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RATING THE QUALITY OF SOFTWARE AS A SERVICE IN THE CLOUD: INTRODUCING THE SAAS CLOUDQUAL MODEL

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ABSTRACT: Many businesses rely on the cloud as their primary method of data storage and exchange. Everything as a Service (XaaS) is available. As is well known, software-as-a-service is an important component of cloud computing. Users of a service can use software without having to install it on their own computers. And take use of the advantages of SaaS. Because of the increasing growth in SaaS usage, choosing quality is more critical than ever. This research presents a novel way for assessing the quality of software as a service (SaaS) based on its most important qualities. Because the major traits that differentiate SaaS and contribute to its quality distinguish it from other forms of software.

Keywords: Cloud computing · Software-As-A-Service (SAAS) · Servicequality · Software quality

1. INTRODUCTION

Cloud computing is a sophisticated form of computation that allows users to access resources via a web browser and the Internet. These assets are very scalable and regularly virtualized. In a cloud computing environment, everything is supplied as a service, including the network, infrastructure, platform, software, and applications. SaaS (software-as-a-service) is one type of cloud utility.

Many people use the service, which benefits both users and service providers. Because demand is growing, it is critical to assess the quality of SaaS in the cloud to fully appreciate these benefits. This quality approach also makes it easier to manage quality at the highest level based on evaluation outcomes.

Traditional quality models are incapable of accounting for the specific characteristics of software services. This paper begins with an alternative explanation of the traditional software and service quality paradigm. The paper then goes into additional depth about the suggested model. The report then provides and discusses the findings. The key component is future reach.

2. PROPOSED QUALITY MODEL

Based on quality parameters, this study presents a novel way for evaluating the quality of cloud-based software as a service. The ISO/IEC 9126 Software Quality Model (PERFUME) (25010) There are two types of ISO/IEC standard quality models: quality in use and output quality.

Based on its fixed and variable properties, a product quality model is separated into internal and external models. The quality in use approach focuses on connecting how a product is used to its settings.

The ISO/IEC Standard quality model was then amended to become the 25010 quality model, which could be used to evaluate the quality of software products. Internal and exterior quality characteristics, as well as their sub-characteristics, are equivalent in this paradigm. Quality can be measured in a variety of ways. There are no such things as substandard grades. There are six techniques for evaluating software quality, according to ISO/IEC 9126 standards.

Six primary variables and twenty-four smaller

factors comprise the quality paradigm for software products. A quality model similar to ISO/IEC 9126 is built and used to evaluate software products in this study. Figure 1 displays the distinguishing features.

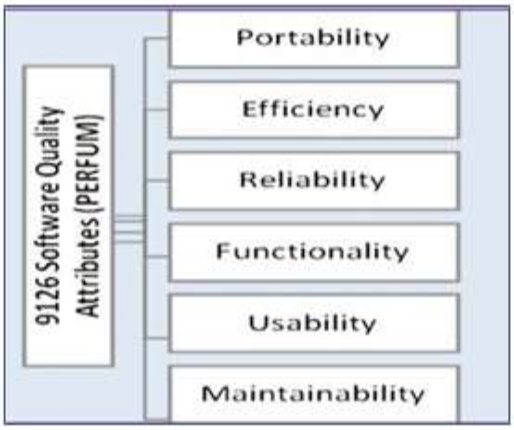

Fig. 1 ISO/IEC9126 quality model

Traditional quality models based on ISO 9126 cannot be used to evaluate the quality of SaaS due to the differences between traditional computing and cloud computing. They do not facilitate the speedy and correct assessment of the obvious quality aspects of cloud computing. A model that can accurately evaluate what cloud-based SaaS requirements are still required. As a result, much effort is being expended in building the quality model required for cloud-based Software-as-a-Service testing.

Service Quality Model: (RATER)

In 1988, Parasuraman and his team created a standard quality model for service evaluation, allowing anyone to assess the quality of the service they are receiving. This machine was composed of five parts. It's called SERVEQUAL, and it's become a popular way to evaluate service quality. According to Figure 2, "the service qualities emphasized are dependability, assurance, responsiveness, empathy, and tangible." Customers' pleasure is becoming increasingly important to businesses all around the world. In addition to SaaS quality, service quality had to be assessed.

Key Features of Software-As-A-Service(SaaS)

Both the SaaS goods and the customer service are excellent. The essential properties of SaaS are critical when discussing the quality of software as a service. Figure 3 displays seven important SaaS properties.

There are several tenants: According to the definition, multi-tenant refers to an idea that benefits a large number of people. The major method for multi-tenancy is software as a service. This means that several end users can use the same application instance at the same time. The service's users all want the same features. Reaction time, throughput, and availability are examples of multidimensional QoS characteristics.

