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Multi-Source Information Service (MSIS) Process Management In Cloud Computing Environment

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ABSTRACT

During the past few decades, a large extension in the delivery and process capability of network resources have evoked the demand of high available, reliable, security, customized, networked and toward Multi-Source Information Service (MSIS). Accordingly, Cloud Computing has been one of the research hotspots in computer science and network engineering area, which is a revolution of computing paradigm whereby all the resources in the network as a huge resource pool are delivered as integrated and on-demand services in the form of, i.e. CaaS, MaaS, SaaS, PaaS, IaaS, etc. Besides, the services provided in Cloud Computing are largely oriented to the requirement of information services today. Thus, Cloud Computing provides an opportunity of development and environment for new service pattern of MSIS. This purpose of this article is to put forward some issues associated with Cloud Computing and the nature part of the relation between MSIS and Cloud Computing, and to propose a novel view of information service concept that is characterized by multi-source in the service process model and service management, which combines the top-down and bottom-up process approaches into an integrated one by using an information exchange platform provided by the cloud.

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1. INTRODUCTION

Cloud computing is gaining more and more attention from both the academia and industries domain today. It is an effective, efficient and competent way to implementing information service in a more service-oriented, information-integrated, process-modified sense to enable the information service management. However, as the result of different implement strategies of the Cloud Computing in the enterprises, which all want to recommend their strategy as the Cloud Computing implement standard, there is no unified definition of Cloud Computing, instead there still exists an agreement on the characteristics of Cloud Computing in the academia, that it is a new distributed computing paradigm driven by economies-scale, in which a pool of abstracted, virtualized, dynamically scalable, managed computing power, storage, platform and services are delivered on demand to the external customers over the internet. No matter in what domain, we can infer that Cloud Computing is aimed to deliver services including storage resources, computing resources, network resources, etc, of course including the information service to customers in a flexible, customized and scalable way. With respect to the development of information service, it is the target of service that the state of high performance, cost-efficiency and seamlessly-switch according to the change of

the external condition demand on personal transaction and organizational level. However, with the information explosion and the increasing complexity of personal and business services that require a large amount and types of resources to support the deliver of services, existing information services can not well satisfy the requirements of customers of enterprises or individual. For the no-long future we can see that MSIS is a trend of both technology and business requirement that has a significant effect on the development of the economy and society, as it is a revolution on the logic and nature of the society operation and deployment. It is not exaggerated that MSIS is one of the most promising develop pattern of information service that makes general type, model, source of information service integrated, aggregated, combined, or directed to deliver to customers who are in need. Therefore, MSIS should have powerful backup of the architecture and storage, allocation, process and delivery of resource, which far exceeds the existing situation and stage that the information service is on.

1.1 Some Issues

From the above point of view we can conclude that in one hand, we need a new computing paradigm gear to the MSIS in the term of computing power, storage capability, service-oriented architecture suited to the information service management, etc. On the other hand, as the result of superior attributes of Cloud Computing, it is probably the most appropriate candidate to enable the deployment and the implement of high performance and quality of a variety of information services in a new service delivery pattern and service process mechanism. However, there are still some problems related to the Cloud Computing that should be addressed here:

1. Cloud Computing brings about a more complex information service platform, where the type, sourcing, processing methods, etc, of information is much more different from that of before. There may be a mass of intricate information on the distributed network, or in the heterogeneous systems, or the different sourcing of databases in Cloud Computing environment. Therefore we need to make Cloud Computing a validate support of MSIS, not an obstacle to enabling it.
2. with the changes of information service that comes from the development and orchestration of network technology, software technology and communication technology, there is the problem that how to leverage an effective method to manage the information service in the Cloud Computing environment, as the service process management is critical to the fulfillment of the information service offering, that only when service process management is of propriety, would the service offering be much more efficient and well-performed.

