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Dynamic Multi Granularity Service Composition

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ABSTRACT

The trend is for enterprises to outsource parts of their services, in order to concentrate on their own core `businesses. Meanwhile, users usually need to compose multiple different services to create a sophisticated application. Through the service-oriented architecture paradigm, users can compose elementary services to form new value added services through the process of service composition. In template-based service composition, an abstract composite service, consisting of a collection of abstract services orchestrated by workflow patterns, is first defined and then instantiated and executed at run time by binding abstract services to concrete ones. This dynamic binding ensures a loose - coupling of services and all so-called QoS-aware service composition problem. In existing work, to expand the selection scope using the concept of generalized component services, a backtracking-based algorithm and an extended genetic algorithm(GA) has been applied for finding an optimized solution and near-optimal solution respectively in composition service The proposed work, will adopt the multi-granularity service composition automatically at run time. This will be useful to study how to extend other Meta-heuristic algorithms along with Tabu-search algorithm used for efficient optimization service selection.

Keywords: Service Selection, Service Composition , Cloud Computing.

I. INTRODUCTION

A challenging task in Web service composition is the runtime binding of a set of interconnected abstract services to concrete ones. This question, formulated as the service selection problem, has been studied in the area of service compositions implementing business processes. Despite the abundance of work on this topic, few of them match some practical needs that we are interested in. Indeed, while considering the business process implemented by service compositions, we can distinguish between two classes: compositions that correspond to single business process and those implementing multiple communicating processes. While most of the prior work focuses only on the first case, it is the latter that interests us in this paper. This paper contributes to the service selection by proposing a new algorithm in polynomial time, that generates a mixed linear integer program for optimizing service compositions based on the service response time and the energy consumption. The novelty in this work is on multi-process composition and energy consumption. This paper also proposes a new analysis of the service selection[27] and an evaluation of the proposed algorithm. The prevalent techniques for building Web service compositions (WSCs) in middleware distinguish between two levels of service manipulation[1, 2], at the upper level, the middleware manipulates abstract services, defined through an interface of operations and a behavioral specification. This one might be expressed by using for instance OWL-S[3], WSDL-S[4] or DAML-S[5], at this abstract level, we also have WSCs, here defined as a set of Web-based interactions over services operations. Underneath, there is a concrete level made of published Web services (WSs). In order to run the WSC, the middleware must at runtime associate each abstract operation with a concrete one. Our paper focuses on this aspect.

The automation of runtime binding in service composition has been addressed in previous work. The viewpoint that we adopt for its implementation is inspired by the work of Lee[2] and Ben Mokhtar et al.[1],There are two successive tasks to be done for

runtime binding. The first is the determination of the functional bindings of each abstract operation. This is done by comparing the specification defined for these operations, with published information, available on concrete WSs. For each abstract operation, the execution of this task returns a set of concrete operations that meets its specification. If this set is empty for an abstract operation, then the service composition is not realizable. Assuming that we have a realizable composition, the second task consists of finding the functional bindings that can result in an optimal composition, with respect to some QoS parameters (e.g. availability, service response time, price, energy consumption). Usually, we may have several abstract operations to bind, implying a combinatorial problem.

The work described in this paper is part of a middleware project[6],that aims at implementing both of these tasks (determining functional bindings and optimal binding choice) on ultra large scale compositions of WSs. Our study however only focuses on the second binding challenge. More precisely, given a realizable WSC, we seek the optimal concrete services for running it in order to optimize the QoS of the composition. We focus, in this paper, on service response time (SRT) and energy consumption (EC).

II. LITERATURE SURVEY

New item and new consumers represent a huge test to recommendation system. All in all these issues are alluded to as the cold start problem [1], the literature is rich with diverse classes of routines for comprehending the cold start problem proposal Issue, for example, Measurable modelbased approach [2], the comparing likelihood dispersion measurements are made as per the consumer, extend and introduce rates and high likelihood items are need to be recommended [3]. However there is still the issue of low exactness in proposals in these techniques. The first cold start issues emerge in Collaborative filtering systems, where an item can't be prescribed unless some consumer has appraised it in the recent past. This issue applies to new items, as well as to obscure items, that is especially unfavorable to consumers with diverse tastes. All items considered the new-item issue is likewise regularly alluded to as the first-rater issue [4]. The other methodologies for distinguishing which of the new items may be applicable to a consumer is the consumer demonstrating methodology.

[1] M. P. Papazoglou, P. Traverso, S. Dustdar, and F. Leymann, "Serviceoriented computing: State of the art and research challenges," Computer, vol. 40, no. 11, pp. 38–45, Nov. 2007.

