

## Green Computing – Study on Current Trends

Shivani Ganatra<sup>1</sup>, Meenakshi Garg<sup>2</sup>

<sup>1</sup>PG Student, Vivekanand Education Society's Institute of Technology, Department of MCA, Mumbai, India

<sup>2</sup>Assistant Professor, Department of MCA, Vivekanand Education Society's Institute of Technology, Mumbai, India

\*\*\*

**Abstract** - With rising vitality cost and developing ecological concerns, GREEN COMPUTING is accepting to an ever increasing extent consideration. . Programming and framework models (regarding simultaneousness designs) assume a urgent job in both processing and media transmission frameworks, and they have been investigated for execution, dependability, practicality, and security. However, little chip away at examination dependent on the measure of vitality that the CPU/processor will devour has been accounted for. Since most correspondence frameworks need to run every minute of every day (e.g., most server ranches, servers in a distributed computing foundation), the vitality utilization of a framework dependent on a particular programming engineering is vital. For instance, high vitality expending consistently prompts higher operational expense of the framework. High vitality utilization likewise suggests more warmth created, consequently, more force is required for chilling off. As the quantity of PCs is expanding step by step, so is the measure of power devoured by them which thusly is expanding the carbon content in air. This issue has been figured it out by the analysts and a few remedial measures are being taken which help in limiting the force use of PCs what's more, this procedure is called as Green Computing. In the current paper he creators present a few green activities at present taken in the PC business, just as issues that have been raised with respect to these activities and presents an investigation about the green registering and e-squander reusing process. The creators additionally attempted to investigate how to augment vitality productivity during the item's lifetime, and furthermore to advance the reusing excess items and industrial facility squander.

**Key Words:** Green Computing; distributed computing; green initiatives; e-waste; sleep and hibernate component.

### 1. INTRODUCTION

Green processing is the act of utilizing figuring assets productively. Present day IT Systems includes confounded systems both programming and equipment level. Green processing is the most extreme prerequisite to ensure condition and spare vitality alongside operational costs in the present progressively serious world. It's likewise essential to learn about what sort of vitality gains and operational increases can be accomplished. Subsequently, examination of the hole between what we have today and what we'll need to do is fundamental so as to accomplish the advantages of green registering. The facts demonstrate that

Green Computing can not be executed in one day yet every enormous change starts from little activities. For instance a client must set the force alternative in a PC in financial mode or the PC ought to rest mode when the client isn't utilizing the PC by any stretch of the imagination. At the point when a client leaving from the PC for in excess of a couple of moments then the PC ought to go to reserve mode and the screen ought to goto remain by mode or it might turn off programmed to spare calculable measure of vitality. As of late, organizations in the PC business have come to understand that becoming environmentally viable is to their greatest advantage, both as far as advertising and decreased expenses. In the current paper the creators will investigate a few green activities at present under route in the PC industry, just as issues that have been raised with respect to these activities. Green figuring or green IT, essentially worries to earth economical figuring or IT. The field of green processing is characterized as "the information and practice of structuring, assembling, utilizing, and discarding PCs, servers, and related subsystems—which incorporate printers, screens, and systems administration, stockpiling gadgets and correspondences framework proficiently and adequately with negligible or no effect on the earth. Green processing is limiting vitality expenses and sparing nature. Vitality to produce, store, work, and cool registering frameworks has developed fundamentally in the ongoing years, basically because of the volume of frameworks and figuring that organizations currently intensely depend upon. Fundamentally, the entire green perspective came about a significant number a very long time back when the news that nature was not a sustainable asset truly hit home and people started understanding that they expected to do their part to make sure about nature. Government divisions over the globe have started vitality the board programs, for example, Vitality Star, a global standard for vitality proficient electronic gear that was made by the United States Ecological Protection Agency in 1992 and has now been received by a few different nations. Vitality Star decreases the measure of vitality devoured by an item via naturally exchanging it into —sleep mode when not being used or diminishing the measure of intensity utilized by an item when in —standby mode. Shockingly, backup —leaking, the power devoured by apparatuses when they are turned off, can speak to as much as 12 percent of a run of the mill family's power utilization. Fundamentally, the proficient utilization of PCs and registering is the thing that green processing is about. The triple primary concern is what is significant with regards to anything green and the equivalent goes for green processing. This thinks about social

