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Method for Sharing Resources in Collaborative Cloud Computing

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ABSTRACT: Collaborative cloud computing (CCC) has a promising future in the current age of cloud computing. In CCC, resources that are globally dispersed and distributed and that are the property of several organisations are utilised to give services to customers. Due to the self-governing characteristics of CCC's constituent parts, reciprocal communication is necessary to ensure the successful growth of CCC on the problems of reputation management and resource management. In the past, these two problems were tackled together, however doing so now results in double the overhead. As a result, resource management and reputation management solutions are weakly constructed and ineffective. If the client chooses the node with the greatest reputation, the other reputation nodes are ignored, resources are not fully used, and client QoS requirements are not met [1]. We provide an approach called Harmony to get around this. Three steps make up harmony: selecting a multi-QoS-focused resource, price-assisted resource/reputation management, and multi-faceted resource/reputation management.

KEYWORDS: Distributed systems, resource management, reputation management, and cloud computing are some index terms.

I. INTRODUCTION

Cloud computing has developed into a flexible method for offering customers services online. There are several companies offering cloud services, including Amazon, Google, IBM, and others. These service providers assess fees based on how much storage and bandwidth are used, among other factors. When the number of customers is growing, the service provider cannot provide services utilising only one cloud. Additionally, during busy hours, it sometimes is unable to completely offer resources to an application. In order to deliver services, researchers must link several clouds with a virtual lab environment in order to provide customers access to super-computing power and make the most of the available resources. The need for collaborative cloud computing (CCC) has increased as a result of these advances and futures in cloud computing [2]. We are able to serve individuals in situations when a major portion of the resources belonging to several organisations are pooled because to CCC. In order to enable resource sharing in the cloud and provide its customers a virtual picture of the resources, CCC links numerous physical resources. When a client demands resources and the cloud is short on those resources, this viewpoint is helpful. It must locate and use the resources in several clouds [3]. Management of resources and reputation are crucial since CCC operates in a vast environment with millions or thousands of resources that are dispersed globally. It may be seen that a large number of users enter and exit the system, causing a steady fluctuation in resource availability and use. As a result, resource management is made productive. We may assign various Qos parameters to distinctive nodes due to CCC's special characteristics. Due to equipment failure or a lack of readiness, a node may deliver poor QoS in order to save money. This flaw has been exposed in service providers including Amazon, Google [5,] and others. All of these service providers and grids have prioritised security as a key concern [6]. As a result, reputation management is necessary for resource management in order to assess resource supply quality and inform resource selection [2] [5].

II. LITERATURE SURVEY

The authors of the paper "Building a Secure Virtual Organisation for Multiple Clouds Collaboration" discovered that a single cloud's resource capacity is typically constrained and that some applications frequently require multiple cloud centres to deliver services simultaneously over the Internet. They concluded that Virtual Organisation (VO) will be a promising method to integrate services and users across multiple autonomous clouds. They suggested a method for creating a safe virtual organisation to accomplish the collaborative aims, which is a crucial topic that requires proper attention to concerns like membership agreements, policy conflicts, and trust management. For the purpose of offering some adaptable and dynamic VO management protocols for clouds, they provided a framework for cloud VO that is based on security principles and trust management methodologies.

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Researchers discovered that Internet clouds function as service factories built around Web-scale data centres in their article titled "Cloud Security with Virtualized Defence and Reputation-based Trust Management" [6]. Huge datasets handled using elastic cloud resources are vulnerable to copyright infringement, privacy invasions, and security flaws. On-demand cloud services that have been provisioned are particularly susceptible to hacker assaults. These flaws are clearly visible in the cloud systems created by Google, IBM, and Amazon. They suggested a novel strategy for combining virtual clusters, security-enhanced data centres, and dependable data accesses controlled by reputation systems. It is recommended to use a hierarchy of P2P reputation systems to secure data centres and clouds at the site level and data objects at the file-access level. IaaS, PaaS, and SaaS, the three types of cloud service models now used by Amazon, IBM, and Google, respectively, are recommended as different security remedies.