In order to figure out a solution of the above contradiction, this paper is aimed to propose an approach to devise the MSIS process, on which it is based that a methodology of MSIS process management is discussed, and comes to the conclusion that the MSIS process management in the Cloud Computing environment is needed for the high performance of an information service system. According to the clue of the idea of the paper, the next content is arranged as follows: section two is about some related work of the information service process management and Cloud Computing; Section three will give the definition and main attributes of MSIS, while taking it to consideration that the traditional information service process still existing now is not proper for MSIS in the Cloud Computing environment; Section four is aimed to illustrate the MSIS process model, and state this process through an instance is more effective and efficient than the traditional process, and may become the unique nature part of MSIS; section five is arranged to protocol a set of strategies of MSIS process management in the Cloud Computing environment, which can be a critical part of information service deliver inferring to the service quality and vitality. Section six is the conclusion of this paper, that the MSIS process management in Cloud Computing environment is a inter-related between service process management and the deployment of Cloud Computing, in which the high inter-affective will be largely enhance the performance of service offering, and the relation is nature-determined, macro-view, and non-trivial.

2. RELATED WORK

The purpose of this section is to present how the service processes are defined, related to the Business process, and developed in traditional service sector, Web service and cloud environment.

2.1 The Relationship between Service Process and Business Process Management

Based on the basic theories of the service process management in information economy, there are researches on the relation between the information service process and business process management (BPM), which is aimed to implement effective business network processes [1]. In several branches of information systems (IS) research; there are some questions left open, for example, the relationship between the business view on services and the underlying technical elements that are required for implementing it [2]. It is critical to view them from different perspectives that integrate business and technology-related opportunitiesand implementation [3]. Nowadays the world economy is transitioning to the service sector in which value creation, employment, and economic wealth dependent on [4].Concerned with the deployment of information system, people have to rethinking the system architecture from a service perspective, that is, the organizations should transform their traditional single and tightly coupled business process into more loosely coupled services, and align them vertically with IT services that are sourced by virtual resources [5]. Refer to the specific IT service and Web service sector, service process management as a solution to effectively manage publication, discovery, negotiation, deployment, and implementation of services is increasingly important in Web services [6], which are a set of new standards to support distributed computing and inter-enterprises collaboration. Web services offer effective and standard-based means to improve interoperability among different software applications over Internet protocol, and have emerged as a promising enabling technology for BPM. J. Leon Zhaoa states that the web services standard represents a platform neutral and language independent technology that is capable of enabling new strategic e-business partnerships, creating new service-oriented businesses, and developing a third party software marketplace based on an open standard[7]. Therefore, the intersection of web services and process management can be viewed as a hybrid area of research, because of the natural union between the two research domains.

2.2 Service Process in Cloud Environment

As for the Cloud Computing area, which is a new paradigm of computing paradigm where computing resources are offered over the internet as scalable, on demand (Web) service[8]. Therefore, on one hand, the service process in cloud environment is much different from before, because the service section in the businessprocess is directly related to the datacenter of cloud computing provider where the services are configured through the resources in the network place in a real-time, on demand, scalable and customized way. On the other hand, in Cloud Computing environment, the services are delivered in the form of SaaS, PaaS, IaaS, etc, which is based on the virtualization of a variety of resources presented in a unified transparent manner. Hanan Al Shargi[9] propose a new approach that we consider the possibility where information processing can be organized in analogy with the emerging cloud computing paradigm. However, there is no enough attention has been given to how the complexities of function arise from the limited amount of information provided by the genetic configurations. Luis Rodero-Merino[10] proposes a new abstraction layer-Claudia for cloud systems which automates the deployment and scaling of services, providing them with an appropriate Service Abstraction Level. This research gives service providers a method to close the gap between them with their needs and the functionalities. However, due to the lack of maturity typical of new management strategies, cloud solutions still have some limitations, i.e., service provider should clarify roles and responsibilities of parties involved in the overall services information transformation to satisfy the predefined SLAs.

3. MSIS PROCESS VS TRADITIONAL INFORMATION SERVICE PROCESS

With the high-speed of increment of information on the internet, which may come from any kind of resource and databases, the MSIS requires effective processing models to integrate and combine many types of services on the network. Before we give the definition of MSIS, the characteristics of MSIS should be highlighted that it is more customer-oriented because of the on-demand of customers' requirement to the service, instead of the former single type of service and mechanically-deliver model, an information service is delivered as an outsourcing, and process-driven integration of resource which is close to the application.