obligation, monetary practicality and the effect on the earth. Numerous business just spotlight on a main concern, as opposed to a green triple primary concern, of financial suitability with regards to PCs. The thought is to make the entire procedure encompassing PCs all the more inviting to nature, economy, and society. This implies makers make PCs in a manner that mirrors the triple primary concern emphatically. When PCs are sold organizations or individuals use them in a green manner by lessening power utilization what's more, discarding them appropriately or reusing them. The idea is to make PCs through and through a green thing. The answer for green figuring is to make an effective framework that executes these elements in an ecologically well disposed manner. A genuine model would be IT supervisors buying equipment that has been EPEAT affirmed implying that upkeep is decreased, the equipment's life is expanded, and makes reusing the PC simple once it is not, at this point vital. Cell phones are superior to PCs – green figuring. A PC is utilized for Surfing Internet, visit, gaming, long range interpersonal communication, downloading, work area figuring including archives, spreadsheets or introduction making or simply viewing photographs and recordings. Then again a cell phone can do all these, maybe now and again increasingly over the customary telephones. The cell phones have quicker processors, more slam, quicker remote Internet availability and bigger recollections. Cell Phones devour low force. Through Technologies, a Taiwanese organization that produces motherboard chipsets, CPUs, and other PC equipment, presented its drive for "green registering" If everybody considers green processing then our universe of PCs will have as meager a negative effect on our physical world as could be expected under the circumstances and that is the thing that green figuring is about. This paper depicts need of the green figuring and fate of the green processing. The essential goal of such a program is to represent the triple productively primary concern. In the current world all practically every individual is utilizing PC. Each office is mechanized and each one can utilize the PC for their own motivation. Be that as it may, the greater part of the clients don't know about the hurtful impacts of the PCs. The PCs emanate carbon dioxide hurtful gases. The vitality utilization by different registering gadgets is additionally assumes a primary job towards our hurtful condition. In the current paper the creators have made an orderly examination on different issues and difficulties of green registering lastly how one can actualize green processing technique in instructive organization or in business condition

## 2. WHY GREEN COMPUTING

Environmental change and a dangerous atmospheric deviation are seen by numerous individuals as the two most testing issues confronting the Earth. Green IT furthermore, specifically, green figuring, are two different ways the data and correspondences innovation network is attempting to address those issues. With the unstable development of

Internet-empowered distributed computing and superior registering focuses, IT's vitality utilization and supportability impacts are relied upon to keep climbing great into what's to come. Endeavors are in progress in both industry and the scholarly community, in any case, to address it. As interest for figuring and correspondence keep on developing, servers, systems, and server farms will expend more what's more, more vitality. For instance, IT assets in the US presently expend more than 1.5 percent of all out power utilization. Force utilization of US server farms in 2006 was 1.5 percent of the absolute vitality devoured, and at an expense of more than US \$4.5 billion.