Service-oriented computing promotes the idea of assembling application components into a network of services that can be loosely coupled to create flexible, dynamic business processes and agile applications that span organizations and computing platforms. An SOC research road map provides a context for exploring ongoing research activities.

[2] Q. Z. Sheng et al., "Web services composition: A decade's overview," Inf. Sci., vol. 280, pp. 218–238, Oct. 2014.

Service-oriented computing (SOC) represents a paradigm for building distributed computing applications over the Internet. In the past decade, Web services composition has been an active area of research and development endeavors for application integration and interoperation. Although Web services composition has been heavily investigated, several issues related to dependability, ubiquity, personalization, among others, still need to be addressed, especially giving the recent rise of several new computing paradigms such as Cloud computing, social computing, and Web of Things. This article overviews the life cycle of Web services composition and surveys the main standards, research prototypes, and platforms. These standards, research prototypes, and platforms are assessed using a set of assessment criteria identified in the article. The paper also outlines several research opportunities and challenges for Web services composition.

[3] L. Zeng et al., "QoS-aware middleware for Web services composition," IEEE Trans. Softw. Eng., vol. 30, no. 5, pp. 311–327, May 2004.

The paradigmatic shift from a Web of manual interactions to a Web of programmatic interactions driven by Web services is creating unprecedented opportunities for the formation of online business-to-business (B2B) collaborations. In particular, the creation of value-added services by composition of existing ones is gaining a significant momentum. Since many available Web services provide overlapping or identical functionality, albeit with different quality of service (QoS), a choice

needs to be made to determine which services are to participate in a given composite service. This paper presents a middleware platform which addresses the issue of selecting Web services for the purpose of service composition in a way that maximizes user satisfaction expressed as utility functions over QoS attributes, while satisfying the constraints set by the user and by the structure of the composite service. Two selection approaches are described and compared: one based on local (task-level) selection of services and the other based on global allocation of tasks to services using integer programming**.**

[4] G. Canfora, M. Di Penta, R. Esposito, and M. L. Villani, "An approach for QoS-aware service composition based on genetic algorithms," in Proc. GECCO, Washington, DC, USA, 2005, pp. 1069–1075.

Web services are rapidly changing the landscape of software engineering. One of the most interesting challenges introduced by web services is represented by Quality Of Service (QoS)--aware composition and late--binding. This allows to bind, at run--time, a service--oriented system with a set of services that, among those providing the required features, meet some non--functional constraints, and optimize criteria such as the overall cost or response time. In other words, QoS--aware composition can be modeled as an optimization problem.We propose to adopt Genetic Algorithms to this aim. Genetic Algorithms, while being slower than integer programming, represent a more scalable choice, and are more suitable to handle generic QoS attributes.

[5] T. Yu and K.-J. Lin, "Service selection algorithms for composing complex services with multiple QoS constraints," in Proc. ICSOC, Amsterdam, The Netherlands, 2005, pp. 130–143.

One of the promises of the service-oriented architecture (SOA) is that complex services can be composed using individual services. Individual services can be selected and integrated either statically or dynamically based on the service functionalities and performance constraints. For many distributed applications, the runtime performance (e.g. end-to-end delay, cost, reliability and availability) of complex services are very important. The auther earlier work, the proposed service selection problem for complex services with only one QoS constraint. This paper extends the service selection problem to multiple QoS constraints. The problem can be modelled in two ways: the combinatorial model and the graph model. The combinatorial model defines the problem as the multi-dimension multi-choice 0-1 knapsack problem (MMKP). The graph model defines the problem as the multi-constraint optimal path (MCOP) problem. Author has proposed an algorithm for both models and studies algorithm performances by test cases. We also compare the pros & cons between the two models.

III. EXISTING SYSTEM

Many existing cloud data services provide similar access control models, in which individual and organizational privacy, a key requirement for digital identity management, is unprotected. Also, with cloud computing initiatives, the scope of insider threats, a major source of data theft and privacy breaches, is no longer limited to the organizational perimeter. Multicloud environments exacerbate these issues because proxies can access data (which the environment might dynamically move or partition across different clouds) on behalf of clients. Revealing sensitive information in identity attributes to proxies that grant them authorization to access the data on behalf of clients is not an attractive solution.

Inefficiencies in composite policies include;

• Redundancy—a policy is redundant if every access request that matches the policy also matches another policy with the same effect.
• Verbosity—similar to data element merging in data integration, policy composition can merge similar policies from different origins; resolving the policy verbosity during composition affects the policy size.

