

Data Migration between Crossbreed Platform using Ant Colony Optimization

Dilbahar Singh, Sumit Kumar Yadav, Gaurav Kumar

Abstract—In this fast moving world of digitization, cloud computing is becoming an essential part of the daily life if you are somewhat related to the business. Keeping the data secure on the server has become one of the major issues. With the increase in the time factor cloud services has become one the most challenging environment in this world. To overcome this problem cloud computing has emerged into the world but it is quite expensive. Now the problem is if you want to transfer the data along with its architecture from one server to another, it is important to keep the data secure and safe until and unless it reaches to the server end. Cross platform data transfer has been an issue from the last few decades. It has been seen that each and every platform uses different types of protocol for the architecture. In this paper we are proposing a technique for migration of the platform architecture along with the data with perfect accuracy to another cloud platform using Simple Object Access Protocol (SOAP) and Ant Colony Optimization (ACO) concept in Role-Based Access Control System (RBAC) will take a lot of effort due to the sophisticated architecture of a system protocol. This may lead to a new era in the cloud computing.

Index Terms— Ant Colony Optimization, Cloud Computing, Migration of Platform Architecture with data, Role-Based Control System, Simple Object Access Protocol

I. INTRODUCTION

Cloud computing provides a computer user access to Information Technology (IT) services i.e., applications, servers, data storage, without requiring an understanding of the technology or even ownership of the infrastructure. Companies have their own infrastructure maintained in proper ways and the user simply uses the resources without having the ownership or operational responsibilities. Cloud computing is a subscription-based service where you can obtain networked storage space and computer resources. Cloud computing enable the users for sharing of resources, software and information on-demand on the basis of a fee-for-service. The concept of cloud computing and virtualization has gained much momentum and has become popular technology in IT field. Infrastructure as a Service providers use virtualization to abstract their hardware and to create a dynamic data centre. Virtualization aids in the consolidation of virtual machines and also the migration of these machines to other hosts in runtime. Each provider uses its own methodology to efficiently work on a data centre.

Manuscript received on March, 2013

Mr. Dilbahar Singh, Department of Computer Science and Engineering, Lovely Professional University, Phagwara, Punjab, India.

Mr. Sumit kumar Yadav, Department of Computer Science and Engineering, Lovely Professional University, Phagwara, Punjab, India.

Mr. Gaurav kumar, Department of Computer Science and Engineering, Lovely Professional University, Phagwara, Punjab, India.

There are the various services which are expressed as:

Software as a Service (SaaS): This perspective refers to a service delivery model in which remote component is used business services are accessible through a software interface and can be combined to create new business services delivered via flexible networks.

Platform as a Service (PaaS): Cloud systems can offer an additional abstraction level: instead of supplying a virtualized infrastructure, PaaS can also help to provide the software platform where systems run on. The sizing of the hardware resources demanded by the execution of the services is made in a transparent manner. In other words PaaS is the delivery of a computing platform and solution stack as a service.

Infrastructure as a Service (IaaS): Infrastructure Providers handle a huge set of computing resources that includes storing capacity and processing capacity. Through Virtualization, they are capable of dividing, assigning and dynamically re-sizing these resources to build ad-hoc systems as required by customers. They explore the software stacks that run their particular services.

Hardware as a service (Haas): Hardware as a Service gives remote control over raw hardware resources. The client user might just require allotted CPU count to be increased.

Cloud computing provides various types of cloud models:

Private cloud: This cloud infrastructure is provided for restricted use by a single organization consisting multiple consumers (e.g., business units). It is owned, handled, and operated by either the organization, or a third party, or any combination of them, and the cloud may exist on or off the premises.

Community cloud: The infrastructure of cloud is made for exclusive use by a specific community of consumers from organizations that have common concerns such as mission, security requirements, security policy, and compliance considerations. It may be owned, handled, and operated by one or more of the organizations in either the community or a third party, or may be the combination of clouds, and it can exist on or off premises.