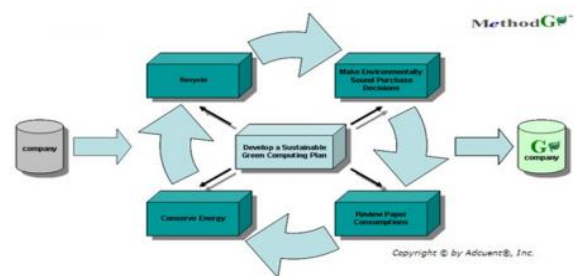


Figure-Implementation of green computing

Today, the green correspondences idea centers for the most part around creating vitality productive correspondence strategies for systems. Three primary methodologies are proposed for power the board in correspondence systems: accomplish less work, diminish working rate, and mood killer inert components. Accomplishing less work implies enhancing forms so the framework executes less activities and hence utilizes less vitality. Diminishing activity speed could forestall excess asset use from the confounded speed of sub forms. At long last, closing down inactive system segments and connections can clearly lessen vitality scattering. The all out vitality utilization by servers, PCs, screens, information correspondence prerequisites and cooling frameworks for information focuses is consistently expanding. This expansion in vitality utilization brings about expanded ozone depleting substance discharges. Every PC in use creates about a huge amount of carbon dioxide consistently. As vitality emergency depends and the assets drain, we have to truly consider rolling out significant improvements in our way of life for vitality protection Green enlisting is one technique for dealing with the essentialness crisis. It is conceivable to lessen carbon discharges, spare vitality and ensure nature overall with this methodology. Green processing is the act of utilizing PCs and related innovation in an ecologically dependable way It centers around definitely changing the way in which we approach preparing, using the electronic contraptions and adhering to extreme imperativeness security rules, to restrict the mischief caused to the earth by PCs. This action isn't simply constrained to sparing power, yet in addition adopts an all encompassing strategy towards condition benevolent utilization of PCs. Contriving imaginative and condition cognizant systems for vitality age is likewise one of its angles.

### 3. GREEN COMPUTING TECHNIQUES

Sparing force is the principle goal of Green Computing and that is likewise with least effect on nature. It is about how to diminish the force utilization of the screens to spare vitality, increment the Quicker processors utilize more force. The field of green preparing as "the examination and practice of organizing, gathering, using, and disposing of PCs, workers, and related subsystems, for instance, screens, printers, accumulating devices, and frameworks organization and correspondences systems adequately and 1'wviably with inconsequential or no impact on the earth.. A portion of the proposed techniques are:

#### 3.1 Profiling the Energy Usage

##### 3.1.1 Vitality Usage Profile for the Hardware:

The server's vitality utilization is a lot simpler to quantify. A few minimal effort gadgets are accessible to screen vitality utilization. The significant thing is to assemble a general image of how much vitality the server utilizes out of gear and under pressure. The vitality use of individual parts shouldn't be careful, yet is significant in light of the fact that it gives a positioning framework to vitality buyers inside the server. CPU utilization is the most costly asset regarding real expense and ecological sway. Memory utilization has an insignificant expense, best case scenario. Hard circle use has negligible expense. The essence is that in the event that we are going to endeavor to enhance our framework and application to limit vitality use, the CPU ought to be the essential objective.

##### 3.1.2 Vitality Usage Profile for the Application:

Devices can be utilized to decide exact CPU utilization for explicit parts of the application. These following measurements can at that point be utilized to assault the significant expense bits of the application. At the end of the day, locate the most costly activities and advance them to decrease CPU utilization. A definitive objective is to bring down asset utilization to where numerous applications can be facilitated on a similar arrangement of servers. Server sharing can diminish the vitality impression of the considerable number of utilizations included.

##### 3.1.3 Vitality Usage Profile for the Operating System:

Taking a gander at the information gathered for physical servers when inactive and at top burdens, we can see that a lot of vitality is squandered on the framework inert procedure. This squandered vitality can be recovered through working framework virtualization. Virtualization permits the host machine to run at roughly 80 percent of pinnacle processor use with partially expanded force

necessities. The initial phase in tuning the virtual visitor is to handicap or deactivate unneeded administrations. Depending on the sort of visitor working framework and its motivation, there might be various pointless administrations running as a matter of course. Dispense with screensavers and assess your occasion logging prerequisites for every visitor working framework. This will maintain a strategic distance from squandered processor cycles and circle movement. Limiting circle movement is basic to both execution and vitality proficiency. Look carefully at the system use of your applications with a system checking apparatus to find and wipe out talkative conventions and superfluous system correspondence. Wire -+shark is a successful and openly accessible instrument for organize investigation.

#### 3.2 Virtualization

Virtualization, a term that used to the different procedures, strategies or ways to deal with make a virtual domain, for example, a virtual equipment stage, virtual working framework (OS), stockpiling gadget, or system resources. Computer virtualization is the procedure of running at least two legitimate PC frameworks on one lot of physical equipment. With virtualization, a structure regulator could join a couple of physical systems into virtual machines on one single inconceivable system, hence unplugging the primary gear and reducing power and cooling use. One of the essential objectives of practically all types of virtualization is making the most proficient utilization of accessible framework assets. Virtualization features "Green Figuring"; by uniting servers and augmenting CPU preparing power on different servers. Capacity virtualization makes it workable for frameworks to get to a common stockpiling subsystem. Obviously this methodology would decrease the quantity of capacity gadgets required, the measure of intensity required, the warmth created and, as a magnificent reaction, would decrease the operational furthermore, managerial expenses of back up, authentic capacity and so forth.

