Techniques of Data Migration in Cloud Computing

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Abstract: *Data migration is the process of transporting data between computers, storage devices or formats. It is key consideration for any system data implementation, Upgrade or consolidation. During data migration, software programs or scripts are used to map system data for automated migration Once the data migration is complete, an organization validates statistics to determine data accuracy. Finally, data cleaning facilities improve data quality via the removal of unnecessary or repetitive data.*
This paper presents the different data migration techniques.

Keyword *- Data migration, data migration Techniques, data migration services*

I. INTRODUCTION

Cloud computing is a means of providing computer facilities via the Internet, but that is only half of the picture. The other half is that it is also a means of accessing those same computer facilities via the Internet from different locations. When a large bank, for example, moves to cloud computing for online operations, it necessarily considers both halves of the equation. The adjective "cloud" reflects the diagrammatic use of a cloud as a metaphor for the Internet. In telecommunications, a cloud is the unpredictable part of a network through which business and personal information passes from end-to-end and over which we do not have direct knowledge or control.1 Most of us have been using cloud-computing facilities in one form or another for years through ordinary email and the World Wide Web. Recently, the term has come to reflect the use of software and the running of computer applications via the Internet where the computer infrastructure and software are not "on premises." Cloud computing is an evolving concept, even though major financial institutions, consulting organizations, and software vendors have invested heavily in the technology and associated business practices, and the U.S. Government has endorsed the model for federal computer operations (1)

II. SERVICES OF DATA MIGRATION

Cloud Computing Services Main Cloud Computing Services are given below: a. Infrastructure-AS-A-Service. b. Platform-AS-A-Service. c. Software-AS-A-Service.
2.1. Software-as-a-Service (SaaS): SaaS can be described as a process by which Application Service Provider (ASP) provide different software applications over the Internet. This makes the customer to get rid of installing and operating the application on own computer and also eliminates the tremendous load of software maintenance; continuing operation, safeguarding and support]. SaaS vendor advertently takes responsibility for deployingand managing the IT infrastructure (servers, operating system software, databases, data center space, network access, power and cooling, etc) and processes (infrastructure patches/upgrades, application patches/upgrades, backups, etc.) required to run and manage the full solution. SaaS features a complete application offered as a service on demand. In SaaS, there is the Divided Cloud and Convergence coherence mechanism whereby every data item has either the ―Read Lock‖ or ―Write Lock‖ . Two types of servers are used by SaaS: the Main Consistence Server (MCS) and Domain Consistence Server (DCS). Cache coherence is achieved by the cooperation between MCS and DCS . In SaaS, if the MCS is damaged, or compromised, the control over the cloud environment is lost. Hence securing the MCS is of great importance. Examples of SaaS includes:Salesforce.com, Google Apps.
2.2 Platform as a Service (PaaS): Customer deploys applications using an application development environment and middleware capabilities for specific languages like java, python, .net etc. and doesn't control infrastructure, servers, OS, or storage but has control over the apps. Some examples of PaaS vendors include Microsoft Azure, Amazon, Force.com
2.3 Infrastructure as a service (IaaS): refers to the sharing of hardware resources for executing services using Virtualization technology. Its main objective is to make resources such as servers, Network and storage more readily accessible by applications and operating systems. Thus, it offers basic Infrastructure on-demand services and using Application Programming Interface (API) for interactions with Hosts, switches, and routers, and the capability of adding new equipment in a simple transparent manner. In General, the user does not manage the

underlying hardware in the cloud infrastructure, but he controls the Operating systems, storage and deployed applications. The service provider owns the equipment and is Responsible for housing, running and maintaining it. The client typically pays on a per-use basis. Examples of IaaS include Amazon Elastic Cloud Computing (EC2), Amazon S3, and GoGrid.(7)(9)

III. DATA MIGRATION TECHNIQUES

Live Virtual machine Migration is a technique that migrates the entire OS and its associated application from one physical machine to another. The Virtual machines are migrated lively without disrupting the application running on it. The benefits of virtual machine migration include conservation of physical server energy, load balancing among the physical servers and failure tolerance in case of sudden failure. The different virtual machine migration techniques are as follows

2.1 Fault Tolerant Migration Techniques

Fault tolerance allows the virtual machines to continue its job even any part of system fails.
This technique migrates the virtual machine from one physical server to another physical server based upon the prediction of the failure occurred ,fault tolerant migration technique is to improve the availability of physical server and avoids performance degradation of applications.

2.2 Load Balancing Migration Techniques

The Load balancing migration technique aims to distribute load across the physical servers to improve the scalability of physical servers in cloud environment. The Load balancing aids in minimizing the resource consumption, implementation of failover, enhancing scalability, avoiding bottlenecks and over provisioning of resources etc.

2.3 Energy Efficient Migration Techniques

The power consumption of Data center is mainly based on the utilization of the servers and their cooling systems. The servers typically need up to 70 percentage of their maximum power consumption even at their low utilization level. Therefore, there is a need for migration techniques that conserves the energy of servers by optimum resource utilization. (3)(10)

IV. APPLICATIONS

Microsoft identifies the following eight types of applications to be considered   for migration to the Cloud
1. SaaS applications
2. Highly-scalable Web sites
 3. Enterprise applications
4. Business intelligence and data warehouse applications
 5. Social or customer-oriented applications
 6. Social (online) games
7. Mobile applications
 8. High performance or parallel computing applications.
 9. Migrate physical and virtual servers
10. Migrate one server or entire application suites
11. Supports Windows and Red Hat Linux applications
12. Supports moves to CSC CloudCompute, CSC BizCloud and CSC BizCloud VPE(4)(8)

V. PERFORMANCE METRICS

The performance of any live VM migration strategy could be gauged by the following metrics
1) Preparation Time: This is the time between initiating migration process and transferring the VMs processor state to the target node, during which the VM continues to execute and dirty its memory.
2) Down Time: This is time during VMs execution is stopped .It includes the transfer of processor state..
3) Pages Transferred: This is the total amount of Emory pages transferred, including duplicates, across all of the above time periods.
4) Resume Time: This is the time between resuming the VMs execution at the target and the end of migration, all dependencies on the source are eliminated.
5) Total Migration Time: Total time taken by migration process from start   migration process to finish the migration process. Total time is very important because of it affects the release of resources on both source and destination nodes.
6) Application Degradation: When Virtual machine migrated from one host to another, the application

performance is degraded which is running on that vm..(3)(10)

VI. CONCLUSION

Cloud Computing, is considered as the next generation architecture of IT Enterprise is a talk of the town these days. The way cloud has been dominating the IT market, a major shift towards the cloud can be expected in the coming years. Cloud computing offers real benefits to companies seeking a competitive edge in today's economy. Many more providers are moving into this area, and the competition is driving prices even lower. Attractive pricing, the ability to free up staff for other duties, and the ability to pay for ―as needed‖ services will continue to drive more businesses to consider cloud computing. Mobile cloud computing is expected to emerge as one of the biggest market for cloud service providers and cloud developers.

In this paper, we surveyed the current research and the data migration techniques or methods and services on live migration..

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