Based on the characteristics of MSIS, we can define MSIS as "the collection, processing, transformation, storage, integration of a variety types of information in the network that is of different ideal, paradigms, methods of delivery, participation form of users, sources of information,presentation of information, and the patterns of management , which is all in a unified delivery process to users as the form of services.", whereby "multi-source" is reflected on a variety of

characteristics and features, and any other dimension that can divide the service type into a range of typical domain reasonably. In a conclusion, MSIS more widely includes all that can be embraced in the information services in the term of resource type, computational method, and even storage model that is another form of information service, which is not confined by the information meaning of itself.

Just as the Cloud Computing' s "XaaS", the character of MSIS is not only about the raw information resources which are integrated or processed to form as services, but also refer to the processing and model of service offerings that impact all the components of services. Thus we should focus on how to give the information service a comprehensive view to consider the relation between each partner involved in the whole service process that are handled in the term of architecture and the service model, not instead focus on the information process part and the services delivery part.

In Cloud Computing environment, the information service system is aimed to plan and integrate the information resource-delivery entities, resource-processing entities and resource-use entities through a certain relation and behavior mechanisms and rules, making all entities in the system can acquire their purposes and realize their benefit. So, the MSIS not only involves in the internal of the service providers, but also the external users who are related to the service delivery. For the cloud platform, it is the place in which service is managed and system integrated. Client can interact with service (business) partners, who will receive the customers' need, and then the core service delivery platform, on which the resources are discovered and deployed by the form of online service collaboration, reusable, componentized service asset and solutions. Besides, there are assistant service partners who will provide specific service components to form a new service according to the requirement to service management part. The different service partners and roles is shown in Fig.1.

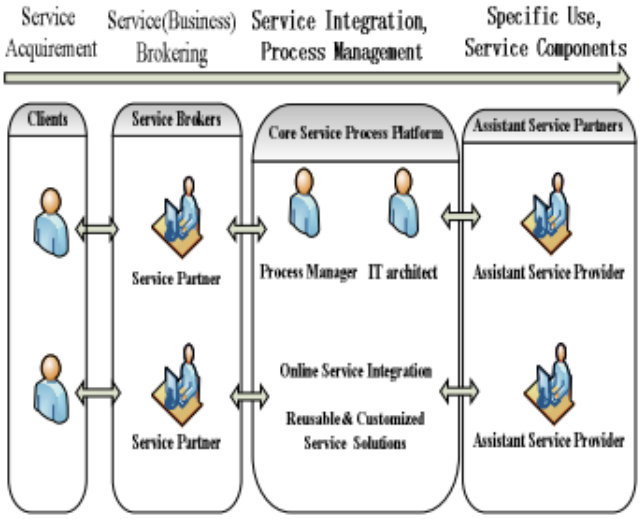

Figure 1. Roles and process of dynamic service

To establish an information service model is to make information service more compliant with the requirement of efficiency of services and have them operated according to the customers' demand, and then formalize a process which can become the standardized rules, methods, tools, etc, of the activities involved in the information service needed by the customers, and then will facilitate the reuse and refine of these service. However, traditional information service process is not suitable for the MSIS, because the latter contains more content and intension of service than the traditional one, thus it is much more complex when it comes to the service process. For example, MSIS is mainly about the integration of a variety of information based on which formalize some novel services delivered to the users, where should take the software and system configuration, the real-time interaction with users, scalability of services, customization according to the users' need, the strategies of billing etc. Such that characterized in MSIS is not consistent with the traditional information service. Next section we will propose a more suitable and efficient one to have the MSIS operated in a higher efficiency manner, which can be tested in a simulation Cloud

4 MSIS PROCESS

In Cloud Computing environment, a service process platform that is used to deploy the information service architecture and to manage, allocate, utilize all the resources in the network is

helpful to develop the MSIS. It is attended to a mixture of a variety of information system, which is to provide customization, diversification, service-oriented Band unified delivery of information resource. Therefore, we should apply the Cloud Computing platform appropriately and device a service process pattern of high-efficiency of the information service from the development of service to the process of service instances and to the final service results in a seamless manner.