##### 3.2.1 Solidification:

Before, it was essential for every PC framework to have its own stockpiling to work. Capacity virtualization makes it workable for frameworks to get to a common stockpiling subsystem that is some place out on the net. It additionally implies that duplicates of information that used to be put away on each PC's circles would now be able to be put away once in the mutual stockpiling subsystem. Obviously this methodology would decrease the quantity of capacity gadgets. Required, the amount of intensity required, the warmth delivered and, as an awesome side impact, would decrease the operational and regulatory expenses of back up, authentic capacity and so forth.



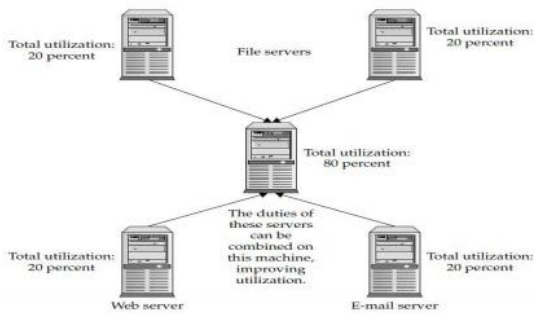


Figure1:-by consolidating servers we can reduce the power and increase s the utilization of machines.

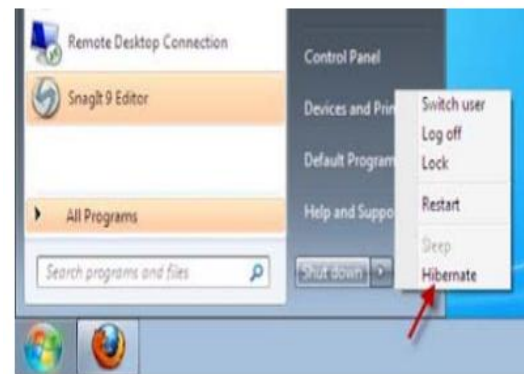


Figure2:-hibernate steps for windows 7.

### 3.2.2 Proper gadgets:

Since the connection between the application and the genuine stockpiling gadget is broken by capacity virtualization programming, the gadget can be chosen dependent on what's generally suitable. Applications and information that are gotten to much of the time can be put away on high speed, costly gadgets that expend more force. Applications and information that are gotten to less oftentimes can be put away on lower speed, more affordable gadgets that expend less force. Seldom got to applications and information can be moved to chronicled capacity gadgets that bring about the most minimal cost and require the least force utilization.

### 3.3. Preserve energy

Actuating the influence the executives includes on your PC sets aside vitality and cash while helping nature. Your PC's SLEEP and HIBERNATE settings are two of the best ways for you to make your PC more earth neighbourly.

#### 3.3.1 Sleep mode:

Permitting the screen to nod off in the wake of sitting for quite a while Period is another handily utilized technique for improving vitality proficiency. At the point when a screen nods off or enters a "remain by "mode, it enters a low force utilization state. It spares 60-70 percent of power. The screen will be clear, with no light emanating from it.

#### 3.3.2 Hibernate mode:

The sleep mode goes above and beyond than backup mode by totally fueling off the PC. Conjuring the rest mode causes the memory state to be spared onto the hard plate before shutting down. When coming out of sleep mode, the PC reestablishes the memory state, restoring the PC to its pre-rest state. A PC will devour roughly 3 watts in rest mode versus 5 watts for backup a disservice of the sleep mode is that it takes somewhat longer to enter and exit sleep than reserve, the consequence of sparing and reestablishing the memory state to and from the plate.

### 3.3.3 Screen savers:-

One of the least difficult and most natural force sparing strategies is the best possible utilization of screen savers. The regular graphical screen saver, initially intended to limit "consume in" of PC screens, really expands power utilization Rather than utilizing a 3D illustrations screen saver, and with screen consume in not, at this point a worry, power use effectively can be decreased by impairing screen savers. Along these lines, power devoured by serious designs is disposed of, prompting the screen "nodding off " after a period of sitting, naturally monitoring still more force.

