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Paper Authors

TUSHARKUMAR RAJARAM SATHE, P. SUDHAKAR RAO

Nishitha College of Engineering & Technology, Hyderabad, T.S, India

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PROCESS TO OFFSET PROTECTION EXPENSES CONTROL CONSERVATION IN CLOUD INFORMATION

TUSHARKUMAR RAJARAM SATHE[1], P. SUDHAKAR RAO[2]
[1]M.Tech Student, Dept of CSE, Nishitha College of Engineering & Technology, Hyderabad, T.S, India
[2]Asst Professor, Dept of CSE, Nishitha College of Engineering & Technology, Hyderabad, T.S, India

ABSTRACT:

We point to the problem of managing the energy states of the servers in the Cloud Data Center (CDC) to reduce electricity consumption and maintenance costs caused by energy variation (and, therefore, the temperature) on the CPU of the servers. In more detail, we consider a set of virtual machines (VM) and their requirements in terms of CPU and memory in a set of time intervals (TS). Then we model the electricity consumed considering the costs of processing virtual machines on servers, the costs of data transmission between virtual machines and the costs of migrating virtual machines through servers. In addition, we use the material-based fatigue model to calculate the maintenance costs necessary to repair the CPU, due to the difference in time of the server power states. After detailing the problem formulation, we are designing an original algorithm called MECDC to solve it. Our results, obtained in multiple scenarios of a real CDC, show that MECDC greatly exceeds two reference algorithms, which instead point to load balancing or power consumption for servers.

Keywords: Cloud Computing, Cloud Data Center, Maintenance Costs, Electricity Costs, Fatigue, Energy-efficiency.

1. INTRODUCTION:

Data centers have become an important aspect of the ICT sector. Historically, the idea that developing countries exploit computing tasks dates back to the first half of the 19th century, when several prominent researchers discovered the concept of the global brain [1], [2], with the aim of providing encyclopedic knowledge methods . Since then, the impressive growth in the information and communications technology sector, including improvements in HardWare (HW) manufacturing, as well as the almost obvious advantages provided by SoftWare (SW), have completely revolutionized capacity from developing countries to use computer science. Today, developing countries are widely distributed throughout the world to maintain a variety of applications, such as surfing the Internet, streaming, HD videos and cloud storage. Not surprisingly, DCs have adopted a cloud computing model [3], [4], according to which virtual applications (and complete operating systems) operate on a set of distributed physical servers, which can be located on different continents Consequently, the management of the CDC is an aspect of fundamental importance for the owner of capital (which is referred to as a content provider hereinafter). And related electricity costs. In this context, the content provider must face a large amount of energy consumed by its CDC. As a result, low energy consumption in the CDC has been a traditional hot topic. According to this trend, several companies aim to reduce the power of servers in CDC by managing their energy states. Among them, applying suspension status (SM) to a subset of servers is a very promising way to save energy. In more detail, thanks to the fact that user traffic is not static and generally varies according to different times of the day, it is possible in the CDC center to place different servers in SM and focus users on a subset of the servers that remain in active mode (AM). In this way, an energy reduction is achieved, which reduces the associated electricity costs paid by the content provider. Although the SM application can guarantee lower electricity costs compared to the situation in which all servers operate, the transition between SM and AM, especially when applied for several months and years, tends to have a negative impact on costs of maintenance paid by a supplier The content In more detail, when the server is placed in the SM, a rapid decrease of the temperature of its components is observed (especially for the CPU and the memories). Specifically, the temperature falls from very high values (generally above 70 to 80 ° C) at room temperature, which is generally cooled and maintained at approximately 20 ° C. On the other hand, the opposite effect on temperature is observed when The server goes from SM to AM. The temperature difference in electronic components, especially when repeated over time, tends to introduce the effects of heat fatigue. This phenomenon is similar to the mechanical stress experienced by the fuselage, and is subject to cabin pressure and decompression at different heights, which can lead to long-term deterioration. Similarly, when exposed to large temperature changes, the HW equipment tends to increase the failure rate. In more detail, the effects of fatigue (and cracks) are experienced, for example, by welding connections that connect the CPU / memories to the motherboard. As a result, the server is subject to frequent AM / SM changes that often experience failed events, compared to the situation in which it is always left in AM, which increases its associated maintenance costs for Fi xy / or replacement. of components with failures. In the worst case, maintenance costs will be greater than the electricity saved by applying the SM, which will result in a financial loss for the content provider. This context presents many challenges: What is the impact of maintenance costs on total costs? Is it beneficial to benefit from the compensation between electricity consumption and maintenance costs? How to optimally formulate the problem? How to design an effective algorithm to deal with?

