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Research Article

CLOUD COMPUTING BASED DYNAMIC SERVICES MIGRATION IN CLOUDENVIRONMENT

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ABSTRACT
With the recent addition of new Data Mining and Machine Learning services to Cloud Computing providers, users now have access to incredibly sophisticated data analysis tools that take advantage of all the benefits of this sort of environment. Cloud Computing for Data Mining service providers offer descriptions and definitions in a variety of formats, many of which are incompatible with those of other providers. From a practical standpoint, the ability to describe entire Data Mining services is critical for maintaining usability and, in particular, portability of these services, regardless of software/hardware support or cloud platform differences. The major goal of this paper is to create a Data Mining service definition that allows a data mining process to be ported and distributed in different providers or evenin a Market Place for these types of ready-to-consume services using a single and simple specification. This paper proposes a semantic system for the definition and description of comprehensive Data Mining services, taking into account both the provider's management of the service (pricing, authentication, SLA) and the characterization of the Data Mining workflow as a service. It makes a significant contribution to the standardisation and industrialisation of Data Mining services. A list of services from Data Mining providers has been described, and an example of a comprehensive service for a Random Forest algorithm has been defined as a service, to examine the validity of the scheme. A realistic scenario has also been established, which involves the creation of a deployment platform for Data Mining services to provide functional support for the scheme, demonstrating the proposal's practical benefits to the end user.

INTRODUCTION
Cloud Computing (CC) has made its way into our daily lives in a seamless and transparent manner. The ease with which people may use the Internet, as well as the exponential rise in the number of linked gadgets, has increased its popularity. Adopting the CCphenomenon necessitates a significant shift in how information technology services are researched, consumed, and implemented. CC is a service delivery paradigm for businesses, entities, and customers that is based on the utility model, such as energy or gas. CC can be thought of as a service delivery model in which computer resources and processing power are contracted via the Internet of services (IS). The volume of data generated by businesses and organisations is increasing at an exponential rate. According to Forbes, the growth is likely to continue in 2020, with data generation expected to rise by up to 4,300%, all due to the massive amount of data generated by service users. According to Gartner, more than 25 billion gadgets will be connected to the Internet by 2020, producing more than 44 billion GB of data annually. In this context, cloud providers are presently exploiting their vast computer capacity by offering new data mining services to cloud users (DM). Amazon Sage- Maker1 and Microsoft Azure Machine Learning Studio 2 are two cloud providers and services that offer a set of algorithms as services within CC platforms. Other CC platforms, such as Algorithmia3 or Google Cloud ML4, follow in this vein, offering high-level Machine Learning (ML) services, such as object detection in photos, sentiment analysis, text mining, and forecasting, to name a few. Each CC service provider has a unique definition of these services that is incompatible with those of other service providers, not only in terms of Data Mining (DM) but also in terms of CC service administration. For example, if one supplier offers a Random Forest (RF) algorithm, another may offer a service with a similar name, features, or settings, even if the two algorithms are identical. This makes it

impossible to establish services or service models that are not dependent on the provider, as well as compare services using a CC service broker. Indeed, standardising the concept of services would increase competition by allowing third parties to interact with these services in a completely transparent manner, bypassing the provider's specific details.

RELATED WORK

Users with predictable and constant demands, which are favourable to capacity planning, are preferred by cloud providers. In reality, most cloud providers give an additional price option known as thereserve option, which allows you to earn long-term risk-free money. This option, in particular, allows a user to pay a one-time reservation cost and then reserve a computing instance for a long period of time (typically weeks, months, or years), during which time the usage is either free or priced at a large discount. When fully utilised, a reserved instance can easily save a user more than half of the cost. However, a user's ability to benefit from the reserve option is highly dependent on their demand pattern. Becausereservation fees are paid in advance, a reserved instance's cost savings are recognised only when the total instance usage during the reservation term surpasses a specific threshold (varied from 30 to 50 percent of the reservation period). The savings realised are not considerable until they are heavily employed.

As a result, users with sporadic or bursty requests can only deploy instances on demand. It poses new obstacles for consumers who must choose the best service from such a large pool of options, as it will take time for consumers to gather the essential informationand analyse all service providers before making a decision. The first and most crucial task that a cloud broker can perform is to assist cloud consumers in selecting the proper cloud services that meet their needs. Existing research usually focuses on what criteria should be examined and how they should be assessed. With the rapid growth of cloud adoption, as well as the enormous number of new cloud providers and different types of cloud services, a new difficulty arises in cloud selection: how to efficiently select the best cloud services from a big pool. The downsides include user time consumption, uncertainty in selecting how to achieve a requirement at a cheap cost,and features that may be limited.

