job of middleware to implement the algorithm and rate CSPs on the basis of their capabilities. All the user/tenant needs to do is to fill the feedback form correctly as to improve the CSPs performance in the future. [11]

Amrutha, K. K proposed a cloud broker algorithm which finds out best cloud service providers based on its performance. Broker ranks the providers based on some constraints (cost and performance). Proposed brokering method selects some QOS parameters for choosing the best cloud provider among many providers. The parameters are response time, interoperability, suitability, cost of service and customers feedback. The analysis on this proposed approach shows that the ranking of cloud service providers based on QOS parameters is more effective and efficient. [12]

Schlauderer, Sebastian and Overhage, Sven, wrote an article named "Selecting Cloud Service Providers - Towards a Framework of Assessment Criteria and Requirements" In this manuscript, they address the question of how to support the evaluation of software service providers. Building upon a design science research approach and a literature survey, they propose an assessment framework that assembles relevant criteria for the evaluation of software service providers. They examine the practical relevance of the assembled criteria using the results of an empirical study, in which they surveyed 28 experts on the subject matter. The results indicate that the framework is effective in supporting the assessment of service providers... [13] Liu, Y., Esseghir, M. and Boulahia, L discussed that how does evaluation of parameters are important in cloud service selection. In this paper, they propose an assessment method of parameters importance in cloud services using rough set theory. The method can effectively compute the importance of cloud services parameters and sort them. On the one hand, the calculation can be used as the credible reference when users choose their appropriate cloud services. It can help cloud service providers to meet user requirements and enhance the user experience. The simulation results show the effectiveness of the method and its relevance in the cloud context [14]

III. RESEARCH METHODOLOGY

The selection of best possible SAAS product satisfying most of the requirements from available alternatives is a crucial problem. This problem needs thorough understanding of requirements and product offerings. The selection process involves multiple criteria and multiple products; hence, selection based on judgements fails to identify suitable choice. The ranking process requires a crucial step of prioritizing the parameters and products. This step is usually performed manually and may be judgmental or based on some judgmental scales.

The methodology adopted starts with the literature study to understand the parameters satisfying the application requirements. These parameters are discussed with the experts.

A. SaaS product selection parameters

1) Cost: Cost mentioned here is the cost of cloud services .There are many number of cloud providers which provide the similar kind of services. Example, Amazon cloud offers small vim's at lower cost than rack space. But the amount of data storage, bandwidth etc differs .Based on users requirements the lowest cost and best service provider should be selected based on cost.

2) Speed: Speed of SAAS provider can be measured in terms of response time. Response time is the time between the user request and time taken by the SAAS provider to deliver the service .Always customer will look for a provider who provides services in less time. So in order to get better performance service response time should be less. So that services will be available for end users faster.

3) Usability: Usability defined by two attributes, effectiveness and efficiency of SSP's provider, effectiveness defined how many task are completed successfully against total number of task given by SSP's, and efficiency is the task time.

4) Reliability: Software Reliability is the probability of failure-free software operation for a specified period of time in a specified environment. R = MTBF/ 1+MTBF

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5) Availability: Availability of the module is the percentage of time when system is operational. Availability of a software module can be obtained by this formula: A= MTBF/MTBF+MTTR

B. Proposed ASMAN Framework [Appropriate Selection of SAAS Model According to Needs]

This framework provides optimal software as service provider selection from the more number of SSP's. Quality of service parameters provides better selection of SSP among many. The proposed model uses: Cost, Speed, Usability, Reliability, Availability. This architecture contains three-tiers: Application Layer, Business Logic Layer and Database Layer (figure 2). In first layer, user inputs parameters for searching SAAS and submits form online for processing. Then all the parameters are processed and compared at Business Layer and values of these parameters are fetched from the database. Lastly the output is provided to the user and rating is submitted to the database.