IV. PROPOSED WORK

Our proposed framework, will adopt the multi-granularity service composition automatically at run time for generic cloud collaboration allows clients and cloud applications to simultaneously use services from and route data among multiple clouds. This framework supports universal and dynamic collaboration in a multicloud system. It lets clients simultaneously use services from multiple clouds without prior business agreements among cloud providers, and without adopting common standards and specifications. As

more organizations adopt cloud computing, cloud service providers (CSPs) are developing new technologies to enhance the cloud's capabilities. Cloud mashups are a recent trend, mashups combine services from multiple clouds into a single service or application, possibly with on-premises (client-side) data and services. This service composition lets CSPs offer new functionalities to clients at lower development costs.

The specific security issues associated with collaboration among heterogeneous clouds include:

• establishing trust among different cloud providers to encourage collaboration.

• addressing policy heterogeneity among multiple clouds so that composite services will include effective monitoring of policy anomalies to minimize security breaches.

• maintaining privacy of data and identity during collaboration.

V. METHODOLOGY

In this paper, we introduce the concept of "granularity" to WS and propose the QoS-based Multi-Granularity Service Selection Problem (QMGSSP). In Multi Granularity Service which is a generalization of traditional QoS-aware services composition problem, in that the latter is a special kind of QMGSSP. By allowing WS of various granularities to be considered as the candidate for selection, we can obtain a better solution. Furthermore, we formulate granularity service problem through QMGSSP by introducing Multi-Granularity Constraints (MGC). Experiments show the effectiveness of our approach and the performance cost is acceptable**.** The implementation of tabu search uses memory structures that describe the visited solutions or user-provided sets of rules. If a potential solution has been previously visited within a certain short-term period or if it has violated a rule, it is marked as "tabu" (forbidden) so that the algorithm does not consider those services.