MATERIALS AND METHODS

Approach:

In this work, we suggest a new cloud brokerage paradigm in which cloud brokers are in charge of service selection. Then we create a service selection algorithm that matches cloud users with the most appropriate cloud services. The system proposes a revolutionary cloud brokerage-based architecture, in which cloud brokers are in charge of service selection. It also created the B cloud-tree, an effective indexing structure for organising the information of a large number of cloud service providers. Then it creates a service selection algorithm that suggests the best cloudservices to cloud users. Extensive experimentalexperiments on real and synthetic cloud data were conducted with this system, demonstrating a considerable performance gain over earlier approaches. We conduct comprehensive experimentalexperiments on actual and synthetic cloud data and demonstrate that our approach outperforms earlier approaches. This paper uses a B cloud tree technique. The first and most crucial responsibility is to assist cloud users in selecting the appropriate cloud servicesfor their needs.

Algorithm: B Cloud-Tree Algorithm (BCTA)
Require: Lcs is a set of applicant services that returnedby the query Q
1: Final Result ← ∅ ;
2: for i ← 1 to| Lcs | do
3: if Lcs:[i] satisfies all query properties then4: Final Result ← Final Result ∪ Lcs.[i]
5: end if
6: end for

7: if Final Result is empty because of low in storagecapacity then
8: L0
cs ← sort Lcs in descending order of storage capacity9: Associate Service(Q,Lcs,∅,∅,m)
10: end if
11: Check collision in Final Result12: Return Final Result

Architectural View:

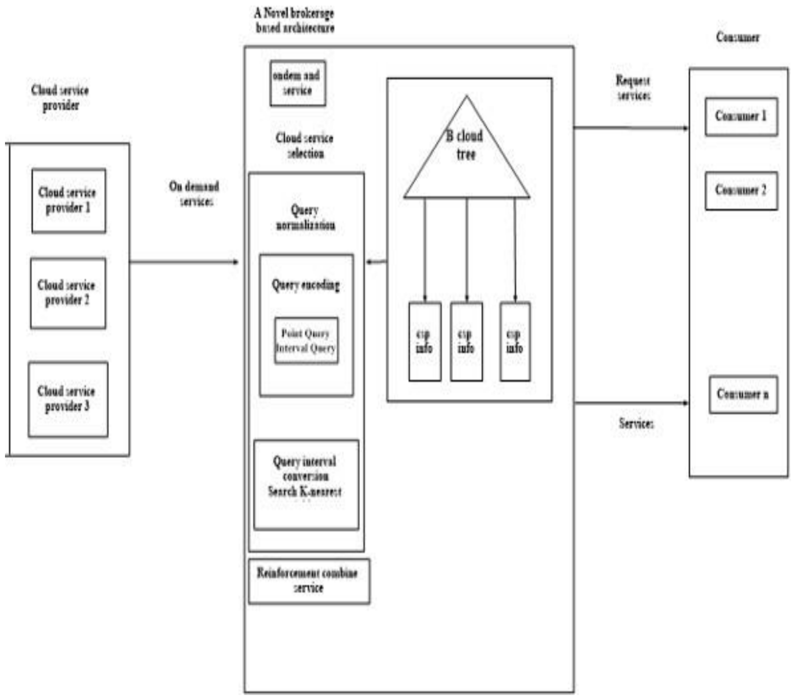

Figure 1: B Cloud-Tree Approach

Approach:
Significant unused hardware and softwareinvestments in the approximation algorithm. Less infrastructure is beneficial to the environment becauseit reduces the amount of e-waste generated by cloud service users. Some writers have proposed different techniques to allocating workloads across servers based on their cost of operation in order to achieve maximum cost-effectiveness. The broker aggregates demand for service from a large number of customers, smoothing out individual bursts in the aggregated demand curve, making it more stable and suited for reservation, decreasing wasted costs due to partialutilisation.

