

Modified DVFS – Innovative approach in Cloud Computing

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Abstract— Most trending subject in area of computer science is cloud computing as it is very cheap and best method where you need not to buy costly servers or space. It is totally on the basis of pay per use. Although there are many advantages of cloud computing but still there exists number of disadvantages that lead to issues of cloud computing. Not only this but also there are many energy issues in the cloud computing that is there is lot of the power consumption in the servers. Therefore this power consumption must be reduced in order to obtain efficiency in part of energy. In this paper we have shown the proposed architecture of cloud environment where we have used the modified version of DVFS technique in little different way. This will help in saving of energy during the power consumption in the servers itself.

Keywords—*DVFS, Modified DVFS, VMs, VMM.*

I. INTRODUCTION

Most of the work done in the cloud environment depends on the power consumption or power dissipation of the servers and the security threats that may hamper the security. For example, if a virtual machine is prone to threats and attacked by Co-virtual machines in a network, where the routers are also prone due to insecurity of vulnerable open ports, then it could lead to subscriber data being compromised. On the other hand, if a router is compromised by packet losses & poor throughput, web applications such as email, http, gaming, chat, etc on the Cloud will be give rise to slow response time which may cause our subscribers to choose alternate Cloud providers.

II. ISSUE OF SECURITY IN CLOUD COMPUTING

International Data Corporation enterprise panel report in August 2008 showed the issues faced during Cloud Computing part of development & also depicts the area of security in Cloud Computing dominates all other problems with the increased percentage of 87.5 percent which is the why research

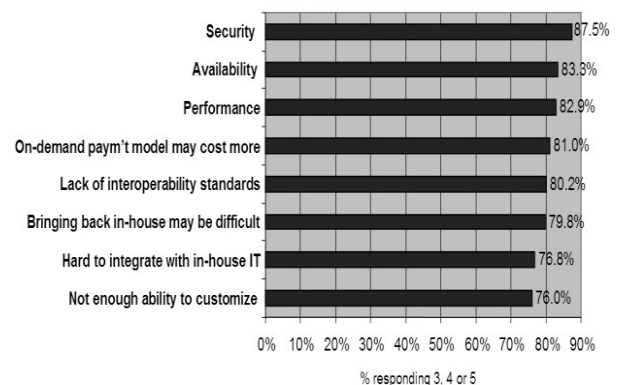
in Cloud Computing issues becomes a major hot spot part While there are many more areas identified as the issues to Cloud Computing which are as follows:

Issues related to Cloud User: The Cloud user may face the following issues:

- A. Issue of data leaks: This is the major issue concern that the data which is of most important part may get leaked by the service providers.
- B. Issue of management right loss: As due to non-clarity of actual location of the service or data, it is difficult to maintain compliance between the different nations of jurisdiction & users should understand this risk related to this.

Q: Rate the challenges/issues of the 'cloud'/on-demand model

(Scale: 1 = Not at all concerned 5 = Very concerned)



Source: IDC Enterprise Panel, 3Q09, n = 263

Figure 1: IDC Report on problems faced during Cloud Computing platform Development in 2008

- C. Issue of unintended data mixture and Issue of data location change virtualization: Cloud Computing has flexible sharing nature. Therefore data of users are placed on a shared hardware which is at the risk of data mixture and location virtualization.
- D. Problem of data recovery and restoration: Data should be completely deleted when requested for this action. Also the data restoration service

should provide data to the user when requested for it.

- E. Challenge of retraction of data: Legal need may request electrical proof be stored and available. Question on how to take back needy information to meet the regulation & legal request is another problem.

Issues to cloud service provider: The Cloud service provider may face the following issues:

- A. Issue of worst compatibility, portability & interoperability: Issues related to incompatible data formats when needed to port virtual machine is of high risk & complete lock on.
- B. Issue of identity & access control breach: Due to the high level of virtualization & centralization users in Cloud environment must be able to make great access control & identity management policies to remain away from imposters.
- C. Issues of user action may caused accident and Illegal results: Users actions must be identified to trace malicious users in the Cloud environment.
- D. Issue of privacy law suits: User privacy may be affected when cloud providers run on users data
- E. Issue of encryption algorithm cracks: There must be strong methods for encryption that are required for hardening of security.
- F. Issue of VMs cross contamination: Virtualization can bring flexibility & may improve capability but at present there is hardly a method developed to isolate & protect the virtual machines.

Issues to the regulators: Regulators can face the below issues:

- A. Issues of publications that is not traceable: Due to flexible binding of resources as like storage, computational power & IP addresses in unstatic way such as in Amazon's Elastic IP mechanism. It may be difficult to find the content publication. The encrypted as well as anonymous information publication place may cause unintended leakage of private information.
- B. Issues of vague jurisdiction: Because of flexibility as well as dynamic nature of data in the Cloud system, information may be located in different countries or spread into different jurisdiction area. Regulative & legal difference could cause more challenge to regulators as well as law enforcement departments.