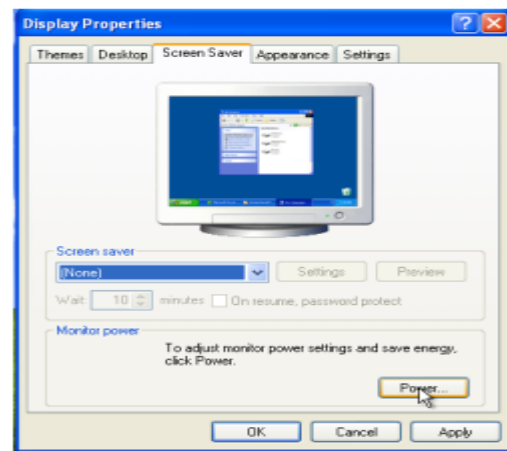


Figure3:-option for no screen saver.

### 3.3.4 System Standby Mode:

Reserve or Stand by is a mode the PC, screen, or other gadget enters when inert for a really long time. This mode makes a difference preserve power when a PC or PC gadget isn't being used without giving up the time it would take to kill also, on the PC. When in Standby, the PC or screen has a strong of blazing light, showing that there is despite everything power in any case, the PC is in Standby. To resume, wake, or wake up a PC in Standby mode move the mouse, press a key on the console, or press the force button on the PC without holding it down for in excess of a couple of moments.

#### 4. REUSE OF ELECTRONIC EQUIPMENT

Dispose of utilized or undesirable electronic gear in a helpful and earth mindful way. Reusing processing hardware can keep unsafe materials, for example, lead, mercury, and hexavalent chromium out of landfills, and can likewise supplant hardware that in any case would should be made, sparing further vitality and outflows. PC frameworks that have outlasted their specific capacity can be re-purposed, or gave to different foundations and non-benefit associations. Be that as it may, numerous foundations have as of late forced least framework prerequisites for gave gear. Furthermore, parts from obsolete frameworks might be rescued and reused through certain retail outlets and metropolitan or private reusing focuses. Figuring supplies, for example, printer cartridges, paper, and batteries might be reused also. A downside to a considerable lot of these plans is that PCs assembled through reusing drives are frequently dispatched to creating nations where natural norms are less severe than in North America and Europe. The Silicon Valley Toxics Coalition evaluates that 80% of the postconsumer e-squander gathered for reusing is sent abroad to nations, for example, China.

#### 5. GROWING THIN CLIENT DEVICE

This arrangement would abuse the innovation behind a server-customer sort of framework. These gadgets would be incredibly slight what's more, would contain no extra room just as processing would be kept at any rate. These are regularly exceptionally structured, fixed "secret elements", containing just the firmware and I/O ports required to interface with the screen, mouse, console, and organize. The cases are intended to trade just keystrokes, screen invigorates, and mouse clicks with the application living on the server; the application runs on the server and feeds screen invigorates back to the slim customer. The slight customer machines not just lessen the expense of the PCs yet in addition executes green processing and limit e-squander. There would be a tremendous focal server which would be utilized to convey numerous such slight customer gadgets. The whole capacity would happen at the server, just as the processing undertakings would be completed at the server itself. The meager customers would just have the advancements required to speak with these focal servers and send data to the servers and recover data over from them. This would definitely lessen the vitality use and will be constrained to just the vitality spent by the focal server. This arrangement can be powerful in office systems where at present you would have for model 100 lodges in a single huge room, each having a Desktop PC. These 100 PC's can well be supplanted by 100 such flimsy customer gadgets and one focal server connecting with them.

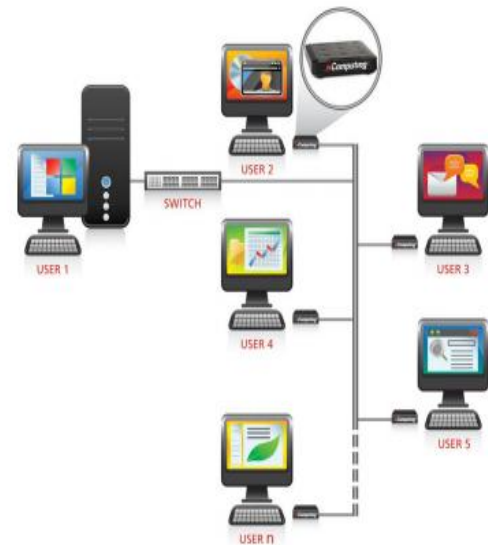


Figure-desktop virtualization using N computing.