Algorithm: Effective Approximation Algorithm (EAA)
Input: Online registeration strategy at time t, upon anarrival of demand dt.
Step 1: Initialization: rt = 0.
Step 2: for l = 1to dt do
Step 3: Let al be the gathered cost incurred by the use of on-demand instances in the past reservation period,i.e., from time t- α + 1 to time t.
Step 4: if al > β then
Step 5: Reserve an instance at level l at the current time t, i.e., rt ← rt + 1.
Step 6: else
Step 7: Use an on-demand case to serve the currentdemand at level l.
Step 8: end if
Step 9: end for

Architectural View:

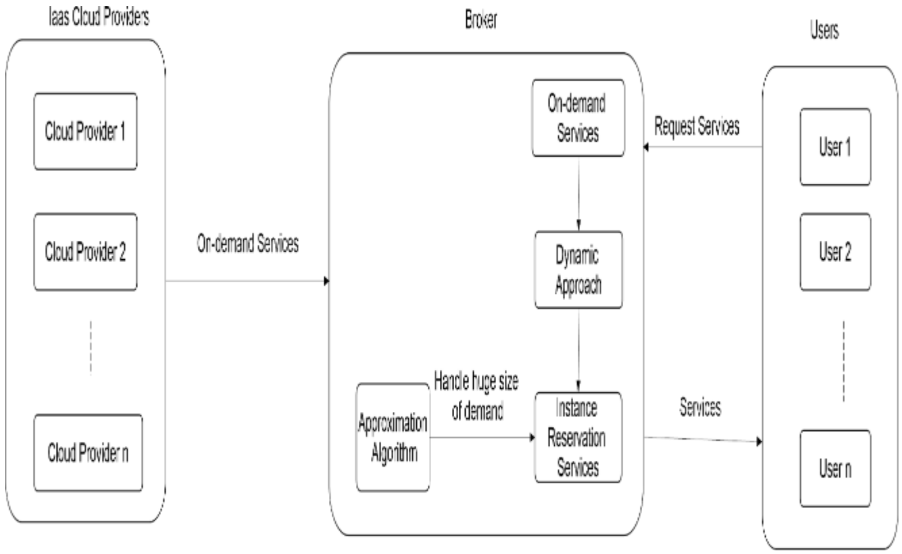

Figure 2: Approximation approach

Approach:

A cloud provider is a company that provides businesses and/or people with cloud computing-based services and solutions. This service organisation may offer virtual hardware, software, infrastructure, and other services that are rented and controlled by the provider. Companies are increasingly interested in cloud services because of the cost, scalability, and accessibility benefits they provide. Customers of cloud providers have Internet and programmatic access to cloud resources, and are only charged for resources and services used according to a subscription billing scheme. We prove partial correctness for iterative algorithms by identifying a loop invariant and using induction on the number of iterations to prove that loop invariant. Iterative algorithm's evidence of termination entails connecting a diminishing sequence of natural numbers with the iteration number. The following theorem can subsequently be used to prove the termination.

Algorithm: Efficient Information Retrieval Query(EIRQ)
Input: $\epsilon,\mu,\lambda h\ \Sigma,$
SOutput: ph S.
1: Initialization: Let inc be a relative small positiveconstant. Set ph S $\leftarrow$ 0, and $\phi \leftarrow 0$.
2: while ($\sum$ j$\in$S ph j < 1) do
3: Set mid $\leftarrow \phi$ + inc, and $\phi \leftarrow$ mid.4: for (each server j $\in$S) do
5: ph j $\leftarrow$ Calculate ph j ($\epsilon,\mu j,\lambda h\ \Sigma,\phi$).6: end for
7: Set inc $\leftarrow$ 2×inc.8: end while
9: Set lb $\leftarrow$ 0 and ub $\leftarrow \phi$.10: while (ub−lb > ϵ) do
11: Set mid $\leftarrow$ (ub + lb)/2, and $\phi \leftarrow$ mid.12: for (each server j $\in$S) do
13: ph j $\leftarrow$ Calculate ph j ($\epsilon,\mu j,\lambda h\ \Sigma,\phi$).14: if ($\sum$ j$\in$S ph j < 1) then
15: Set lb $\leftarrow$ mid.16: else
17: Set ub $\leftarrow$ mid.18: end if
19: end for
20: end while
21: Set $\phi \leftarrow$ (ub + lb)/2.

22: for (each server j ∈S) do
23: ph j ← Calculate ph j (ϵ,μj,λh Σ,ϕ).24: end for
25: return ph S.