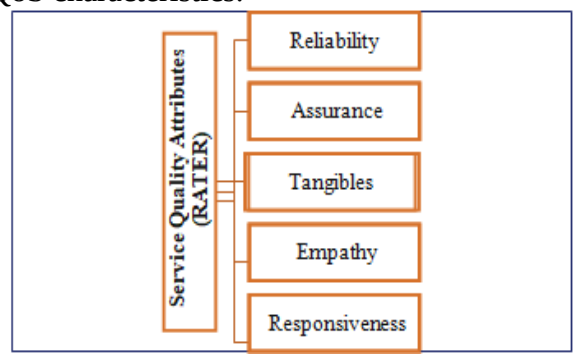

Fig. 2 A model of exceptional service

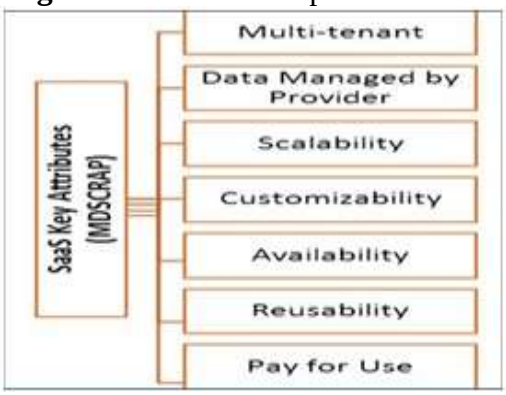

Fig. 3 Significant elements of SaaS

Data Maintained by Service Provider: Customers can obtain permission from service providers at any time and from any location using software as a service (SaaS) models. As a result, service providers will be in charge of data configuration and management. As a result, the majority of user data is safely stored in the service provider's data center.

Scalability: It is a characteristic that customers want in cloud services. In computing, scalability refers to the ability to handle more work or tasks. Users of the service are unable to change the accessible resources. Only service businesses can provide new services when clients want them.

Customizability: This is a mechanism that allows service consumers to transfer services, resulting in better service consumption.

Availability: Customers can use a web browser to connect to SaaS in a cloud computing environment. Individuals who are not business owners can make use of SaaS. In other words, the program must be installed and operating on

the service provider's machine. This is one of the most significant aspects of SaaS.

Reusability: This section covers how to reuse critical software components when constructing new apps. The foundation of cloud computing is the recurrent use of various Internet services. It is critical that cloud-based SaaS be reusable.

Pay-per-use: Prices for software as a service are determined entirely by the quantity of service utilization and have nothing to do with the purchase of the product.

SaaS Cloud Quality Model

The proposed SaaS quality model is based on the software and service quality. The most important aspect of SaaS is the quality plan. This model defines the key components of SaaS and compares them to the software product and service quality models. A number of criteria for evaluating SaaS content have also been created. Figure 4 displays the model's process flow.

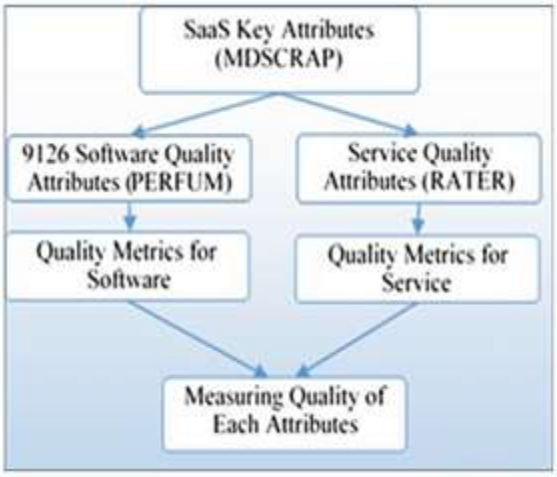

Fig. 4 Workflow has been proposed as a quality metric.

3. RESULTS AND DISCUSSION

Mapping Software Quality Attributes

Standard software product quality attributes based on ISO/IEC 9126 are mapped to the key components of SaaS using the suggested quality model. Figure 5 demonstrates the relationship between SAAS's key components and ISO 9126's quality requirements. The goal of this mapping is to make each significant SaaS feature more useful and to provide a technique for evaluating the quality of the program. As shown in Figure 7, each quality characteristic of the software product quality model is linked to the major SaaS features, and associated metrics are created. This allows you to calculate the software value of each SaaS function.

