International Journal of Scientific Research in Engineering and Management (IJSREM)
Volume: 07 Issue: 03 | March - 2023 Impact Factor: 7.185 ISSN: 2582-3930

Green Cloud Computing

Author: Ms. Vanshika Shahaji Nikam

Abstract

Cloud computing is a method fo delivering computing resources. Cloud computing services, ranging from data storage and processing to software such as customer relationship management system, are now available instantly and on demand. The cloud computing has completely changed the IT infrastructure and also the businesses associated with it. Unfortunately, the demand for cloud infrastructure is growing rapidly, so is that the energy consumption of information centers. Here is when the green cloud computing comes into play. Green cloud computing refers to the environmental benefits of switching your IT services to the cloud.

Introduction

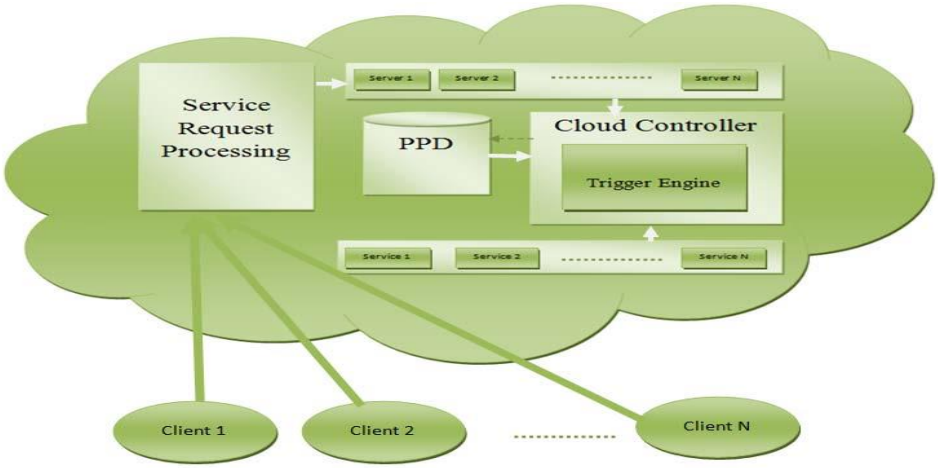
Green cloud is the buzzword that refers to the potential environmental benefits that IT services delievered over the internet can offer society. The term made up of the word green meaning environmentally friendly and the cloud the traditional symbol of the internet and the shortend name for cloud computing.
This concept is to reduce energy consumption and reduce the waste disposed to the environment. Before the starting the concept of what is green cloud computing we have to understand the reason behind this. As cloud computing usage increased the increase in carbon emissions in the environment also increases. The increase in energy consumption happens due to the augmented increases of data servers and other infrastructure. The reduction in energy consumption will reduce carbon emissions in the environment. To reduce energy consumption, cloud computing is exploring energy-efficient ways of working. Green computing in cloud computing is to find and produce energy saving digital ways to reduce carbon emissions to the ecosystems.

- **WHAT IS GREEN CLOUD COMPUTING?**

Green computing (also known as green IT or sustainable IT) is the design, manufacture, use and disposal of computers, chips, other technology components and peripherals in a way that limits the harmful impact on the environment, including reducing carbon emissions and the energy consumed by manufacturers, data centers. The goals of green computing are similar to green chemistry: reduce the use of hazardous materials, maximize energy efficiency during the product's lifetime, increase the recyclability or biodegradability of defunct products and factory waste. Green computing is important for all classes of systems, ranging from handheld systems to large-scale data centers. Many corporate IT departments have green computing

initiatives to reduce the environmental effect of their IT operations.Yet it is also clear that the environmental footprint of the sector is significant, estimated at 5-9% of the world's total electricity use and more than 2% of all emissions. Data centres and telecommunications will need to become more energy efficient, reuse waste energy, and use more renewable energy sources to stay competitive. Some believe they can and should become climate neutral by 2030.

- **ARCHITECTURE OF GREEN CLOUD COMPUTING**



Consumer:It is the submit the collect service requests from anywhere in the world to the cloud. It is very important to notice that there can be a difference between cloud consumers and users of deployed services. For instance, a consumer can be a company deploying a web application, which presents varying workload according to the number of users assessing it.

Green Resource Allocator:It is act as a interface between the cloud infrastructure and consumers.It requires the interaction to support energy efficient resource management.

Virtual Machine:It can be dynamically started and stopped on a signal physical machine to meet accepted request. Hence it providing maximum flexibility to configure various of resource on same physical machines.

Physical Machines:It creating virsualized resources to meet service demands by providing hardware infrastructure of underlaying physical computing servers.

- **TECHNIQUES TO MAKE THE CLOUD "GREEN"**

1. **Nano data centers:**

   Nano data centers have been proposed as a low cost solution that incorporates reduce requirements of cooling devices and localization that reduces distance from the end users and decreases network delays. The architecture of a typical nano data centers is illustrated in figure.