The purpose of this document is to shed light on these issues. In more detail, we have provided a simple (but effective) model for calculating maintenance costs, given the time variation in the power states of a group of servers. In addition, we adopt a detailed model to calculate the energy consumed by the CDC. Specifically, our energy model

RELATED WORK

By focusing on memory and storage management, "Consolidated performance and growth of scientific workloads" uses energy efficiency information to estimate the parameters necessary for storage and memory to conserve energy and costs in the CDC. It is important to keep in mind that your semi-analytic performance modeling may be accurate, but it requires a deep understanding of each individual application that runs on a VM and server. Therefore, a constant amount of preliminary information is needed and, as a result, the pretreatment time of the problem can be reasonably increased.By focusing on memory and storage management, "Consolidated performance and growth of scientific workloads" uses energy efficiency information to estimate the parameters necessary for storage and memory to conserve energy and costs in the CDC. It is important to keep in mind that your semi-analytic performance modeling may be accurate, but it requires a deep understanding of each individual application that runs on a VM and server. Therefore, a constant amount of preliminary information is needed and, as a result, the pretreatment time of the problem can be reasonably increased.point out that other costs than the ones considered here may increase the maintenance bill. Specifically, the cost of regular updates, due to HW/SW upgrades, may have an impact on the maintenance costs paid by the content provider. In addition, the adoption of renewable energy sources may also vary the electricity bill. Both these issues, which are not considered in this work, can be potentially added in our framework

IMPLEMENTING DYNAMIC FACETED SEARCH

This context presents many challenges: What is the impact of maintenance costs on total costs? Is it useful to increase the compensation between electricity consumption and maintenance costs? How to optimally formulate the problem? How to design an effective algorithm to address? The purpose of this document is to shed light on these issues. In more detail, we first present a simple (but effective) model for calculating maintenance costs, given the variation over time in the power states of a set of servers. In addition, we adopt a detailed model to calculate the energy consumed by the CDC. Specifically, our energy model takes into account the electricity costs related to the server CPUs, the data transfer costs between servers and the virtual machine relay (VM) costs that run on the servers. After formulating the CDC problem and related maintenance costs, we propose a new algorithm, called the Energy Maintenance Cost Data Center (MECDC) to address it. Focusing on the tasks performed by the assignment manager, this component is responsible for administering the proposed VM assignment algorithm, which can increase the compensation between electricity and maintenance costs when working on PS power states. In our work, we assume that time is estimated in time intervals (TS) and that the allocation algorithm is executed for each TS. Given: i) TS currently - and the corresponding VM requests for CPU and memory; 1 i) PS power status (AM or SM) and VM assignment on TS-1 above; the assignment manager calculates the VM assignment for TS τ. Finally, the assignment manager observes the PS systems that must be placed in AM / SM for the current TS. If the PS device is in AM on a previous TS and needs to be placed in SM on the current TS, the assignment manager interacts with the PS operating system to shut down the device safely, indicating that costs other than those mentioned Here you can increase the maintenance bill. Specifically, the cost of periodic updates, due to HW / SW updates, may affect maintenance costs paid by the content provider. In addition, the adoption of renewable energy sources can also change the electricity bill. These two issues, which have not been discussed in this paper, can be added to our framework.

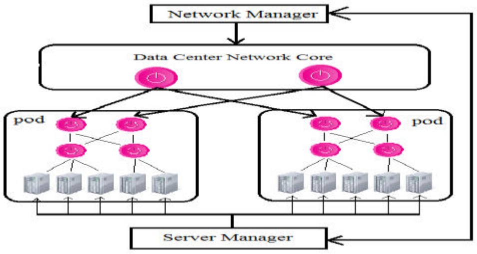

FIG NO 1: SYSTEM ARCHITECTURE

CONCLUSION

We have addressed the problem of joint management of maintenance costs and electricity consumption in the CDC. After demonstrating that changing the energy states of PS devices has an impact on both fault management costs and energy consumption, we formulate an OMEC problem, with the objective of jointly managing the aforementioned costs. Since the problem of OMEC is NPHard, we have described the MECDC algorithm, which is designed to increase the effectiveness of differentiation between different costs, as well as to take into account its long-term impact over time. The results, obtained through a set of realistic scenarios, clearly show that MECDC always requires lower costs compared to the FFD and NFD reference algorithms. In addition, we have also shown that the total costs incurred by the MECDC are also close to the minimum. In addition, the calculation time, obtained from a scenario in which there are hundreds of virtual machines and when operating the algorithm on a desktop computer, is very low, that is, less than 2 [s] on average.

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