Cloud Computing and Green Computing: Challenges & Issues in Indian Perspective

Prantosh Kr. Paul[1] and Dipak Chatterjee[2]
[1] FBAS, Bengal Engineering and Science University, Howrah, West Bengal, India
[2]Principal, IEM, Saltlake, West Bengal, India
E-mail : prantoshkpaul@gmail.com, dipchat@rediffmail.com

Abstract – **Cloud computing and green computing are actually complimentary to each other. Both of these advance computing gradients have important role for technological advancement and transformation. Cloud computing is a kind of network grid in which network and communication technology play an important role for complete virtualization of information technological infrastructure. On the other hand green computing is nothing but reusing of information technological product. In green computing recycling can play an important role. Cloud computing and virtualization is an important method of green computing, which make less use of computers, products and energy. In this paper both cloud computing and green computing are described with special reference to their need and value in today's competitive world. We also discuss the main challenges and issues of these technologies in Indian scenario.**

Keywords: **Cloud Computing, Virtualization, Green computing, Green Technology, Material Recycling, Energy Management, Resource Management, Advance Computing, Information Science, Computer Science**

I. INTRODUCTION

'Cloud and Green' both are most important terms in the present information technology age. Both Cloud and Green Computing are treated as Advance Computing and both are related to each other [28]. Cloud Computing is actually nothing but the virtualization of various information technological infrastructure, including software, hardware, application, utilities, driver and so on. Fundamentally cloud computing is the way in which one user can get benefit from a remote area and almost at all times and any where from the world. Where as green computing is a practice of green technology or green initiatives for prosperous computing systems. Green computing means deployment, optimization, virtualization and energy management and more over resource allocation. Today green computing is the initiative for energy and power saving. Cloud computing and green computing both have several challenges and issues; however the main and common challenges are

initiatives, awareness, and financial matters [25]. Due to unbelievable and wonderful benefits of these computing there applications are emerging in many other new field and area [18].
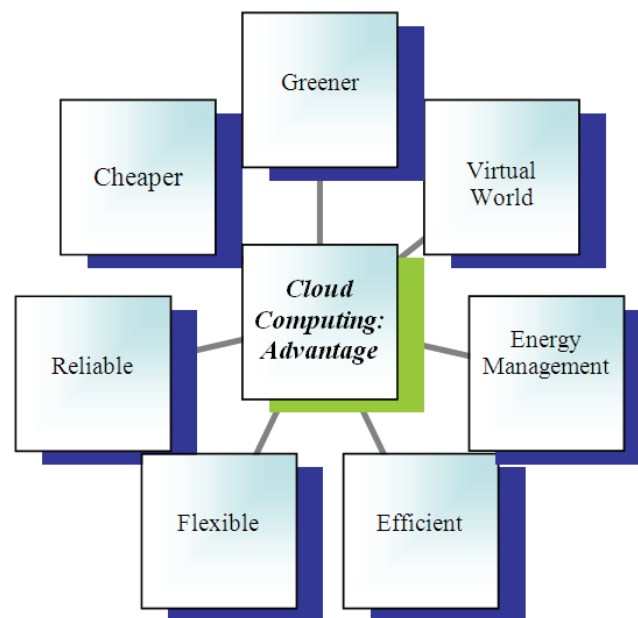

Fig. 1Main advantage of Cloud Computing

II. OBJECTIVES

Some of the aim listed bellow for which we conduct this research work including:

i.   To know basic about Cloud Computing and Virtualization;

ii. To know the role and importance of Cloud Computing;

iii. To learn the emerging area of Cloud computing and Green Computing;

iv. To learn the contemporary challenges of Cloud Computing emphasizing developing countries;

v. To learn the main problems of Cloud Computing and there probable solution;

vi. To find out the main challenges of Green Computing in Indian Scenario;

vii.The find out the probable solution of Green Computing.