Public cloud: The infrastructure of cloud is allowed for open use by the public in general. It may be either owned, or handled, and operated by a business, or by academic, or by government organization, or may be by some combination of them. It is present on the premises of the cloud provider.

Hybrid cloud: The infrastructure of cloud is a combination of two or more different cloud infrastructures such as private cloud, community cloud, or public cloud and that remain unique entities, but are combined together by standardized technology that allows data and application portability for example cloud bursting for ACO between clouds.



Data Migration between Crossbred Platform using Ant Colony Optimization

Migration of the entire data along with the architecture has always been an issue to be discussed. The main reason behind that is each and every cloud server uses its own type of protocol for the communication. When this type of migration is taking place various issues figure out related to the data security, system architecture or protocols compatibility will allow or support the data migration or not and there is any backup in case of data loss and any failure in transaction. For this purpose we are using Ant Colony Optimization (ACO) algorithm is a computer networking methodology to distribute the work across multi computers or may be clusters of computer, to provide optimal utilization of resource, maximizing of throughput, minimize the response time, and avoid the overload. ACO in cloud varies from classical thinking on balancing of load architecture and implementation by utilizing commodity services and to balance load distribution, migrate the load from the source nodes (which have surplus workload) to the comparatively lightly loaded destination nodes. By this increase the performance considerably, maintain the stability of the system, have a backup plan when system fails partially and accommodate the future variations in the system. Here we are going to analysis the accuracy, efficiency and data security of the transferred data before and after migration.

II. RELATED WORK

Migration of the entire data along with the architecture has always been an issue to be discussed. The main reason behind that is each and every cloud server uses its own type of protocol for the communication. Several researchers have put their methodology in this contrast. Here is an overview for some of them.

Sudipto Das, Shoji Nishimura et.al (2009-10) gave their opinion about the database services of the cloud to solve out the upper issues of the cloud platform. They say that whatever cloud platform you are using, they provide SQL query service to get the query execute into the system. So a scheme of scripts came into action from the very that moment. For this purpose Microsoft adapted a Script wizard service to migrate the data along with the architecture but somehow it did not work appropriately [1].

Mohammad Hajjat and Xin Sun et.al (2011) solves the issue of the TCP calling in their research work in their published paper. They said that to configure an IP which does not belong to the server at which you are currently in, one can use the IaaS services of the cloud. IaaS is the infrastructure as a service thing which is one of the basic entities of the cloud platform. Now to configure IaaS at your system, one will have to purchase the licensed version of the cloud space. The migration can be done using any platform but the basic issue is whether hundred percent data will be migrated or some data loss would be there [2].

Aaron J. Elmore et .al (2011) said that why we need to migrate only the database from one platform to another if we can keep the entire application on the cloud. He put a strong emphasis over the security of the application as well as the data. His logic was somewhat true but purchasing space for both the application and the database is not a cheap target for the common people as we are thinking of the cloud to be a general platform for all of the general public who uses the internet to keep their data secure [3].

Consiglio Nazionale delle Ricerche et.al (2012) explain the

working over the cloud platforms for the last few decades. According to him the general migration issue raises when your data is not secure at the one platform. Now the issue comes that whether we can transfer the data with the architecture from one end to another. He proposed that if we can use the TCP/IP technique to find out at which server the data is going to be migrated and if we can configure it to the server from where the data has to be migrated can make a difference into the migration but he did not talk about how an existing architecture allows the second server to be configured into itself [4].

Chaim Fershtman and Neil Gandal et.al (2012) talked about the eco friendly migration of data through the advanced scripting system. If we see for an example of SQL SERVER 08 it can encrypt the data along with the architecture and it consumes a less amount of energy also if we can run the advanced script over the cloud. For this proposal to take place , other cloud services started working on it and as a result we can see different cloud servers using run a script method into their architecture as software as a service parameter [5].

