

## **REDUCING DOWNTIME OF VIRTUAL MACHINES MIGRATION USING CLOUD CACHES EFFICIENT MIGRATION OF VMs WITH 99% REDUCED DOWNTIME**

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### **ABSTRACT**

There are various reasons behind migration of virtual machines running on one host to another due to of maintenance of the server, Load Balancing, to maintain SLA agreement or website migration. While these situations happens we require to transfer the data of VM from one host to another. There are two Techniques which are commonly used to migrate virtual machines between two physical server.i.e Pre-Copy and Post Copy with their advantages and disadvantages. In pre-copy while migration there is downtime occurs to redirect the traffic from one physical server to another. we present new idea to reduce the approximately 99% of downtime while transfer Virtual machine from one host to another by using the cloud caches technique. After implementing this technique we can reduce the most of downtime of the live virtual machine.

**KEYWORDS:** VM Migration, Downtime, Migration Time

### **INTRODUCTION**

Virtualization is the best way to create number of users on the single physical server. But sometimes the due to heavy workload or higher user demand we fail to provide high Resources to users like CPU computations and RAM Memory on the same physical machine.[1] To fulfill the demands of the user we either need to scale up the server or migrate few virtual machines from one host to another physical for balance the load. The scale up technique is costly and hard to implement because it need physical presence of manpower. To resolve this problem we use a technique called live migration of VM's from one host to another host. While migrate we must take care about the policies of companies. Most of companies committed to users to provide 99.99% uptime hence 5 minutes downtime in a 365 Days. To maintain this agreement we always focus on reduce the downtime of our services (VM availability).

Before Migrate VM on another host we first predict the load on all available physical servers. Advanced model for efficient workload prediction in the cloud, we can predict the available resources on the available physical servers. [2]

After analysis of load on various physical machines we select the appropriate. While migrating data of virtual machine from one host to another we use high speed LAN interconnections. The Best available technique to migration arepre-copyand Post-copy.

In the pre-copy approach for live VM migration is the contents of the VM's memory are first sent to the target host and then the VM is restarted. Another approach is post-copy.[3] Here, only the VM's VCPU and device state is sent to

the target host and restarted there immediately. Memory pages accessed by the VM are then fetched in parallel and on-demand while the VM is running on the target host.

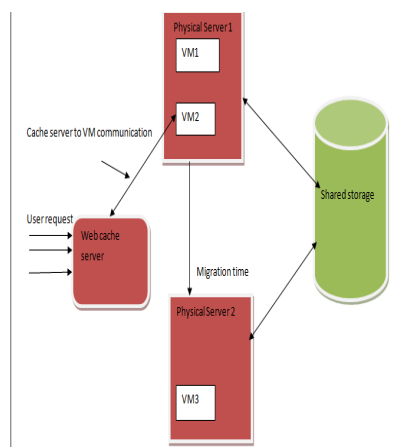
## RELATED WORK

In pre-copy we first compress the whole data of the VM on present host and send it to the target host.[4]On the target host we can decompress the data and enable the VM on that host and disable the previous host and traffic (User requests) are redirected to the location of new server. We used a Huffman Coding compression algorithm to reduce the live migration time from one to another host.[4] In the goal to reduce downtime another technique is provided by Changyeonet. al. in which we can use shared secondary storage between two physical hosts.[5] According to this paper we don't need to transfer the secondary storage data while migration because of availability of same link of shared file system storage between both physical servers.

Using the existed presented methods like Pre-copying, Post Copying, Data Compression and Shared Secondary storage, we can reduce the downtime at some extend but we proposed a new method which can give the better performance to reduce the downtime up to 99%. In this technique we are using followings ways to reduce the downtime.

- We proposed a method which can reduce the downtime while live migrating VM's between two hosts by providing cache server. While migrating VM from one to another host user requests should be handled by the cache server.[6]
- On cache server Most recently used pages are already available. We predict the user required pages before the time of actual migration of VM from one server to another. And load that pages in the cache memory. if user request that page while migrating that request should be served by the cache server. If user request to change that data available on cache server then that requests should be stored in the Queue on the cache server and further that changes would be reflected on the Actual VM After successful migration.
- We can use the single shared cache server for both the physical servers. Figure 1 shows the clear view web cache method implementation.

## PROBLEM DESCRIPTION AND HANDLING



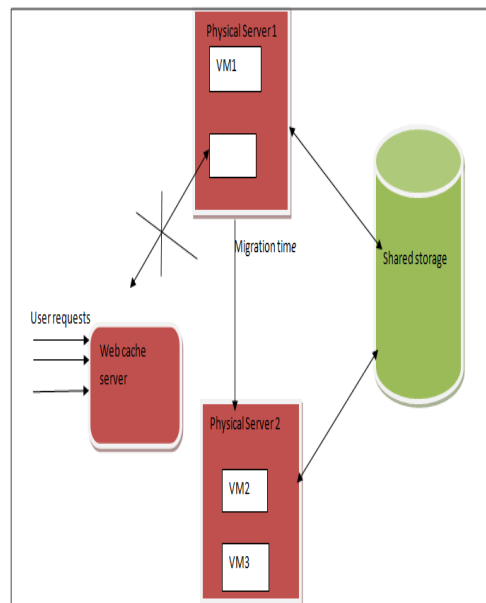
**Figure 1: User Made Requests for VM (Which is Migrating) Page but Due to Downtime it is Un-available. So Request is Handled by the Cache Server. (Before Migration)**

- **Before Migration**

In the figure 1 we can load the user required pages in the web cache so that whenever we migrate the VM to another physical machine that pages should be available for user to fulfill the request.

- **While Downtime**

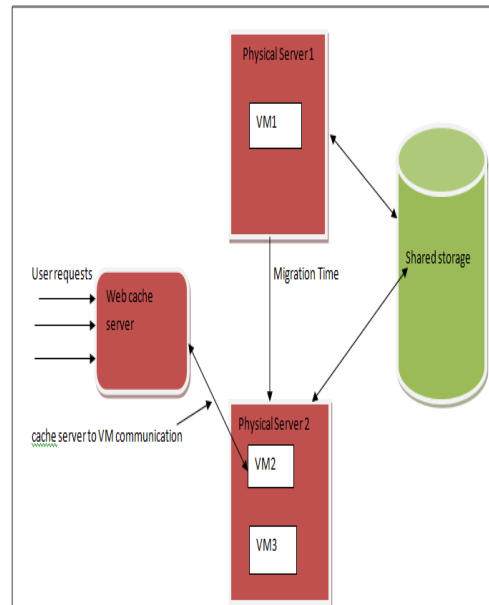
In present available techniques, this time is considered as downtime. But we implemented web cache server to handle the user requests as a frontend and backend VM is restarting and CPU state is transferred to the new Physical machine server.[7]But still user using services even backend is migrating and down. In this way user does not suffer downtime.



**Figure 2: Downtime While Migration but User Requests Handled by the Web Cache Server**

- **After Migration**

After the completion of migration, Control of web cache server is handover to the Migrated VM machine on 2nd physical server to continue communication between cache server and migrated VM.



**Figure 3: Shows the Exact View of Control Handover to the 2nd Physical Machine VM Handled by the Web Cache Server**

## CONCLUSIONS

In this we discussed how we able to reduce the downtime of virtual machines using pre-copy and post –copy techniques. We provide an overview how virtual machines handle by web cache sever and their all three phase before migration, during migration and after migration.

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