III. CLOUD COMPUTING AND GREEN COMPUTING: AN OVERVIEW

We know that computing means designing and building hardware and software system for information processing, structuring and managing and so on, so that in simply manner cloud computing means designing and building of hardware, software and software system more over the total IT infrastructure in the sense of virtualization. We can see many benefits from cloud computing for technology as well as governance [28]. In cloud computing, computerized virtual networking is possible, very efficiently, smoothly and effectively [22].
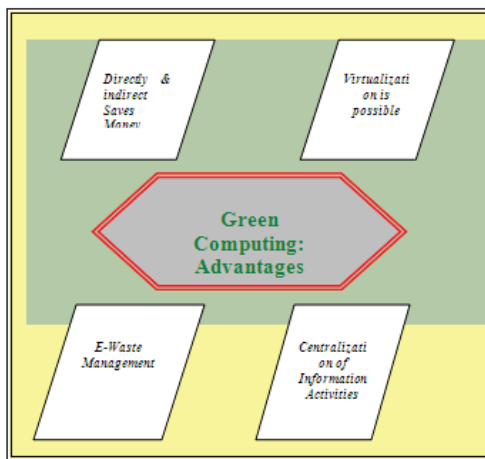

Fig. 2 Green Computing and its main advantage

Other hand green computing is a kind of approach or model or design or initiative. In generally green computing talks about green manufacturing, green designing, energy saving, minimum input and maximum output, green disposal and so on. In other way green computing also refers to environment friendly, effective information technological, computer designing [22, 23]. Green computing today treated as study as well as practice area.

IV. CLOUD COMPUTING AND GREEN COMPUTING: RELATIONSHIP

Cloud Computing And Green Computing Both Are Closely related, first of all both the computing concept consider as advance computing. Secondly cloud computing is about design and development of computing and other hand green computing also design and development of computing and systems. Thirdly green computing is actually designed for Eco friendly computing and technological

infrastructure which supports less power utilization and power management. In all these, virtualization is important way for green computing. So, out of methods in green computing virtualization is important one, which also falls under the category of Cloud Computing [05, 08].

V. ROLE OF CLOUD COMPUTING

Cloud Computing play an important role for creation of virtual world and virtualization through the information technological designing and development [09, 22]. The major benefits of cloud computing includes:

i. Greater efficiencies in information activities.

ii. Reduction of Information Technological cost.

iii. Hassle-free deployment of database and software.

iv. Hassle free deployment and maintenance of user database.

v. Better collaboration and cooperation among the entities and section of the organization.

vi. Cloud Computing gives us easily available IT solutions.

vii. To save money and human resource- directly and indirectly.

viii. It creates green computing infrastructure.

ix. It requires less hardware and software.

VI. NEED OF GREEN COMPUTING

The main approaches of Green Computing like virtualization, Power management, Material cycling and tele-commuting gives various importance to the organizations. The main requirement of Green Computing includes [05, 13].

• Better algorithm helps to save energy, thus it helps in power management.

• As virtualization helps to use IT infrastructure through remote places; so indirectly it helps in Energy management with less component uses.

• It helps in recycling process and helps to solve the main problems of unused computers.

• The centralization of computing infrastructure is possible through this.

• It keep eco friendly atmosphere.

- For organizational growth it helps in directly.

- It helps to make use of hexavalent and chromium free IT infrastructure.
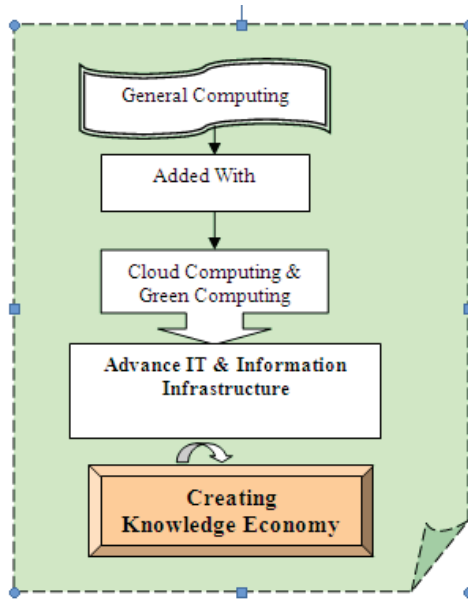
VII. CLOUD COMPUTING: MAIN CHALLENGES AND ISSUES

As far as country like India is concerned, cloud computing has several challenges and issues like:

- Still people are not aware of the core benefits of cloud computing [19].