A similar approach is described by Mishra Ratan and Jaiswal Anant et.al. (2012) that says there are different issues in traditional cloud computing. That includes fault tolerance, load management, and also different security issues while working in cloud environment. Here, load balancing is the main issue that is described in context of cloud computing. Now the load can be of difference categories such as Network load, CPU load or it can be the Memory capacity or delay. Load balancing can be defined as the distribution of the load between various nodes or terminals while we are working in a distributed environment. It can enhance the total resource utilization and the Response time of the Job. Ant Colony Optimization (ACO) is used here to solve the typical load balancing problem in context of cloud computing environment [6].

Pat Gelsinger et.al (2012) proposed a system for economic service over the cloud computing. He said that you can keep the application at some server which is cheaper and you can have the database at the cloud which is strong enough to keep your data secure. But there is an issue of the server where your application is running, what is the server gets down and someone is in the middle of a very important transaction. To serve such system, concept of back up was proposed later on [7].

Jayson Tom Hilter talks about the SOAP proto calling in his words. SOAP is an XML-based messaging framework specifically designed for exchanging formatted data across the Internet, it can be explained with the example of using request and reply messages or sending entire documents. It is not affected with the different operating system, programming languages, or platform of distributed computing. A more efficient way was needed to explain the messages and how these messages are communicated. The Web Services Description Language (WSDL) is a specific form of an XML Schema, implemented by Microsoft and IBM for defining the XML message, its operation, and its protocol mapping of a web service used during SOAP or other XML protocol [8].



Linan Zhu, Qingshui Li and Lingna He (2012) proposed an algorithm for the cloud computing resources scheduling based on Ant Colony Optimization (ACO) that produced better results in load balancing and scheduling of the resources as compare to the other algorithms. They told how tasks are scheduled or classified on the basis of Service of Quality (QoS) parameters these are network bandwidth, service completion time, system reliability and costs. Service of Quality (QoS) classification parameters classified the user's tasks priority order and used the Ant Colony Optimization (ACO) algorithm for implementation of resource allocation and scheduling [9].

Vipul Snehadeep Chawathe (2012) talked about how the task of data mining can be done using Ant Colony Optimization (ACO) when the data or sources are logically distributed over the cloud or data center. Classification of task will be done by the help of ACO which is a random stochastic population based heuristic algorithm give the computational theory language rules for the classified data and classification is done within the data mining operations on databases for knowledge discovery information's. Ant Colony Optimization (ACO) used as the Ant- Miner algorithm for knowledge discovery from data centers [10].

The migration work from the local server to a server which is desired, different platforms has been used for the migration like .NET, JAVA etc but till now it has not been tried to migrate a bulk amount of data from a cloud server to another cloud server. The reason behind this is all the cloud servers use different type of protocol architecture. Now it is not compulsion for a cloud server to use the same type of protocol architecture.

III. PROPOSED WORK

To ensure the successful migration of the data along with the architecture we need to develop a platform which can interact with both the platforms simultaneously. We will be ensuring the successful implementation of the TCP/IP protocol of one service into the local server so that its configuration can be merged into the second server. To create an intermediate service for the communication, we will be using the SOAP proto calling service and will check that whether that service is working properly with the SaaS service of the cloud platform or not. For migration of the platform architecture along with the data with perfect accuracy to another cloud platform using Simple Object Access Protocol (SOAP) and Ant Colony Optimization (ACO) concept in Role-Based Access Control System (RBAC) which helps to convert the existing server architecture protocol into intermediate service reference and move the service reference to another cloud platform to ensure the successful removal of the architecture from one platform to cloud. Then we would be fetching the architecture first from the home server with the use of XML SOAP service to ensure the creation of the basic building block of the architecture to the another server. We would run the XML fetched architecture to the any cloud platform to check whether our implemented service (intermediate) is able to communicate with it or not .If yes then we would be using the data contract service of Windows Communication Foundation (WCF) to fetch the data and to merge it into the existing Extensible Markup Language (XML) architecture. Then a final service will run to ensure the safe removal of the data along with the architecture from

home server to cloud.

