

## **GREEN COMPUTING AND INFORMATICS: WAY TO GREEN AND ENERGY CONSUMED WORLD**

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### **ABSTRACT**

*Green Computing [GC] is actually deployment, optimization, virtualization and energy management and more over resource allocation. Green Computing [GC] is actually a better Environmental Science practice. This is deals with so many challenges and issues; however the main and common challenges are initiatives, awareness and financial matters. Green Computing [GC] is actually preparation and designing of Eco Friendly Computing and Technological machinery practice; this is energy consumed techniques and thus helps in better power management. Virtualization is an important way for Green Computing [GC]; thus Cloud Computing is also helpful for better Green Computing [GC]; including the opportunities and challenges. Paper also mention about various methods available for better Green Computing Practice.*

**Keywords:** Green Computing, Green Science, Green Technology, Energy Management, Virtualization, Carbon Emission, Recycling, Power Management

### **INTRODUCTION**

Green Computing [GC] is the recycling and reusing of Information Technological products. It makes less use of computers, produces and energy. Green Computing [GC] is a type of approach or model or designing or a kind of initiative. Green Computing [GC] depends on so many methods and way out of which material cycling, Tele- Commuting/ Conferencing, Power Management treated as most important[02, 05, 13, 22]. Today many Eco Friendly or Green initiative supporting organizations still does not include Green Computing [GC] in their business policy and thus proper awareness is needed for better Eco Friendly Computing and Technological Practice. 'Energy Star' was the beginning of Green Computing [GC] agenda. Government Financial Support is also must to promote Green Initiative. Better and healthy methodologies practices are also helpful for better Green Computing [GC] utilization.

### **OBJECTIVES**

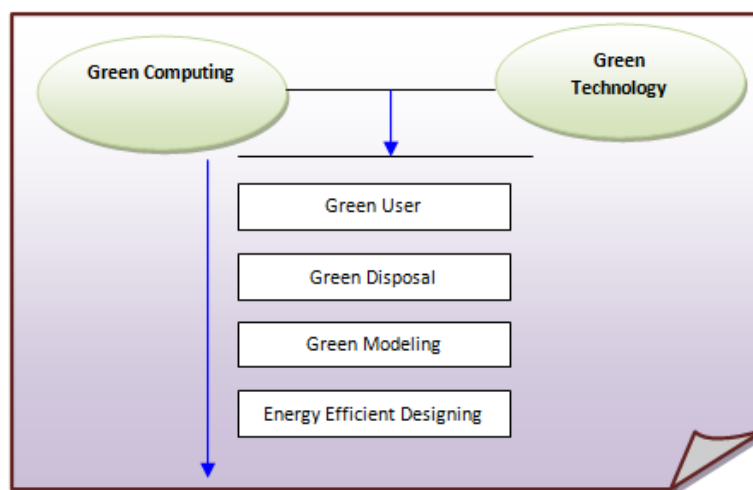
The main aim and objective of this paper is includes; but not limited to as follows:-

- To know basic about Green Computing [GC]; its basic, uses and importance in brief manner;
- To find out main advantages and features of Green Computing [GC] at a glance;
- To find out the deployment models of Cloud Computing; including some general and less discussed deployment models;

- To learn about the possibilities of features of Green Computing [GC] practice.

### Green Computing: Basics

Green Computing [GC] and similar technologies refer to several green aspects like Green user, Green disposal, modeling, Green Product development and so on. This is the modeling and designing of electronics gadgets and their implementation. Green Computing [GC] always prefers in use of efficient and effective electronic gadget which have lesser or no impact on the environment, directly [23]. During 1980's Green Information Technology emerged its concept and today Green Computing comes as a healthy domain and discipline. Energy consumption, material cycling, power management are some key features and requirement in Green Computing [GC] and Technology practice. Green Computing [GC] is deals with wide range of products apart from computing and computers [03, 04, 23].



**Fig: 1.** Green computing and Technology's main base

### Features

- Green Computing [GC] and Technology emphasizes its benefit towards balancing Green House Gases;
- Green Computing [GC] is deals with Energy consumption, material cycling, power management and so on;
- Better algorithm design minimizes for energy consumption;
- Promotion of virtualization, ergonomics are important methods in better Green Computing [GC] practice;
- Green Computing [GC] is deals with broader aspects and deals with much more like-monitor, printers, storage devices, networking and other communication systems and so on[24].

### Methods and Way

Green Computing [GC] is deals with so many methods and models such as:-

- Energy Consumption;

- Virtualization Promotion;
- Material Recycling;
- Ergonomics;
- Power Management;
- Using Hazard free Material;
- Deployment Optimization [12, 15, 25].

