International Journal of Research in Engineering and Science (IJRES)
ISSN (Online): 2320-9364, ISSN (Print): 2320-9356
www.ijres.org Volume 10 Issue 5 ǁ 2022 ǁ PP. 84-87

Green Computing in Cloud Computing

Kakarla Gnanendhar Reddy,*PG Scholar,*
Department of MCA, Dayananda Sagar College of Engineering,
Bengaluru, Affiliated to VTU

Suma S, *Assistant Professor, Department of MCA,*
Dayananda Sagar College of Engineering,
Bengaluru, Affiliated to VTU

***Abstract*—*In this paper it is discussed how cloud computingharms the nature by emitting lots of harmful gases like carbon dioxide which harms the environment. There are lots of energywasted and not used efficiently. Lots of processors and resources run for its entire lifetime and produces lots of heat. Therefore, here it is discussed how green computing in cloud computing can overcome this problems and save the nature by its eco-friendly way of cloud computing. At last, we will see the future scopes of green computing in cloud computing.*
Keywords*—*Green Computing, Cloud Computing Carbon Dioxide, eco-friendly;

Date of Submission: 08-05-2022 Date of acceptance: 23-05-2022

I. INTRODUCTION

Green Computing in Cloud computing is a way to reduce all the pollution caused by cloud computing. It is a way in which cloud computing is done by keeping in mind that environment is not getting harmed. Cloud computing is done in an eco-friendly way. It is known that the processors that are used for cloud computing and all other resources needs maintenance and all the time without getting break. This produces lots of carbon dioxide. The systems carries lotof loads and cooling is needed to be done and that cooling also produces lots of heat on the other side and CO2 is emerged. These all process of providing services and maintenance overall produces lots of pollution in form of carbon dioxide which is harmful for environment. So, green computing is the upcoming solution for this problem which gives an idea to reduce the maximum pollution that can be done by reducing loads on processors and using resources toits full limit by recycling and reusing the resources. To fulfill everyday's demand of customers, the power of computing required is ultimate such as cooling fans, hard disk, console, servers etc and these all resources consumes lots of power[5]. The power consumptions are increasingday by day & year by year. With the growing populations and their growing facilities and demands lots of carbon footprint is emerged. One google search generates 0.02g of carbon dioxide and it is as much CO2 as a human breathe out in 2 seconds[1]. The data centers' electricity consumption in 2012 was approx 38 giga watts and it was 63% more than last year[1].So, it is very important to come with the idea of green computing in cloud computing to overcome these problems and protect the nature. For that every technical companies should follow and practice this idea of green cloud computing. Figure 1 shows CO2 dissipation and electricity consumption in a google search given below.

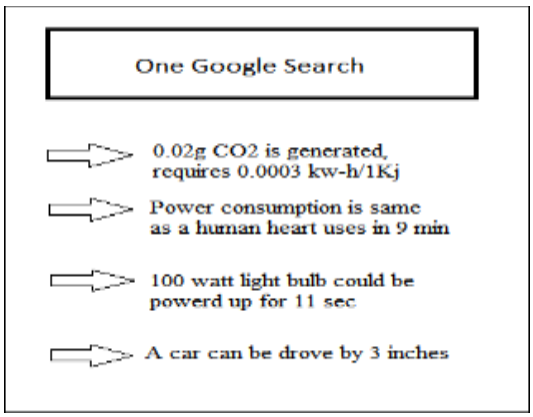

Fig. 1. Energy consumed by one google search[1]

II. CLOUD COMPUTING

In normal cloud computing power consumption is very high so here we will discuss various ways to reduce energy consumption.

- At home using any device at power saving mode can reduce the power consumptionnand it reduces the speedof CPU
- Minimizing the screen brightness at minimum level required.
- Putting hard disk at sleep mode can reduce the power consumption.

These ideas were for home but for data centers given below

- The data centers uses diesel as a backup purpose for energy and using diesel pollutes our environment by producing various harmful gases including carbon dioxide. To solve this problem, eco-friendly energy producers should be used as a backup like solar energy, wind energy etc [3]. So, this will reduce the pollution caused by diesel in data centers.
- Data centers uses refrigerators for cooling purpose which need energy to run and consumes lots of energy and also producing heat on the other side. So, to overcome this. Free cooling method should be used which basically depends on outside weather condition. Although, the equipments are still required in this process but at least it doesn't produce heat like mechanical method of cooling. So, Free cooling method is another way to practice green computing in cloud computing [4].
- By using processors that are energy efficient, lots of power could be saved. In this process, the modification of clock rate is done. The frequency can be minimized and maximized according to the need of software and hardware. This saves lots of energy as the energies are not wasted which are not used. All the energy are used efficiently.

III. PREPARE YOUR PAPER BEFORE STYLING CURRENTTRENDS OF GREEN CLOUD COMPUTING

Green Cloud Computing is a model that gives positive side not only to nature but also to the data center and service provider as they utilize the resources efficiently. The positive side of this model is that it is eco-friendly, it is energyefficient, consolidation, virtualization etc.

i. Eco-Friendly

Green Cloud computing is an eco-friendly model as it prevents cloud computing from harming the environment. It prevents the load on processor and reuse the resources that gives a benefit to use resources efficiently. The heat and all other harmful gases that used to get emerged from cloud computing is minimized due to this model.