No doubted that the information service is the key component part in the system, as it is the interest-undertaker combining relevant entities. The layering of systems is dynamically deployed, i.e., a system may be composed by multiple service layer, or construct a higher layer of system on the top of another service system's architecture. So, instead of including and included, the relation between those systems is applying and applied. The layered view of MSIS process platform in cloud is shown in Figure.2.

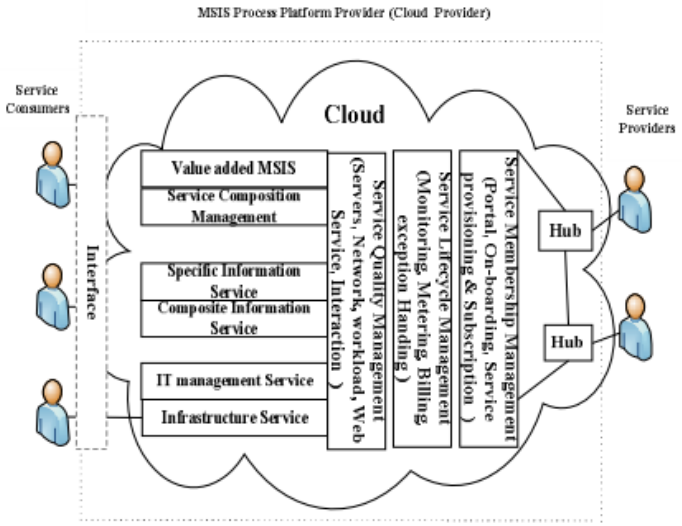

Figure2. MSIS Process Platform from a layered View

In the cloud the bottom is the infrastructure service layer. It provides fundamental support for all the other layer of the service. The layer consists of server, storage, network, and also operating system, database management system, etc. The upper layer in the MSIS Systems is IT management service layer, which helps manage the IT infrastructure efficiently. It is a collection of guidelines and high level processes collected for operating the information resources. The composite information service layer provides a Web service–based service process mechanism so that other services could find and bind to the relevant service at runtime through common IT service or business service composition.

The specific information service layer includes catalog of services that can help the services customers quickly own a specific service competence through organizing and maintaining applications that can be used to implement a specific process or a solution. The service composition management is a function module on the service process platform to manage the relationships of the available service assets and enables customer to dynamically configure abusiness process based on incoming requirements and solution expertise. At the top is the value added MSIS layerwhich organizes and manages service integration based in composition information services and vertical business applications by leveraging service partnership manager. It provides services that are customized to a specific customer's need. As for the three vertical layers for management purpose, they are service membership management, service lifecycle management and service quality management. The first one is responsible for the enablement of portal access, business entity on-boarding, service provisioning and subscription; the second one is responsible for the monitoring, metering, billing and exception handing of services, and the last one is for the monitoring the quality of services that is pointed to servers, network, workload, web services and interaction.

The MSIS process platform should be built upon standards for achieving flexibility and extensibility. Service partners connected to this platform should agree upon each party's SLA. Besides the simple layered view, we

also give a more collaborated and integrated view of service process platform in Figure.3 to illustrate how different roles process the service.

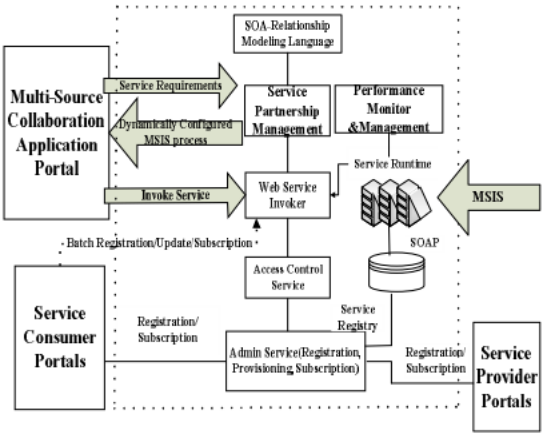

Figure.3 MSIS Process Platform from the Integral View

MSIS Process Management in Cloud Computing MSIS in Cloud Computing is oriented to the public and has much superiority in resource sharing and aggregation of applications, including rapid calculating power, capability of data storage and management, the ability of analysis and decision-making, the competence of resource utilization, the ability of one stop solution service and the capability of coordination across organizations. Therefore, the business process of users can be combined with the application in the virtualization system of Cloud Computing and formed into a service, through which it can be standardized and normalized in forward.

