

Survey on Various Existing Data Transferred Method in Cloud Computing Environment

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Abstract: - Cloud computing is the latest technology in the field of computer science and received significant attention from the researcher as well as industries. It became so popular in very short time due to its valuable features like utility based, scalable etc. It gives the computing resources like CPU, bandwidth, memory to the customer on demand. For this purpose they used the virtualization technology which is the core technology in cloud. Virtualization is the mechanism which enables the cloud provider to divide the physical resource of the server into the multiple parts and assign each part to the user according to their needs. Live migration of the virtual machine is one of the features of the virtualization and pay significant attention by the researcher in very time. It facilitates in various situations like load balancing, server maintenance, server consolidation etc. Several steps are involved in the migration process. These steps are source physical selection, virtual machine selection, target physical machine selection and selecting method for transferring the virtual machine data. Number of methods is available for transferring the virtual machine data like pre-copy, post-copy and stop and copy. This paper discussed various methods used for transferring the virtual machine data with their limitations.

Keywords: - Virtual machine, physical machine, migrations, pre-copy, post copy, stop and copy.

I. INTRODUCTION

Cloud computing is the fastest growing new technology in era of computer and IT industries [1]. It is so popular in due to its quality and cheapest services. It is a utility model and support for an on demand services. Since it support utility model so user pay only for the resources which they actually used [2] several definitions are available to define the cloud. According to the NIST standard "cloud computing is a model for enabling ubiquitous, convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications and services) that can be rapidly provisioned and released with minimal management" [3]. Cloud support various type of services and can be implemented in multiple

ways. Figure 1 shows the various services and the deployment model of the cloud computing [2, 3]. Cloud support three type of delivery model. These delivery models are software as a services (SaaS), platform as services (PaaS) and infrastructure as services (IaaS). In SaaS only software are given to the user on the rent basic. User uses these services anytime at anywhere. One of the biggest advantage of the SaaS is that no need to installed any software to use the cloud services. Gmail is the one well known example of the SaaS model.

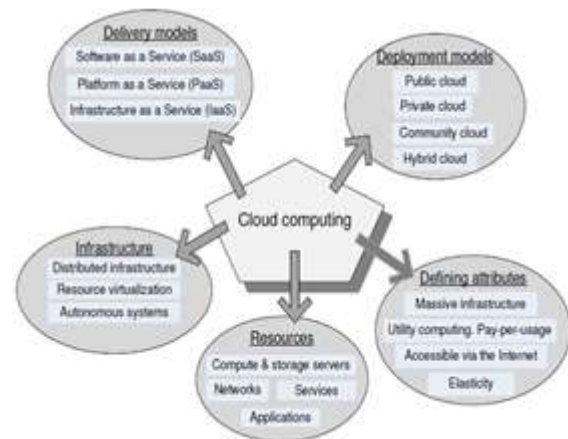


Figure 1: Cloud Model

PaaS and IaaS offer the complete infrastructure which is required to developed new application. It can offer hardware, software, applications, network etc. User can access the cloud services at any time when they want. Virtualization [4, 5] is the technology which makes possible the concept of virtualization. It is the core technology in the cloud and without virtualization we can't think about the cloud. It gives the required resources to the user. For this purpose virtualization divide the physical resources into the multiple types. Figure 2 shows the concept of virtualization [6]. Virtual machine (VM) migration [7, 8] is one of the important features of the virtualization because it enabled the provider to move the VM from one physical machine (PM) to another PM. It facilitates in various situations like load balancing [9], server maintenance, server consolidation [9] etc. Several steps are involved in the migration process. These steps are source physical selection, virtual machine selection, target physical

machine selection and selecting method for transferring the virtual machine data. Number of methods is available for transferring the virtual machine data like pre-copy, post-copy and stop and copy. This paper discussed various methods used for transferring the virtual machine data with their limitations.

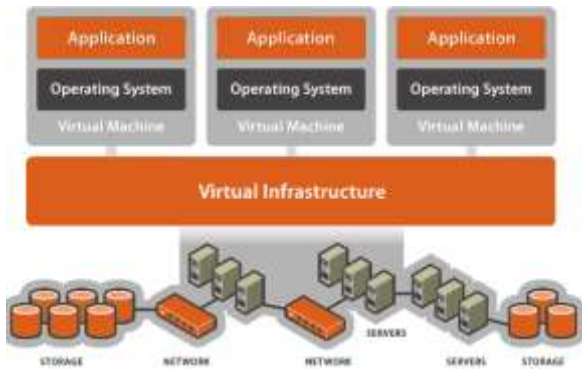


Figure 2: Concept of Virtualization

II. METHOD USED FOR THE VIRTUAL MACHINE MIGRATIONS

Several methods are available for transferring the VM data from one PM to another PM. Which method is good is measured in term of total migration time and down time. Total migration time is the time interval which is required by the VM to complete their execution whereas down time is the time for which VM services are not available to the user. An effective migration approach has minimum total migration time and down time [10, 11].

Stop and copy: - It is an offline approach for transferring the VM data from one PM to another PM. According to this approach VM executing on the source PM is stopped and then moved all VM pages from the source PM to the target PM. When all pages are transferred from source to destination PM then VM is resumed on the target PM.