Architectural View:

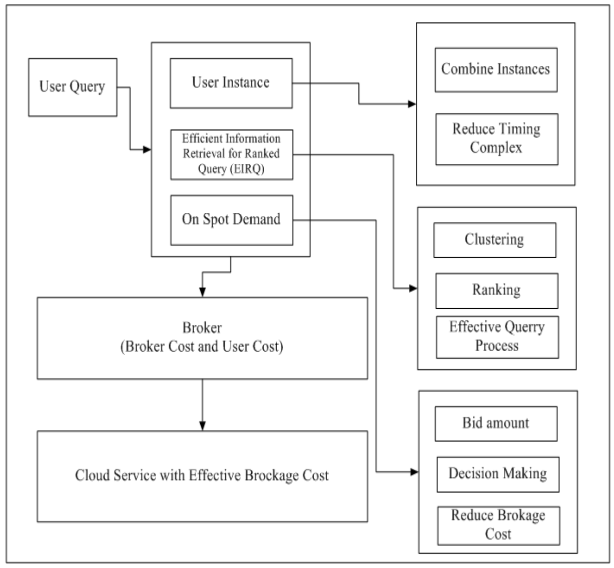

Figure 3: Efficient Information Retrieval Query approach

Proposed Approach:
In this way, cloud computing services provide users with excellent options to obtain the finest service at the greatest price. Based on functional and non-functional communities, they aid the user in determining the best framework for their specific needs. The system proposes a revolutionary cloud brokerage-based architecture, in which cloud brokers are in charge of service selection. As a service, Data Mining services, including provider pricing management and authentication, a Service Level Agreement, and a Data Mining workflow specification. Services for data mining The information about services discovery, process modelling, and service specifics can be stored in the cloud broker.
A list of data mining service providers has been described in order to assess their legitimacy, and a full-service example has been defined as a Random Forestry Algorithm service. In this work, we suggest a new cloud brokerage paradigm in which cloud brokers are in charge of service selection. Then we create a service selection algorithm that matches cloud users with the most appropriate cloud services. We conduct comprehensive experimental experiments on actual and synthetic cloud data and demonstrate that our approach outperforms earlier approaches. This paper uses a B cloud tree technique. Extensive experimental experiments on real and synthetic cloud data were conducted with this system, demonstrating a considerable performance gain over earlier approaches. The first and most crucial responsibility is to assist cloud users in selecting the appropriate cloud services for their needs. The primary benefits include analysing the finest cloud services at the lowest prices, saving time, being user-friendly, and making judgments, choosing the best provider for a certain necessity, comparing ratings, and increasing consumertrust and faith in our software.
Algorithm: Random Forest Algorithm(RFA)
Step 1: If Final Result is empty because of low instorage capacity then
Step 2: L0 cs ← sort LCS in descending order ofstorage capacity

Step 3: Combine Service (Q,Lcs,Ø,Ø,m)
Step 4: End if
Step 5: Check collision in Final Result
Step 6: Return Final Result

Architectural View

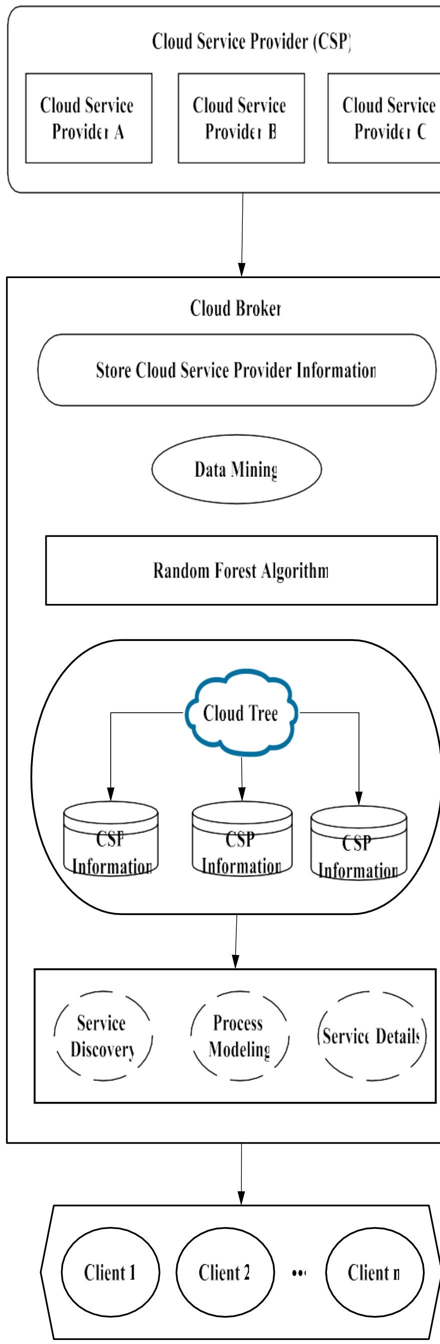

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Figure 4: Random Forest Approach