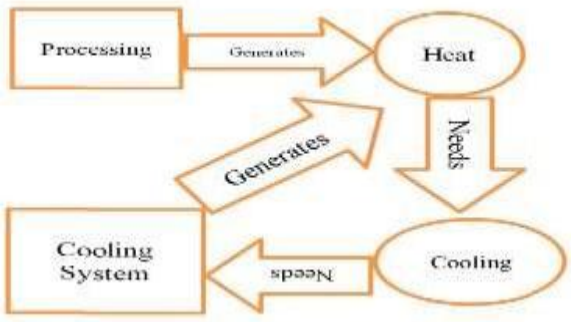

Fig. 2. Need of Electricity

ii. Energy Efficient

Green Computing in Cloud Computing also benefits us as well as nature by saving energy. It not let the power get wasted and use every energy to its max. Previously, the processors used to get hot and it doesn't work properly and energy was also wasted but green cloud computing solves this problem by saving energy and using it efficiently.

Fig. 3. Green Computing Characters

iii. Virtualization

Using some abstract process, this concept of virtualization lets run several logical computers in single physical computer. There are several software that let it doneand process, like Hypervision, It coordinates with the underlying hardware components according to the instructions given by virtual machine.

iv. Consolidation

The process of deploying different data centers related data processing on a single server with virtual technology is consolidation. It implements the process level load balancing. It reduces the power consumption and saves energy.

IV. USING THE TEMPLATE FUTURE SCOPE OF GREEN CLOUDCOMPUTING

Green computing in cloud computing is something that iswhat we need for positive impact on us as well as nature. Many companies and IT sectors are adopting this idea and this is what desperately needed. As, IT sectors are growing rapidly so their goods and services and fulfilling the demandof their customers, therefore, it is also an important reason toadopt this idea [6-9]. It is slow process now but many companies already have adopted it and others are seeking for green computing too. It not only saves their power and energy but also saves environment from harmful gases. Here are some future scopes and advantages of green computing in cloud computing.

- Green computing is cloud computing can help in businessgrowth and their productivity. By practicing green computing their power consumption will havedecrement and more efficient. Thus, there environmentwill also improve and employee can work in moreproductive way.
- There will be improvement in reliability and system will be more redundant and secured. There is a green cloud data center that houses data in green cloud virtual environment. It has ultimate performance and powered by infrastructure composed of CISCO and VMwaretechnologies[2].
- Only pay for what is used is provided by green cloud computing. Due to this the maintenance of all resourcesis minimized and future cost structure can be predicted.
- The most important advantage is that it is eco-friendly and therefore, there is no harmful effect on environment. Also, all the powers and energy are used efficiently and not wasted which is a positive side of green computing in cloud computing.

V. AUTHORS AND AFFILIATIONS ADVANTAGES OF GREENCLOUD COMPUTING

Green computing is about reducing the environmental footprint of computers or of ICT in general. This is most commonly achieved by:

- making data centers and computing devices moreenergy efficient
- using more renewable energy sources,
- using less hazardous materials in computing devices,
- promoting device longevity,
- and making devices and other IT equipment betterrecyclable.

This means that the main benefits of green computing are:

- reduced environmental impact (less GHG emissions,less e-waste, fewer virgin resources needed for manufacturing new devices)
- lower energy costs
- longer lasting computing devices
- reduced health risk for computer workers and recyclers

VI. CONCLUSION

Green Computing in Cloud Computing lets us know how important it is to save the environment as there are lots of ways to produce goods and services but important is to do the same as well as not harming the nature at the same time. By practicing green cloud computing, the resources and equipments that are used in cloud computing are used efficiently. Here we also have seen that how we can save power at home as well as at data center by following simple steps. By practicing this idea the environment can be saved and we can grow in technology without harming the nature. We have also seen how much energy does one google searcg takes and compared it with other means. So it is very important to practice green cloud computing everywhere. The future is for sure that one day green computing in cloud computing will take place in every cloud field giving benefits to us as well as nature.

ACKNOWLEDGEMENT

I would like to thanks MS. Tanu Shree (Assistant Professor of Computer Science and Engineering, Galgotias College of Engineering and Technology, Greater Noida) for encouragement that made this paper possible.

REFERENCES

[1]. Anubha Jain, Manoj Mishra, Sateesh Kumar Peddoju and Nitin Jain. "Energy Efficient Computing-Green Cloud Computing", 978-1-4673- 6150-7/13/$31.00 ©2013 IEEE

[2]. Greenpeace International. 2010, Make IT Green, http://www.greenpeace.org/International/en/publications/reports/make-it-greenCloudcomputing/

[3]. J. Breckling, Ed., The Analysis of Directional Time Series: Applications to Wind Speed and Direction, ser. Lecture Notes in Statistics. Berlin, Germany: Springer, 1989, vol. 61.

[4]. L. Liang, H. Wang, X. Liu, X. Jin, W. He, Q. Wang and Y. Chen,

[5]. Green Cloud: A New Architecture for Green Data Center,‖ Proceedings of the 6th international conference industry session on Autonomic computing and communications industry session, 2009.

[6]. Thillaiarasu, N., Pandian, S.C., Vijayakumar, V. et al. Designing a trivial information relaying scheme for assuring safety in mobile cloud computing environment. Wireless Netw (2019). https://doi.org/10.1007/s11276-019-02113-4

[7]. https://fr.wikipedia.org/wiki/Green_cloud_computing, Publication Date: 13/02/2017, Retrieved Date: 13/03/2017.

[8]. Thillaiarasu, N., ChenthurPandian, S. A novel scheme for safeguarding confidentiality in public clouds for service users of cloud computing. Cluster Comput 22, 1179–1188 (2019). https://doi.org/10.1007/s10586-017-1178-8