III. SYSTEM DESIGN

to examine and research the reliable cloud computing platform and get a thorough grasp of the ideas, as well as its challenges, issues, and potential for usage in practical applications. Prior approaches have solely focused on reputation management or resource management. The researchers' attempt to integrate both strategies produced a problematic double overhead. In this, the top node is always given precedence over all others when choosing which nodes should get resources. Additionally, it's feasible that it may get overloaded if it consistently chooses the highest node [8]. We provide a method termed harmony to integrate resource management and reputation management, as well as to use all nodes for resource selection.

Following is a summary of this work's contributions:
1. Initial analysis of experimental and real-world data: We examined the transactional and feedback rating information we gathered from an online trading platform. We discovered that certain merchants provide high QoS for some goods while offering poor QoS for others, and that consumers prefer to purchase goods from well-known sellers.
The results demonstrate the value of multifaceted reputation as well as the disadvantage of the highest reputation node selection approach.
2. Integrated multifaceted resource/reputation management: Harmony provides multifaceted reputation assessment across numerous resources by indexing the resource information and the reputation of each kind of resource to the same directory node. Harmony relies on a distributed hash table overlay (DHT). This makes it possible for nodes to obtain the details and reputation of accessible particular resources at the same time.
3. Multi-QoS-oriented resource selection: Harmony enables a client to perform resource selection while jointly taking into consideration a variety of QoS requirements, such as reputation, efficiency, distance, and price, with different priorities. This is in contrast to earlier resMgt approaches that assumed a single QoS demand from users.
4. Resource/reputation control that is aided by price: During a resource transaction, a resource requester pays a resource provider (in the form of virtual credits) for a resource. In Harmony, the transactions are carried out in a dispersed fashion. In order to manage each node's resource utilisation and reputation, Harmony uses a trading model for resource transactions in resource sharing. In order to completely and properly use system resources, it allows each node to adaptively modify its resource pricing to maximise its profit and retain a good reputation while avoiding being overwhelmed.

IV. PERFORMANCE EVALUATION

We used a dual-core CPU, 2GB RAM Windows operating system to evaluate the Harmony design. 12 resource kinds were first generated in our system. We then picked 13 merchants from the Zol trace data with three frequent product kinds in order to compute node overall reputations and individual reputations for these resource types. Then, using various collaborative cloud computing platforms, we linked this trace data to the 13 vendors and their 12 distinct product classes.

We initially compared Harmony to Harmony without reputation management (denoted by resMgt) and the Power Trust reputation management system in order to demonstrate the significance of combining resource management with reputation management [11]. We use Power Trust's structure and resource discovery algorithms to compare the techniques. Only the choice of resources differs between these approaches. After discovering resource providers, Harmony selects the one with the best reputation on an individual basis, Power Trust selects the one with the best reputation overall, and ResMgt selects a provider at random.
Price-Assisted Resource/Reputation Control, Multi-QoS-Oriented Resource Selection, and Integrated Multi-Faceted Res/Rep Management.

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V. RESULTS

Results are based on consumer demand for the goods and how well they serve the user. Figure 3 illustrates how a seller's success as a person relates to the reputation of the product depending on the quality of their service. glimpses of the project are shown in the figures below.

1. Using memory size of 180823 bits in improvised bloom filter

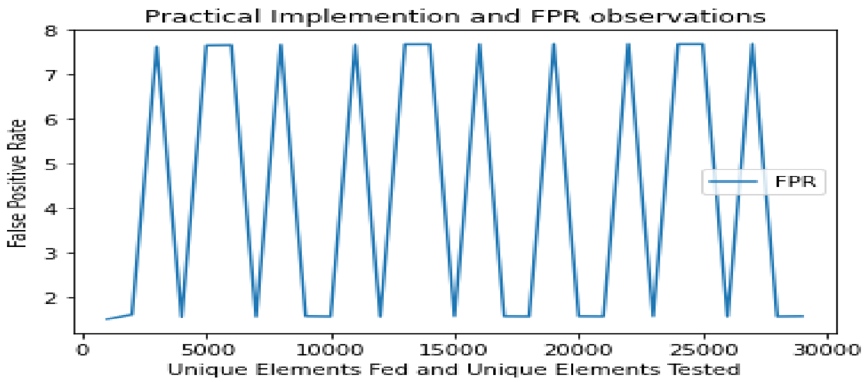

Fig.5.1 FPR for 180823 bits size

Figure.5.1 shows the practical implementation and FPR observations when taking 180823 bits size. In the graph, the X-axis indicates the unique elements fed and unique elements tested, and Y-axis indicates the false positive rates (FPR). The FPR initialized as 5.0 %. And the Practical observation average is 4.302708654133927 %.