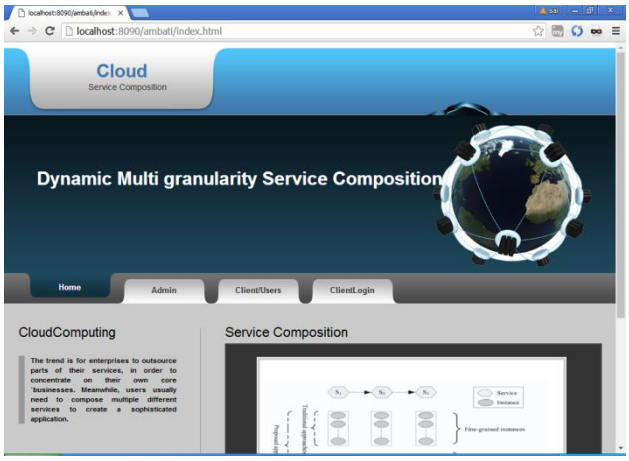

Figure 1: Home Page with Admin/Clinet Activites

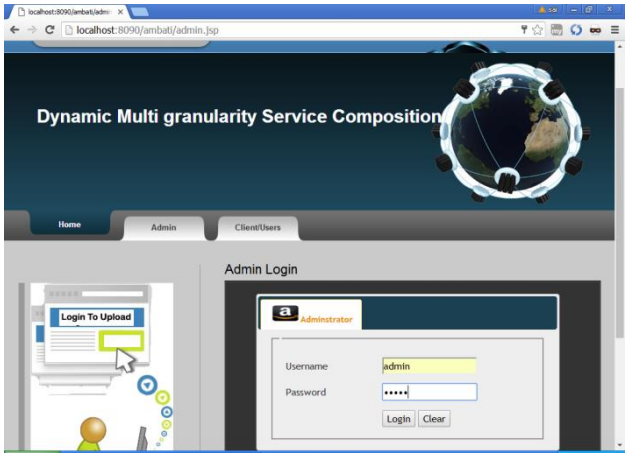

Figure 2: Admin Login

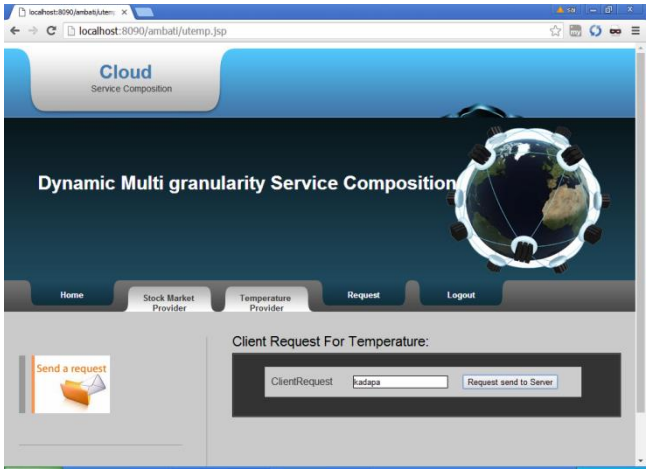

Figure 3: Admin Service Request

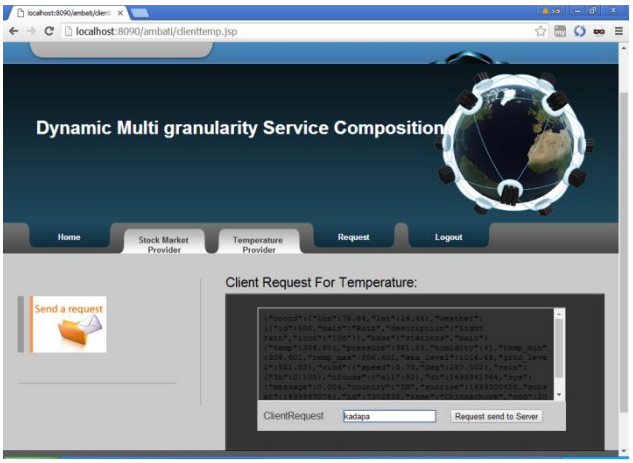

Figure 4: Client Service Request

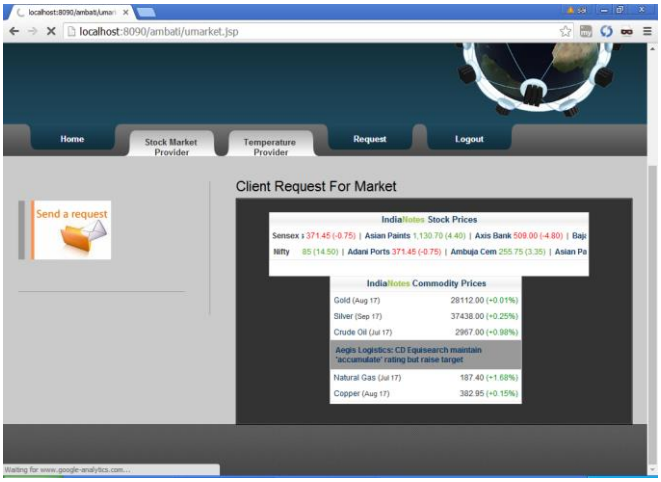

Figure 5: Client Service Usage

Our resolution of the service selection problem uses our prior algorithm(tabu search algorithm) proposed for QoS prediction. Proposed concept provides enhancements for existing algorithms through introducing the choice of concrete services and Providing faster request and response from server through composition. This work motivates several directions for future research. Service Requests plays a very important role in the proper operation of an organization's information. Our evaluations focus on comparing the service request which is induced by authorization steps, including request acceptance and service provision for end user.

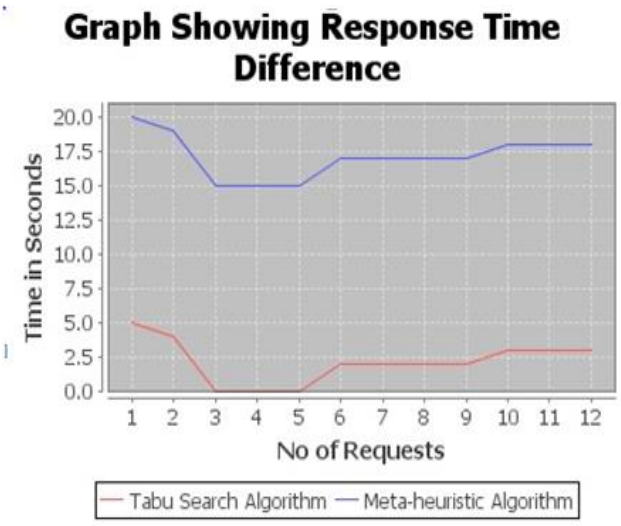

Figure 6: Computation Evaluation

The above Graph shows various Service Requests by user, which are identified by service, ID. We show the response time for user request is better than old heuristic algorithm when compared with Tabu-search algorithm. In Figure, it shows the difference of response time.

VI. CONCLUSION

Traditional approaches to QoS-aware service composition lack flexibility of selection, as only service instances whose functionalities are specified in the composite service via a single service are considered as candidates. This paper presented the concept of dynamic multi granularity service composition to expand the candidate space for service selection to achieve a better performence. A QoS-aware multigranularity service composition model was formulated, where any service instance that can fulfill the partial functionality in the composite service with the same execution sequence can be discovered and utilized for composition. A backtracking-based algorithm seeking the optimal solution and an extended GA for arriving at a near-optimal solution were then presented to solve the optimization problem. Experimental results showed that the proposed approach outperforms the traditional one.

VII. REFERENCES

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