Now let's talk about some methods and way about Green Computing [GC] briefly in the following points:-

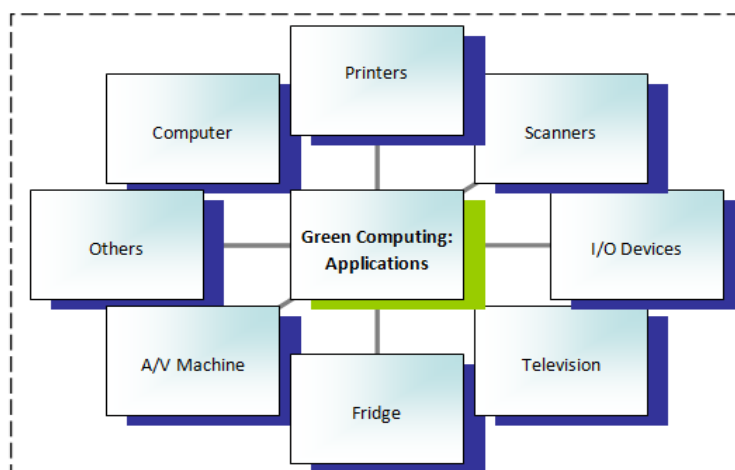
**Deployment Optimization-** This strategy or method is mainly deals with better energy efficient algorithm design and development. This method is related with reduction or minimizes of hardware, software and technological cost. Designing and development of energy consumed intelligent algorithm is also fall under this category for promotion of healthy and better computing machinery;

**Power Management-** Centralized Operating System is the main tool of this method. This strategy is useful for saving power for implementation Liquid Crystal Display, Low Powered Centralized Graphic Card;

**Material Recycling-** Material recycling is one of the important tools which is needed for old computing and other tolls and their recycling and reuses. The machinery includes computers, printers, networking devices such as Routers, switches and so on;

**Tele Conferencing-** By using Tele Conferencing Green Computing [GC] promotes many ways. In Tele Conferencing, through remote places virtual meeting is possible; thus through some centralized devices conference and seminar is possible [26];

**Virtualization-** Virtualization is the way of centralizing computing uses and providing services to so many users. In this mode some centralized machine serve so many point/organization and computing unit; thus it helps by reducing separate and each computing centre in the organization and institutions[27].



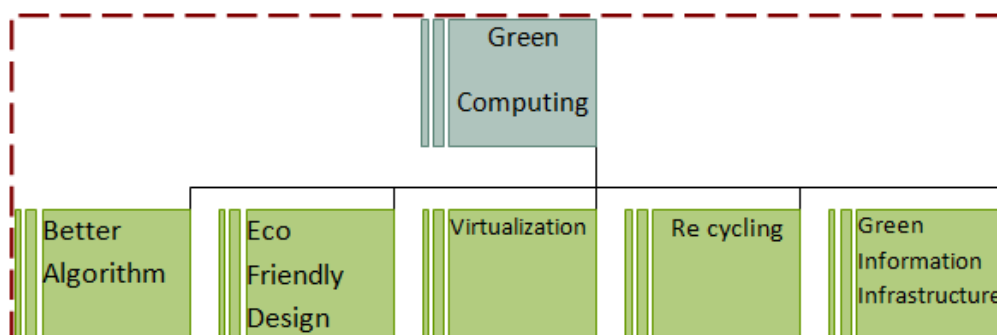
**Fig: 2.** The Main uses of Green Computing and Technology

**Possibilities**

Green Computing [GC] has so many opportunities and possibilities; now let see these briefly:-

- Green Computing [GC] minimizes extra energy consumption through algorithm designed or based computing machines, uses of computers and systems ;Turn off mode, centralized computing uses an so on[05, 06,15];
- Eco Friendly environment promote and minimizes extra carbon dioxide;
- Green Computing [GC] creates environment and eco friendly and carbon emission;
- Green Computing [GC] keeps and helps to promote initiate the agenda of 'Turn Off' of the machines and computers and thus it helps in Power Management;
- It preserve Green Information Infrastructure and overall Information Transfer Cycle chain;
- Green Computing [GC] promotes the agenda 'Minimum Input and Maximum Output' and thus helps in several Information Technological activities;
- It keeps Green Organization, institutions and Governance which includes better E-Administration, E-Governance and E- Services and thus promote a r bring complete Green Society[08, 10, 27];
- Green Computing [GC] is also helpful for healthy and vital role in stimulating economical and social development;
- It helps and keep a better Eco Systems and average temperature;
- Saves money of the concerned organization, Government and even helps in Personal Management;

Green Computing [GC] is helps to build broader and advance Information Systems and Information Infrastructure which is much Greener and Eco Friendly.