The slim customer processing model is naturally progressively secure, since the applications and the registering power are totally housed in the server farm, with its severe principles and orders for change control and application establishment and modification. With no plate access to introduce applications, move information, or present malware, slim customers are an ideal fit for any Higher Education Foundation's severe security prerequisites. To make a slim customer a less segments and less assets are required. In slight customer a decreased number of segments require less electromechanical associations (patch joints) and less mechanical latches and cements. Meager customers are around 60 - 70% lighter in weight and littler in size than PCs and it legitimately influences transportation needs and related CO2 or ozone depleting substance (GHG) emanations. Because of little size of slight customer all the more slim customers can be transported in a similar compartment, bringing down fuel necessities and the natural effect per unit delivered. Littler things likewise require less bundling, which both devours crude material assets and vitality and adds to age of strong waste. Since each case is remarkable, the particular impacts of gadget size on materials use and delivery effect ought to be decided through a lifecycle evaluation (LCA) study. Likewise Desktop virtualization causes registering accessible to additional individuals inside the association for less expense. Over all it spares a ton of vitality and limits e squander, consequently contributing the manageability of the earth.

## 6. E-WASTE MINIMIZATION

1. By supplanting oil filled plastic with bioplastics or plant-based polymers, which require less oil and vitality to produce than conventional plastics and creating arrangements against a test to keep these bioplastic PCs cool with the goal that hardware won't dissolve them.

2. Landfills can be constrained by utilizing the gadget by overhauling and fixing in time with a need to make such procedures (i.e., up degree and fixing) simpler and less expensive.

3. Keeping away from the disposing of won't just control e-squander out of dumps yet in addition spare vitality and materials required for a entirely different PC.

4. Power sucking introductions can be superseded with green light shows made of OLEDs, or regular light-releasing diodes.

5. Utilization of harmful materials like lead can be supplanted by silver and copper making reusing of PCs (which is costly and tedious at present) increasingly compelling by reusing PC parts independently with a choice of reuse or on the other hand resale.

## 7. GREEN INITIATIVE

### 7.1 Redesign with Efficient Components:

Overhauling wasteful segments within a PC can improve a PC's general effectiveness, albeit greater expense is here and there a precluding factor, with part updates now and again requiring other essential segments to be supplanted first. A more financially savvy option in contrast to segment updates is to purposely look for the greenest PC accessible when it comes time for substitution.

### 7.2 Download software:

Rather than purchasing programming on plates in plastic bundling, attempt to download it from the web. Downloading S/W spares the materials, bundling, assembling and transport expenses of an unmistakable duplicate and electronic downloads are frequently less expensive than their partners sold in the shops.

### 7.3 Green Purchasing:

Green buying is the most significant buying technique received now-a-days. Clients of each class are being empowered for green buying. Every single IT organizations and people are moving towards green buying. One of the ways is buying electronic items having names, for example, EPA Energy Star (US), TCO 95 (Sweden), and Blue Angel (Germany). This is likewise reassuring for the organizations to fabricate greener items that expends less force, and makes less mischief to condition. Various techniques are being trailed by various organizations in various nations to make their items green. To buy the PCs and other electronic hardware resembles switches, printers, air-conditioners, etc., the following acquisition activities could be embraced:

1. Set up measures and benchmarks to characterize concur buying strategy for PCs. Decide ecological assessment rules to analyze advancements and parts. Use solid outsider observing and testing associations autonomous of providers. Utilize existing PC layouts from frameworks contracting tenders as benchmarked details for similar purposes.

2. Characterize total buying arrangement with reason, extension and strategies. Build terms and conditions for future tenders and agreements. Anyway the client divisions would need to acknowledge these terms and be happy to join Eco-marks and other naturally well disposed usefulness into their determinations.