- C. Issues to the national security: From the Security point of view monopoly Cloud provider may bring Issues to the national security. Cloud service platform may be controlled by hostile forces or used to perform Cyber Attacks.

III. ISSUES IN CLOUD COMPUTING

The Cloud Computing system auditing & network auditing will give insights on the security as well as performance of virtual machines & the OS on many Data Centers and the intra Cloud network supported by cloud providers & the Wide Area network between the Cloud user & Cloud provider. Therefore System Data as well as Network traffic analysis for Cloud auditing is most important so that users can resort to an external audit party. Moreover power management should also be of major concern. So in this section we will be discussing all the issues in detail. We have also shown in below table various issues that are there in the cloud computing. First issue is cloud user in which issue related to data loss, recovery of data, data retraction and many such comes. While in the second case that is in case of cloud service provider also there are issues related to bad compatibility, encryption algorithm cracks, User Action caused accident or Illegal Results exits. Not only this but there are several other issues related to security as well as performance. Next issue which is shown in table is issue related to regulators that is in this case also security is major concern in which national security, Vague jurisdiction and untraceable publication is there. Last issue which is discussed is power management as power dissipation is also major problem because of heavy machines more power is consumed. Therefore voltage and frequency scaling is important in this case where more power is consumed due to heavy large machines. Therefore this is the reason we have used dynamic voltage and frequency scaling with some modified version. This is done in order to reduce the power consumption by various virtual machines and servers of cloud.

Table 1: Cloud Computing Issues for different Cloud domains

Cloud Domain	Issues

Cloud User	• Data leaks • Data Retraction • Virtualization • Management Right Loss • Data recovery and Restoration • Unintended Data Mixture and Threat of Data Location Change
Cloud Service-Provider	• Privacy law suits • Encryption Algorithm Cracks • Virtual Machine Cross Contamination • Identity and Access Control Breach • User Action caused accident or Illegal Results • Bad Compatibility, Portability and Interoperability
Regulators	• National security • Vague Jurisdiction • Untraceable Publication
Power Consumption	• Power dissipation • Load on servers

to verify the security integrity on the network between Cloud-provider and its users and VMs.

IV. PROPOSED ARCHITECTURE

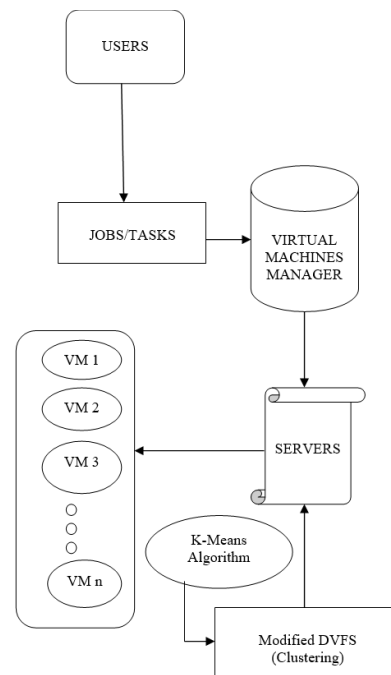


Figure 1: Proposed Architecture with Modified DVFS

Above figure illustrates the proposed architecture for the cloud computing. In this architecture we have shown how the user first sends jobs or tasks to the virtual machines. Virtual machines will allocate those tasks to the servers which further divides those tasks to the concerned virtual machines for which that particular task has been intended. This allocation of tasks to the virtual machine is automatically scheduled according to the scheduling algorithm which will be used. The new or better approach to save the power dissipation is to use the dynamic voltage and frequency scaling technical but with little modification in it. And this modification includes the concept of clustering of the cores processor being used in the servers. In these techniques we will cluster the similar types of cores together which will function as individual unit and then individual tasks will be computed and atlast the result will be compiled up. The main working of Modified clustering based DVFS is as below:

A. Modified Dynamic Voltage and Freequency Scaling

The per-core dynamic voltage & frequency schedule presents the “unconstrained” optimal solution, and our goal is to find a cluster whose performance is as close to this as possible. We use the per-core schedule as a starting point and define a similarity

metric between these schedules for all processors. If we cluster together groups of cores for which the per-core solution is temporally similar over a number of intervals, each core can eventually achieve a temporal assignment that is “close” to the per-core assignment. We use the K-means algorithm to perform this clustering based on the output metric.

V. CONCLUSION

In this paper, we have proposed a modified architecture of cloud computing in which instead of using the DVFS technique, we have used modified DVFS technique. In modified DVFS clustering is done on the basis of similar types of cores working together in single cluster and so on. In this way, we can say that if we use modified DVFS, its power efficiency can vastly be increased.

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