2. **Dynamic voltage frequency scaling:**

   Dynamic voltage frequency scaling is a technique that aims at reducing the dynamic power consumption by dynamically adjusting voltage and frequency of a CPU. This technique exploits the fact that CPUs have discrete frequency and voltage settings.

3. **Virtualization:**

   Is a technology that you can use to creat virtual representations of servers, storage, networks and other physical machines. Virtual software mimics the functions of physical hardware to run multiple virtual machines simultaneously on a single physical machine

- **IMPACTS OF GREEN CLOUD COMPUTING**

Fewer Carbon Footprints Because Of Remote Workers:

A **carbon footprint** (or **greenhouse gas footprint**) is a "certain amount of gaseous emissions that are relevant to climate change and associated with human production or consumption activities".In some cases, the carbon footprint is expressed as the carbon dioxide equivalent which is meant to sum up the total greenhouse gas emissions caused by an individual, event, organization, service, place or product.In other cases, only the carbon dioxide emissions are taken into account but not those of other greenhouse gases.Greenhouse gases, including the carbon-containing gases carbon dioxide and methane, can be emitted through the burning of fossil fuels, land clearance, and the production and consumption of food, manufactured goods, materials, wood, roads, buildings, transportation and other services. As well as calculating carbon footprints for whole countries, it is also possible to calculate the footprint of regions, cities, and neighbourhoods.

Saving the environment by being paperless:

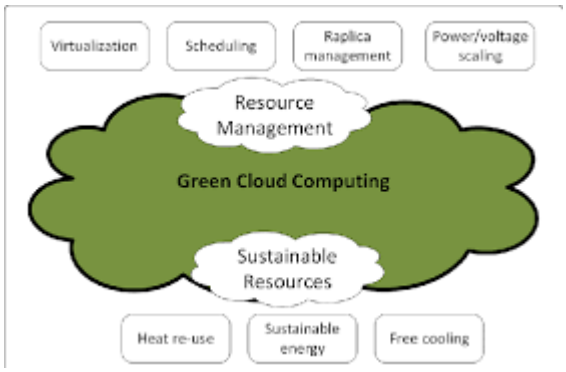
That days are gone where you have got to print and collect all files acquired in your email or all of the reports you've got arranged for your immediate head. With the innovative characteristics of storing data within the cloud, you are doing not need large filing cabinets to gather your printed copies. By Green cloud computing companies and organizations can do with paperless.When you are connected on the net, you'll be able to see options like Google Drive, OneDrive, Dropbox, or SharePoint. These storage options gives you and your whole team to travel paperless. By using these cloud storage options offer drag and drop features for all of your documents, you'll still expect productivity within the entire group or organization even when working remotely. For emergence of Adobe Sign or DocuSign, there's no have to print any file for one signature. These technology innovations will gives you to download any files, fix your signature and send it back to whoever wants it without printing any pages and with just the employment of PC or laptop.

- **GREEN CLOUD COMPUTING APPROACHES**

Virtualization and use of Terminal Servers:

It is the process at the same time where in multiple operating systems run on a computer system. If they have their machine that applications running appear. The use of common servers and sharing the terminal is found to save energy by 80%.

Power Supply and Power Management:



Using green cloud computing technology energy will be used efficiently. In green cloud computing the power management using green algorithm is reducing the power consumption by computers.

- **GOALS OF GREEN CLOUD COMPUTING**
- A. Reduce the use of hazardous material , it causes harm to enviroment.
- B. “Green” data centers.
- C. Using recycle materials.

- **ADVANTAGES**
- A. Conserving energy by green cloud computing-
- B. Remote working reduces the carbon footprint in the environment.
- C. Going paperless with green computing and cloud computing.
- D. Reduction in e-waste generation.

- **APPLICATIONS**
- A. Management of energy in Data Centers
- B. Green Wireless Network
- C. Green Parallel Computing with Big Data Network
- D. Green computing with an algorithm

Conclusion

The aim of the green cloud architecture is to lower data center power usage. The key advantage is green cloud computing architecture is that it ensures real-time performance while lowering the IDC's energy usage. The idea is intended to save both money and the environment. The risk to human life posed by e-waste disposal is also predicted to decrease significantly. The cloud computing and green computing will help enterprises to reduce carbon emissions while also providing a productive work environment. Today, green cloud computing and environmental sustainability are critical.

References

[1]https://medium.com/geekculture/green-cloud-computing-db74a9c55c0e#:~:text=Applications%20of%20Green%20Cloud%20Computing&text=Management%20of%20energy%20in%20Data,Green%20computing%20with%20an%20algorithm

[2] https://www.jigsawacademy.com/blogs/cloud-computing/green-cloud-computing/

[3] https://www.learntek.org/blog/what-is-green-cloud-computing/

[4] https://www.slideshare.net/IamShreyasK/green-cloud-computing-25761737