3. Report/update buy movement on the side of green activities, including everyday advancement to supportability facilitator for consolidation of mindfulness program.

## 8. CONCLUSIONS AND FUTURE SCOPE

The principle goal of this innovation is to diminish the vitality utilization of PC related items. Green figuring speaks to a dependable method to address the issue of a dangerous atmospheric deviation by receiving green figuring, business pioneers can contribute the natural stewardship and secure the earth while likewise lessening vitality and paper cost. So green processing is an attitude that asks how we can fulfill the developing interest for Network figuring without putting such weight on nature. There is an elective method to plan a processor and a framework with the end goal that we don't expand requests on the condition, yet at the same time give an expanded measure of preparing ability to clients to fulfill their business needs. Green preparing isn't connected to going out and organizing biodegradable packaging for things. Presently the opportunity arrived to consider the proficiently utilization of PCs and the assets which are non-inexhaustible It opens another window for the new business visionary for gathering with E-waste material and scrap PCs.

## REFERENCES

- [1] Chiranjeeb Roy Chowdhury, Arindam Chatterjee, Alap Sardar, Shalabh Agarwal, Asoke Nath, "A Comprehensive study on Cloud inexperienced Computing : to cut back Carbon Footprints exploitation Clouds", International I Journal of Advanced pc analysis, Vol-3, No.1, Issue-3(march),pp. 78-85(2013).
- [2] Shalabh Agarwal, Asoke Nath, "Work space Virtualization and inexperienced Computing Solutions", The Second International Conference on "Delicate Computing for drawback determination (SocProS 2012)" distributed within the procedures of the meeting SocPros 2012 which can be control in December twenty eight - thirty, 2012 and distributed in Conference procedures in AISC arrangement of Springer Shalabh Agarwal, Asoke Nath, "A Study on implementing inexperienced IT in Enterprise a pair of.0", International Journal of Advanced pc analysis, Vol-3, No.1, Issue-3(march),pp. 43-49(2013). Aritra Mitra, Riya Basu, Avik Guha, Shalabh Agarwal, Asoke Nath, "Application of

Green computing in Framing Energy Efficient Software Engineering”, International Journal of Advanced Computer Research, Vol-3, No.1, Issue-3(march),pp. 117-121(2013).

[3] Aritra Hindu deity, Riya Basu, Avik Guha, Shalabh Agarwal, Asoke Nath, "Application of inexperienced computing in Framing Energy economical software system Engineering”, International Journal of Advanced pc analysis, Vol-3, No.1, Issue-3(march),pp. 117-121(2013)

[4] Shantanu Ray, Nabaraj Sengupta, Koustav Maitra, Kaushik Goswami, Shalabh Agarwal, Asoke Nath, "Green software system Engineering method : Moving Towards property wares style, Journal of world analysis in pc Science(ISSN-2229-371X),Vol-4,No.1,pp.25-9(2013).

[5] Shalabh Agarwal, Kaustuvi Basu, Asoke Nath, "Green Computing and Green Technology based teaching learning and administration in Higher Education Institutions”, International Journal of Advanced Computer Research, Vol-2, Number-3, issue-11, Sept, pp 295-303(2013).

[6] S. Singh, "Green computing methods & challenges," 2015 International Conference on inexperienced Computing and net of Things (ICGCIoT), Noida, 2015, pp. 758-760.

[7] Chaitali Patra, Dr. Asoke Nath, "Green Computing -New Paradigm of Energy Efficiency and eWaste minimization – A Pilot study on current trends," International Journal of Advance Research in Computer Science and Management Studies Volume 2, Issue 11, November 2014 pg. 533-542

[8] Shalabh Agarwal, amphibian genus Biswas, Asoke Nath, "Virtual Desktop Infrastructure in instruction establishment : Energy potency as associate application of inexperienced Computing, printed in Proceedings of IEEE conference CSNT-2014 control at Bhopal, page-601-605, Gregorian calendar month 7(2014).

[9] Shalabh Agarwal, Arnab Datta, Asoke Nath, "Impact of inexperienced Computing in IT trade to form Eco Friendly Environment”, Journal of world analysis in pc Science(JGRCS), Vol 5, No.4, Page 5-10(April 2014).