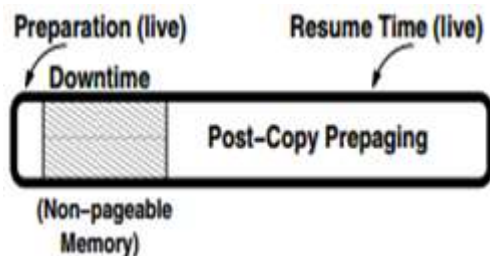


Figure 3: Post copy approach

Post-Copy: - Post copy [12] approaches provide the solution to migrate the VM without the suspension of the services running on the VM. It is a live migration approach for the migration. In these approaches stop the VM on the source PM and then send the minimum data of the VM that required starting the VM on the target PM. Now VM is start on the target PM and transferred the

remaining pages to the target PM. Figure 3 shows the architecture of the post copy approach.

Pre-Copy [13]: - This approach also provides the solution to migrate the VM without the suspension of the services running on the VM. It is a live migration approach for the migration. In these approaches in the first iteration we transferred all memory pages to the destination PM while VM is still running on the source PM. In the second iteration we transferred all the VM data which is modified in the first iteration. This process is continuing until it reached to the maximum number of iteration or minimum size. Figure 4 shows the architecture of the pre copy approach.

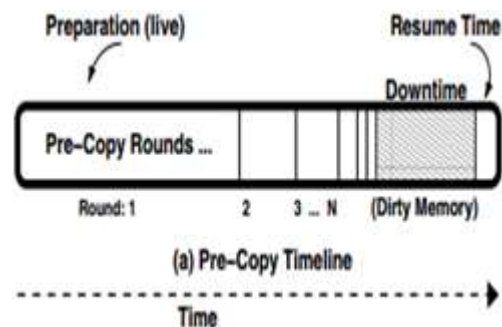


Figure 4: Pre copy approach

III. RELATED WORK

Li Jiabin et al. [14], proposed a VM scheduling approach for assigning the resources to the multi-tenant in the cloud environment. In this approach first they design the formula for allocating the VM to the multi-tenant. This formula considered the requirement of multi-tenant. After this they proposed approach an algorithm for placing the VM which uses the Multiple Knapsack Problem (LP-MKP) this approach successfully reduced the resource fragmentation in cloud.

F. Ma et al. [15], proposed an improved version of the pre copy approach. This approach try to remove the limitation of the traditional pre copy approach where the page is send to the target PM where the page is modified in the last iteration. This approach allows maintaining the record of previous history of the page and then taking the decision on the basis of previous history. Three types of bit map are used by this approach i.e.to-send, to-skip & to-fix. Page which is frequently modified is stored in send- to- last bitmap to-send - bitmap contains the pages modified in previous iteration to-skip - contains the pages modified in current iteration to-fix - contains the pages which are fixed to be sent in last iteration.

to-send	0	1	1	0
to-skip	0	1	0	1
Send/not	no	no	yes	no

Page is send to the target PM when the value of to-send and to skip is 1 and 0 respectively. This approach can minimize the total number of page transferred in the migration process but if the page is change or modified sequentially then approach has no effect.

M.R. Desai et.al [16], present an improved version of migration approach proposed by the F. Ma []. Main limitation of the above approach is that if the page is change or modified sequentially then this approach may increase the number of page transferred. To remove this limitation they used the ratio of K/N where K is threshold value of the dirty pages and N is the number of previous history. In this approach if the page is modified more than K times then page is considered as a high modified page and can't transferred to the target VM. Page is send to the target PM when the page is modified less than K times. This approach may reduce the total number of page transferred in the migration process. Main limitation of this approach is to set the accurate value of K .

S. Joshi et al. [17], proposed cuckoo search approach for the virtual machine consolidation. Main objective of this approach is to reduce the energy consumption and resource wastage. Main concept of this approach is the life cycle of Cuckoo bird which keeps their eggs to the other bird nest. In order to reduce the resource wastages vector projection method is used which the PM to the PM where resource utilization of the VM is opposite to the resource used by the PM. This approach reduced the resource wastage.

H. Jin et al. [18] present the solutions for transferring the VM data by using the logs file. In this approach instead of transferring the VM data they send the log files which generated during the execution. Main idea behind this approach is that they think that logs files are smaller in size as compare to the normal VM data pages. So it will reduce the total migration time. This approach may minimize the total down time but it is very difficult to implement practically because to recover the data at the destination they replay the data. So if the source and destination PM has the different configuration then this approach can't be implemented because if two PM has different CPU then have different clock rate, speed etc.

A. Alahmadi et al. [8], present energy aware VM scheduling approach called EATS-FFD. In this paper they consider FFD as a base approach and make some modification to improve the VM scheduling policies. Local and global manager are used for the scheduling purpose. All user tasks are submitted to the global manager then global manager find the resource requirement of the task and send to the appropriate local manger.

IV. CONCLUSION

It facilitates in various situations like load balancing, server maintenance, server consolidation etc. Several steps are involved in the migration process. These steps are source physical selection, virtual machine selection, target physical machine selection and selecting method for transferring the virtual machine data. Number of methods is available for transferring the virtual machine data like pre-copy, post-copy and stop and copy. Some approaches also use the log file to move the data from source to the target server. This paper discussed various methods used for transferring the virtual machine data with their limitations.

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