Here are the two types of service process management with two mechanisms (Service Computing): top-down& bottom-up service process managementapproaches. The following Figure.4 denotes the details and relationship between all the processes.

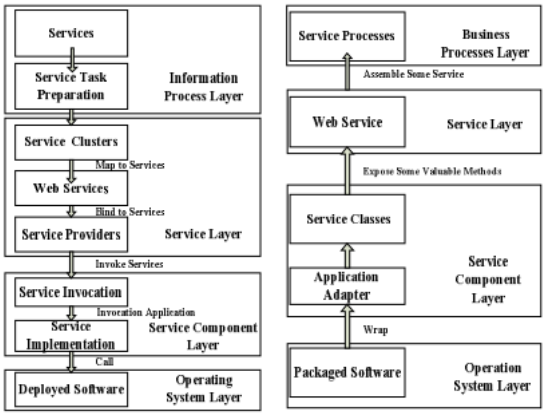

Figure 4. MSIS process management intop-down& bottom-up approach

As shown in Fig.4, the top-down service process management approach refers to the procedure of recursively decomposing a MSIS process into sub-processes or tasks and decomposing a sub-process into smaller sub-subprocesses, until each task is manageable and can be realized by service, either existing services or services thatcan be developed. The bottom-up service process management approach refers to the procedure of configuring, mediating, transforming, adapting, and integrating existing services into MSIS processes. Actually this approach is more about the services composed from bottom to the top. Based on the advantages and disadvantages of the two approaches, we have devised a novel approach that can combine them together and then reserve the superiorities and remove the shortcomings of them. The improved MSIS process management approach is shown in Fig.5 below.

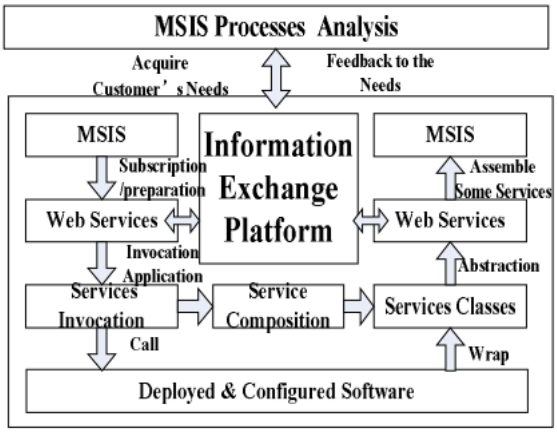

Figure 5. Improved MSIS Process Management Approach

As shown in Figure.5, we have combined the top-down & bottom-up approaches into an integrated one, where there is an information exchange platform, on which the customers' needs of the MSIS processes can be acquired and analyzed in a real-time way, i.e., on one hand, customers can subscribe their needs on the information exchange platform, and there is a service catalog on it too. At the layer of deployed and configured software, the service components are wrapped and integrated intoreusable software components in a specific programming language, such as Java classes. On the other hand, the generated solutions fromservice classes can be exposed to the upper layer and abstracted as Web services, which will interact with the information exchange platform again, and then the Web services can be assembled into MSIS processes, which act as the feedback to the customers' needs. In the whole process of MSIS, it is the information exchange platform that plays the role of bridging the gap between existing services requiring transformation and the entire system with limited architectural styles.

In this paper, we have proposed a MSIS process model which provides an efficient way to manage it, and have shown that the MSIS process management in Cloud Computing environment is a inter-related between service process management and the deployment of Cloud Computing, in which the high inter-affective will be largely enhance the performance of service offerings.

5. CONCLUSION

In this paper, we have proposed a MSIS process model which provides an efficient way to manage it, and have shown that the MSIS process managemen in Cloud Computing environment is a inter-related between service process management and the deployment of Cloud Computing, in which the high inter-affective will be largely enhance the performance of service offerings.

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