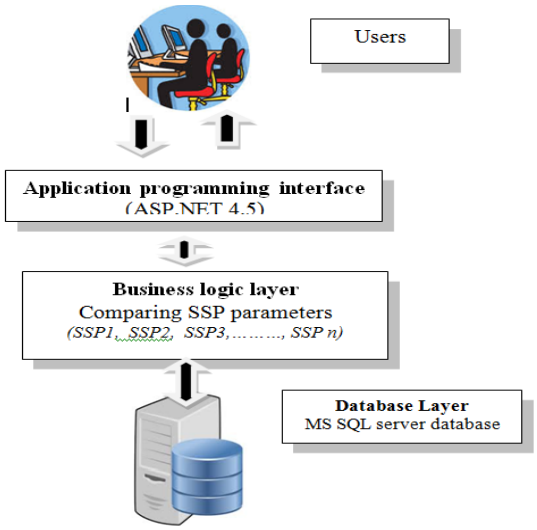

Figure 2- ASMAN FRAMEWORK 3 – tier architecture

1) Application layer

In this layer, user inputs parameters for searching SaaS and submits form online for processing. It allows user for two types of search; Basic search Advanced search. In Basic search user can input parameters based on type of SaaS provider or company name. User submits the form for processing on online server. (Server extracts relevant output to user based on inputs supplied by user.)User Views the output response. In Advanced Search, User selects advanced search link to home page provided link. Extended search functionality is visible to user, wherein user can enter following parameters: which SaaS to search, cost range / pricing Model, by rating and user reviews, by describing key features. User receives the output response and detail of SaaS Service. User hits the button/ link provided to view SaaS service detail. Server processes the request and sends the details of chosen SaaS service to user. This includes various metrics based content or detailed contents on chosen SaaS service.

2) Business logic Layer

All the parameters are processed and compared at Business Layer and values of these parameters are fetched from the database. User selects at least 2 distinct SaaS services for comparison. User submits request to compare. User views the comparison output based on selected SaaS Services. This includes various metrics based content or detailed contents on comparison. User selects SaaS service to add review and rating. User submits the rating and reviews form to server for processing. User receives response of his last action. At last, the output is provided to the user and rating is submitted to the database.

3) Database layer

In this layer, server receives the search request; it facilitates two distinct search respectively basic search and advanced search. In basic search, server receives the response in sentence format, server converts string into character/ word arrays, server sends search string array to appropriate search model. Search model sends request to stored procedure that handles the user request and executes the query on Sql tables. In Advanced search, search form is submitted to server containing various parameters for searching SaaS service lists. Form is broken into search strings as applicable to definition of function / method available in search model. Function of search model receives the details and sends it to stored process of Sql server database engine for processing and then executes and creates a temporary table at Sql server running memory. Thereby creates result as per parameters supplied by server model.

IV. CONCLUSION AND FUTURE WORK

As there are many SaaS Providers like Salesforce, IBM, Wipro, HP etc. there have been several important factors, such as cost, availability of services, reliability, usability, speed etc. Therefore SAAS customers find it very difficult to choose the best provider which can satisfy their requirements. Therefore **ASMAN Framework** proposes an effective and efficient way to find best SSP [software as a service provider] based on available parameters. It is greatly useful for SaaS users to identify best SaaS provider without any confusion. This research aims to design a decision making methodology for adopting SaaS introducing by **ASMAN framework.**

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BIOGRAPHIES

Mamta Dadhich completed her postgraduate degree in information technology in 2010. She is having 5 Years of teaching experience. She is currently a research scholar (Computer Science) and her area of interests includes networking and cloud computing. She has published one paper in international Journal.

Dr. Vijay Singh Rathore obtained Ph.D. degree (Computer Science) in 2009. He has published more than 18 papers in National and 50 papers in International Conferences. He is Member of Various Committees of UGC, IGNOU, RTU, UOR, UOK, VMOU, IISU, SGVU, JNU, JNVU, UOJ, JRNRVU, etc... He has completed his bachelor's degree in 1998 and Masters Degree in 2001. He is currently working as Professor-CSE, Jaipur Engineering College & Research Center, Jaipur, and Chairman, CSI (Computer Society of India) of Jaipur Chapter. He is having 16 Years of teaching experience and his interests include network security, Operating System and System Software. He has also wielded his pen for ten books which were later on published.