2. Using memory size of 97146 bits in improvised bloom filter

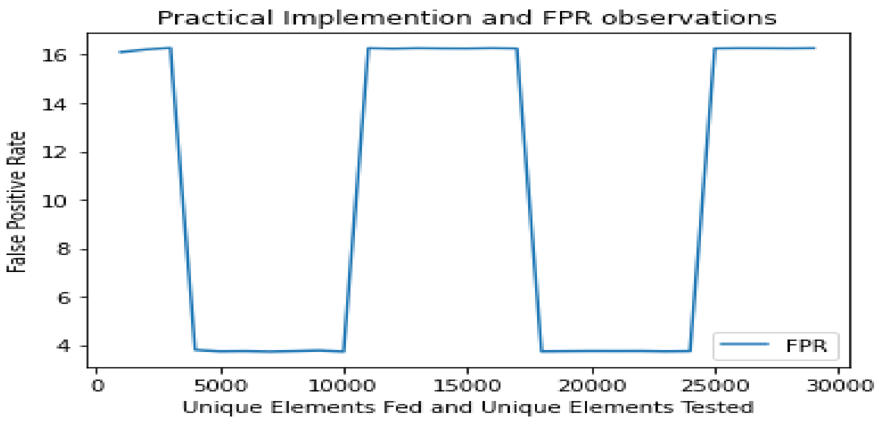

Fig 5.2FPR for 97146bits size

Figure.5.2 shows the practical implementation and FPR observations when taking 180823 bits size. In the graph, the X-axis indicates the unique elements fed and unique elements tested, and Y-axis indicates the False positive rates (FPR). The FPR initialized as 20.0 %, and the Practical observation average: was 10.20874612312953 %.

3. Using memory size of 83677 bits in improvised bloom filter

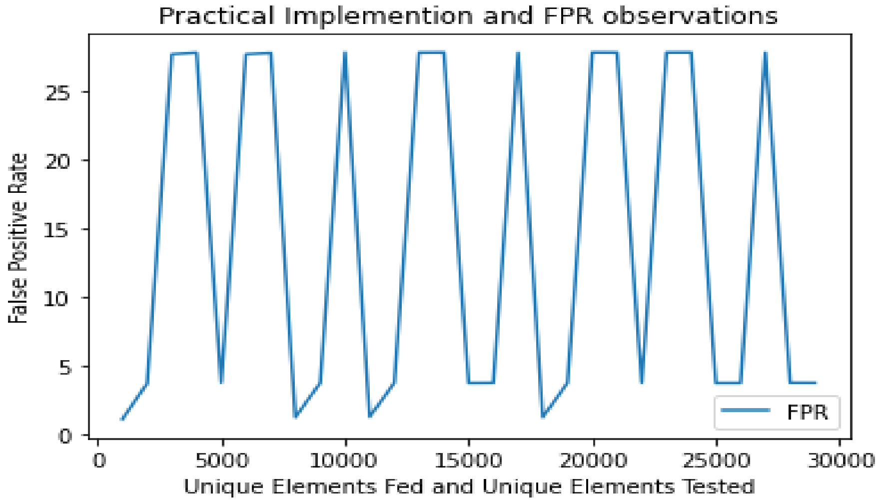

Fig. Practical observation average at 83677 bit size

Figure.5.3 shows the practical implementation and FPR observations when taking 180823 bits size. In the graph, the X-axis indicates the unique elements fed and unique elements tested, and Y-axis indicates the false positive rates (FPR). The FPR initialized as 25.0 %, and the Practical observation average: was 14.196855258603863 %.

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