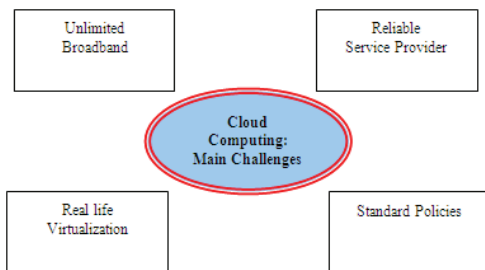- For cloud computing we need consistent and speedy internet connection.

Fig. 4 The main challenges of Cloud Computing

- Information Security is an important issue for advance cloud computing.

- In the country like India, still there is not any strong cloud computing related policy.

- For cloud computing most of the companies need

to depend on a third-party ,i.e., computing service provider, and the fact is that many developing countries are not interested in using cloud computing.

- For cloud computing we need collaborating atmosphere, which is lacking in general.

- Hassle-free deployment of hardware, software, IT Infrastructure in many cases not possible.

- Awareness regarding virtualization still no so popular.

- In government agencies utilization of cloud computing has several problems like- installation, maintenance and proper uses.

- Still availability of job ready virtualization and cloud computing expertise are wanting.

- Cloud computing in information systems and networks are still not properly utilized due to several reasons [28].

VIII. GREEN COMPUTING: MAIN CHALLENGES AND ISSUES

Like cloud computing, green computing too has several challenges and issues are:

- Green computing needs awareness among the stakeholder of computing ranging from manufacturer, user to organization.

- Green computing requires a standardized policy from the government of each country.

- Many eco-friendly or green initiative supporting organizations still does not include green computing in their agenda, due to less awareness of the user.

- Green Computing shows the way of material reuse, but many materials cannot reused. We have to think about these used tools[22].
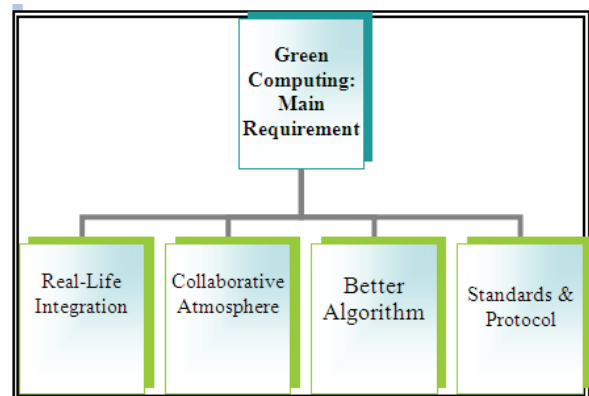

Fig. 5 The fundamental requirement of Green Computing

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- Green computing requires skilled manpower development which is still a problem in India, as most of the computer science programmes running in Indian universities are out dated.

- Fund for resource allocation, cloud architecture, deployment optimization is still an important issue.

- Designing and development of energy efficient algorithm is a big issue rill date.

- Many virtualization techniques may not work properly at times.

- Indian IT Companies are still not interested to design user friendly model.

IX. Cloud Computing: Probable Solution

For better cloud computing and virtualization, we need to pursue the following ways:

- Build IT task force for development proposal on cloud computing.

- Make awareness about Cloud computing through advertisement and user studies.

- Create cloud computing skilled manpower through adequate training infrastructure.

- Keep computer science, information science, information technology curricula up to date in Indian universities.

- We need to make information infrastructure up to date by using several software and applications.

X. Green Computing: Probable Solution

Green Computing has several problems as we already discussed. Now let us look at the probable solutions:

- Companies need to use Green Computing and adopt technological practice.

- IT companies should use Energy Star and other standardization for building healthy Green Computing infrastructure.

- Governmental financial support is a must to promote Green Initiatives.

- Awareness among the user of computer and technology urgently needed.

- We need to prepare contemporary IT policy on Green Computing.

- Design and development of Green Computing specialization in Computer Science (UG and PG) programmes [22].

XI. Conclusion

Cloud Computing and Green computing both are today synonymous to Information Technology advancement and advancement of the society. We have several challenges and need to overcome these problems by the awareness programmes and financial assistance. There are some problems and disadvantages in both the computing methods; we need to keep in mind these methods for healthy information society [18].

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