**Fig: 3.** The wider benefits from Green World of Technology

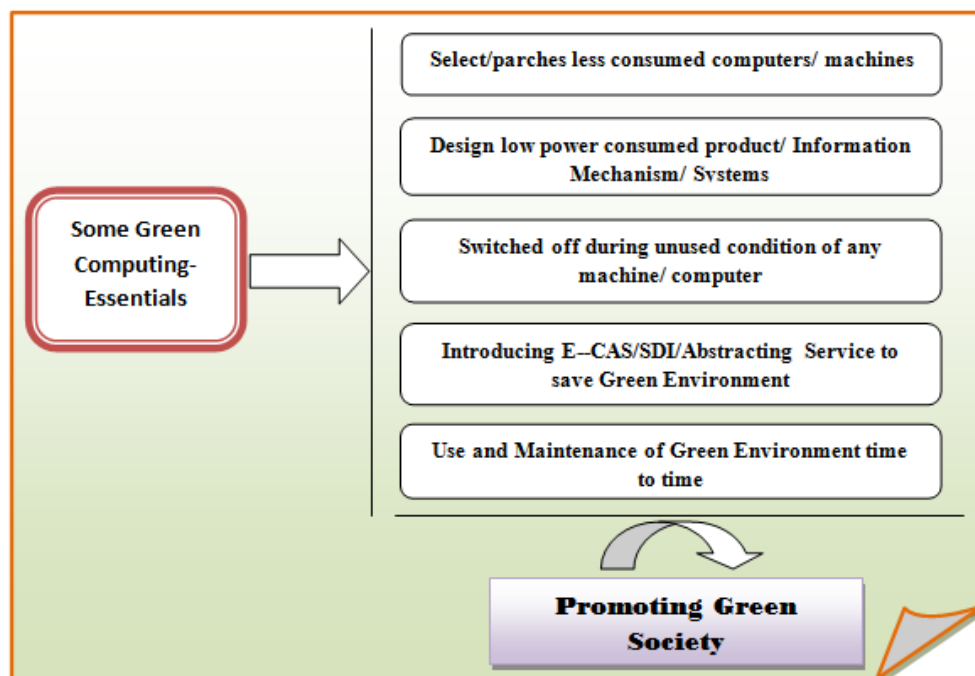
**Green based Cloud or Cloud Based Green?**

For better Green Computing [GC] practice, Cloud Computing is very much essential. Cloud Computing is actually process of virtualization; in which software, hardware, application and utilization makes virtual availability from any where and any time. Thus, in many cases one

centralize service provider may serve so many computing devices and systems and hence no need to separate computing systems in the concerned organization or institutions; thus by removing separate machine in each companies it saves so many energy, indirectly and also helps in Carbon emission. Apart from virtualization, Load balancing method or technique is another one which is keep balance or process among the user of Cloud Computing Service Provider [04, 09, 26]. Thus, by keeping balance in machine under a specific Cloud Service provider it keeps Eco Friendly and Green Computing [GC] systems and practice many ways. Thus, it is better to say Cloud Based Green Computing!

### FINDINGS

- Green Computing [GC] is an advance computing and Energy Management practice and this is the practice of sustainable computing;
- Green Computing [GC] is also known as Green Technology, Green Information Systems and so on;
- Still academic programme on Green Computing [GC] is very much limited and especially in Indian Universities.
- It promotes online services and thus saves printed or manual pages in many ways.



**Fig: 4.** Some condition to introduce Green Computing in Information Practice

### SUGGESTION

- E-Administration, E-Service, E-Society all are possible with Electronic and side by side Eco Friendly Green Computing [GC] practice;
- Organization, institutions and even in Family practicing Green Computing [GC] is helpful many ways;

- Universities and colleges need to start programmes on Green Computing [GC] and similar technologies for better and sophisticated Eco Friendly sustainable development [05, 26].

## CONCLUSION

For the promotion and eye catching of the manufactures towards further designing of the IT products based Green Computing [GC] principles. Energy Consumption, Material Cycling, Power Management are key terms in the field of Green Computing [GC] and Technology; today apart from private concerned the Government houses also give preferences to the utilization of these practices in Governance. Information Technology equipments providers which are includes computers, printers, LAN and WAN devices selection is need to based on energy consumption benefit. So it is better to select only the product having 'Energy Star' or similar tag.

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