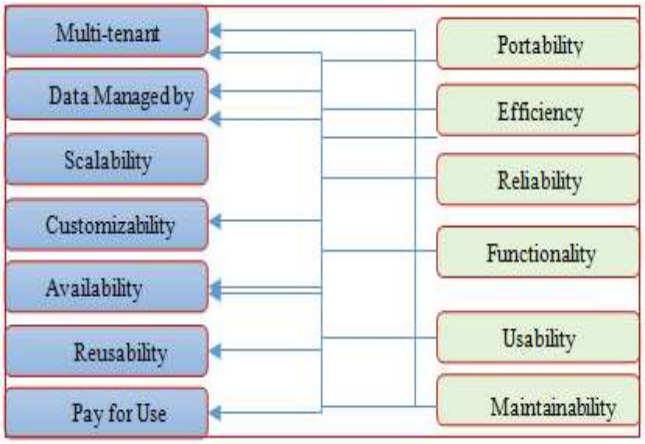

Fig. 5 Qualitative software characteristics mapping

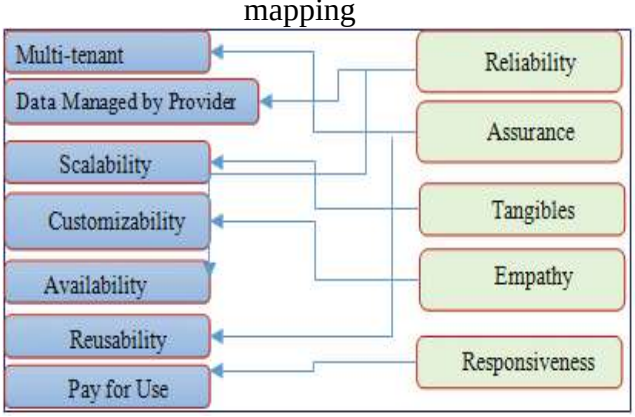

Fig. 6 Qualitative service characteristics mapping

Mapping Service Quality Attributes

The SERVQUAL model is commonly used to evaluate the quality of cloud services since it provides a foundation for service quality. Figure 6 depicts the connections between SaaS components and SERVQUAL attributes.

Derived Metrics

- This mapping's goal is to assign a performance metric to each important SaaS feature. The outcome is identical when each critical SaaS feature is mapped to a quality attribute of the service quality model and the corresponding metrics are determined. This is a sign of superiority. This makes evaluating both the overall quality of SaaS and the quality of its constituent components simple. As shown in Figure 7, a plethora of metrics have been established to assess the quality of SaaS software and services.
- The number of times a program has failed.
- The ability of software to communicate with other software is referred to as interoperability.
- Suitability refers to how well the software performs its intended function.

- The efficiency with which the processes operate.
- The ability to restore a failed system to full functionality, including data and network connections, is referred to as recoverability.
- Making the functioning of a simple system more consistent aids human comprehension and explanation.
- The amount of effort necessary to adapt a piece of code is indicated by its changeability.
- This reflects the difficulty of installing apps.

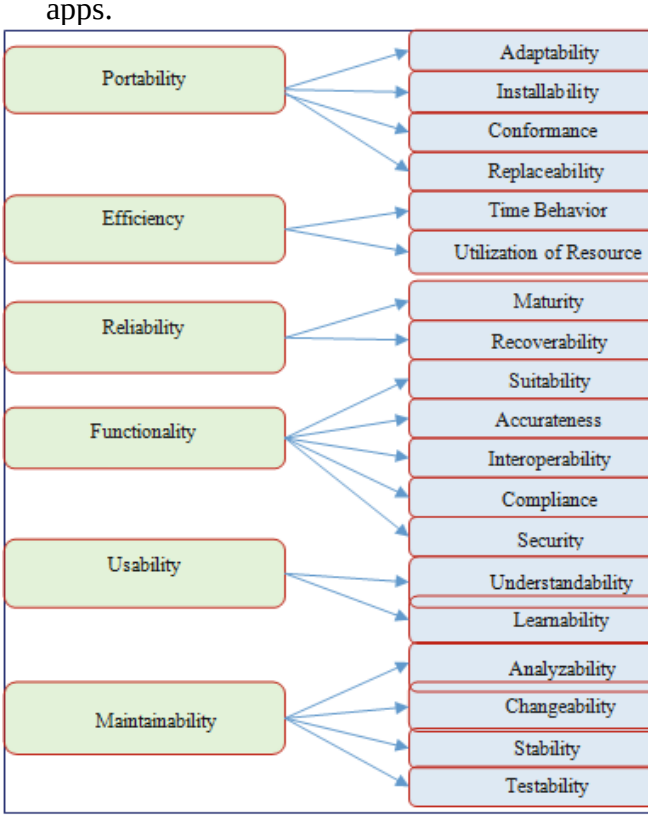

Fig. 7 Created a metric for the features of good software

CONCLUSION AND FUTURE SCOPE

The key components of SaaS have been used to demonstrate the proposed new paradigm. Because SaaS integrates both software products and services, all of the fundamental features that were discovered have been turned into characteristics that both software products and services share. Mapping was utilized to create a metric for assessing the effectiveness of SaaS. The use of this methodology to assess the quality of SaaS is intended to result in the development of automated tools.

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