RESULTS AND DISCUSSION

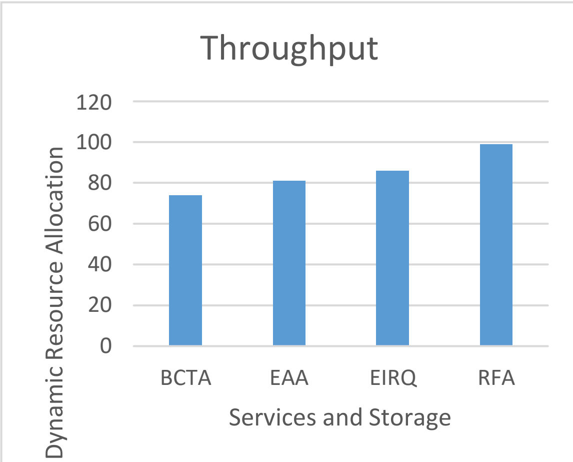

Figure 5: Throughput

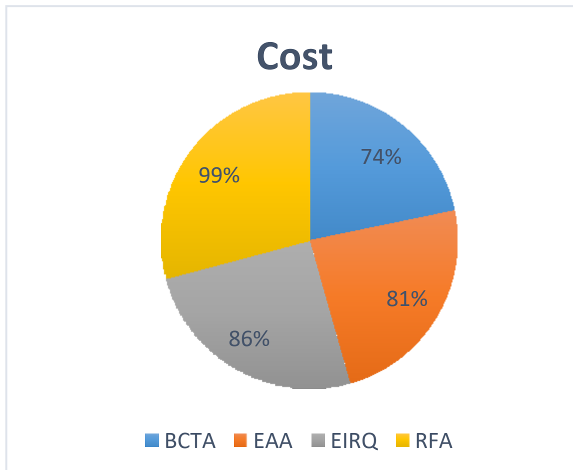

Figure 6: Cost

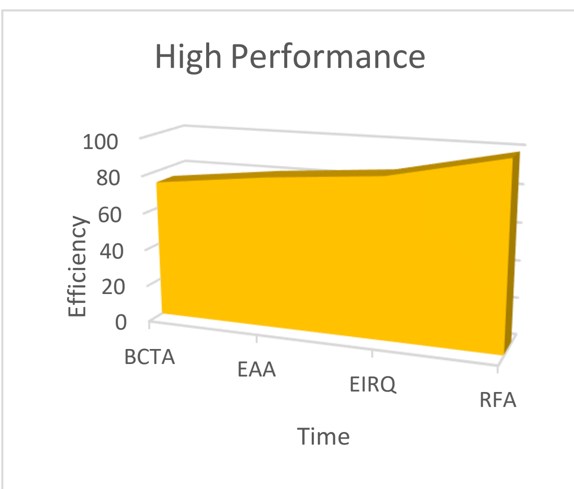

Figure 7: High Performance

CONCLUSION

We introduced dmcc-schema in this paper, a lightweight vocabulary for describing and defining DM services in CC. Our proposal aims to bring together, on the one hand, everything connected to the definition of algorithms as a DM service and, on the other hand, all of the other factors that make up the management of a CC service, which are often overlooked by other approaches.

Other service definition approaches lack this integration, however dmcc-schema bridges the gap in terms of creating all-in-one DM services for Cloud Computing environments. dmcc-schema is provided as a lightweight tool for modelling DM services with the goal of providing a portable definition amongst different service providers. As a result, with dmcc- schema, you can capture all of the essential features and information of the most popular CC providers, such as Amazon, Azure, and Google.

The dmcc-schema schema was created on the Semantic Web platform, utilising an ontology language to construct it and adhering to the LD requirements for reusing existing schemata, which properly complement the service modelling that has been defined. It also assures that the service definition can be expanded and modified in the future, with the goal of providing a far more portable service definition and the ability to respond to changes in CC management.

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