And in another way we can say that we first need to configure the protocol of every server we are communicating with the help of Ant Colony Optimization (ACO). It is an algorithm which will establish the relationship of every server to each other. For this purpose we would use SOAP protocol communication which would act as an intermediate protocol suite which would help our local server to understand the communication portal of the cloud server. Now with the help of the XML WEB SERVICES we would fetch the entire structure to our local server and then as per the algorithm discussed we would migrate it to another cloud server. Then we would repeat the same for the data migration process. In this we are checking the data accuracy after and before the data transfer. We would be keeping a copy of the architecture at the local server to ensure the recovery in case of any failure.

IV. CONCLUSION

This research has a wide scope in point of reducing the load over the server to give out the optimized result. It can also be helpful in the security policies over the cloud computing as well as to the ease of access and the areas of searching in the field of cloud computing. In this paper we are finding out a unique crossbreed application architecture which can convert protocol architecture into an intermediate architecture which is completely understandable by service architecture so that we can move up the entire data architecture along with the data from one server end to another without any data loss. Hence our objective is analyzing the data accuracy after and before the data transfer. In the future, we plan to extend this approach for mining the encrypted multimedia content like text file, image file, video file and other encrypted files using some encryption techniques.

REFERENCES

1. Sudipto Das, Shoji Nishimura, Divyakant Agrawal, Amr El Abbadi, "Live Database Migration for Elasticity in a Multitenant Database for Cloud Platforms", UCSB Computer Science Technical Report 2010-09.
2. Mohammad Hajjat, Xin Sun, Yu-Wei Eric Sung, David Maltz, Sanjay Rao, Kunwadee Sripanidkulchai, and Mohit Tawarmalani, "Cloudward Bound: Planning for Beneficial Migration of Enterprise Applications to the Cloud", IJSC VOL 2 ,2011.
3. Aaron J. Elmore Live Migration in Shared Nothing Databases for Elastic Cloud vol 1 2011.
4. Flavio Lombardi, Roberto Di Pietro, "Secure virtualization for cloud computing," ELSEVIER 2010.
5. Chaim Fershtman and Neil Gandal, " Migration to the Cloud Ecosystem: Ushering in a New Generation of Platform Competition Forthcoming," COMMUNICATIONS & STRATEGIES, no. 85, 1st Q. 2012.
6. Ratan Mishra and Anant Jaiswal, "Ant colony Optimization: A Solution of Load Balancing in Cloud," International Journal of Web & Semantic Technology (IJWesT) Vol.3, No.2, April 2012.
7. Pat gelsing, "Hybrid Cloud Data Migration," Amazon journal 2012.
8. Jayson Tom Hilter, "Elastic Migration of the cloud for security enhancement," EC2 Journals.
9. Linan Zhu, Qingshui Li, and Lingna He, " Study on Cloud Computing Resource Scheduling Strategy Based on the Ant Colony Optimization Algorithm," IJCSI International Journal of Computer Science Issues, Vol. 9, Issue 5, No 2, September 2012.
10. Vipul Snehadeep Chawathe, "ACO based Mining of a Cloud Data Center," International Journal of Engineering Research and Development Volume 2, Issue 3 (July 2012), PP. 65-68.

AUTHORS PROFILE



Dilbahar Singh has completed graduation (B.Tech) in Computer Science Engineering from CCS University, Meerut in 2011. Currently, he is pursuing his Master Degree (M.Tech) in Computer Science and Engineering from Lovely Professional University. He has keen interest in data mining, data warehousing, cryptography and Cloud computing fields.



Sumit Kumar Yadav has done his graduation (B.Tech) from UPTU in 2008 and received a M.S degree in information security from IIT, Allahabad, India. Currently, He is working as the Assistant Professor of Computer Science and Engineering in Lovely Professional University, Jalandhar. His current research includes Database, Data mining and Data warehouse. He has done a lot of research in this field and has published many papers in International Journals and Conferences.



Gaurav kumar has completed post graduation (M.Sc) in mathematics from HNB Garhwal University, Srinagar in 2010. Currently, he is pursuing his Master Degree (M.Tech) in Computer Science and Engineering from Lovely Professional University. He has keen interest in data mining, cryptography and Cloud computing fields.