

HOW IT BASED PROCESSES CAN HELP TO BE MORE ENVIRONMENTAL FRIENDLY IN A BUSINESS ENVIRONMENT

H. P. S. A Fernando¹, Lanka Udawatta² and V. Nanayakkara³

¹ Department of Computer Science Engineering, University of Moratuwa, Sri Lanka. Email: sajinie05@yahoo.com

² Department of Electrical Engineering, University of Moratuwa, Sri Lanka. Email: lanka@elect.mrt.ac.lk

³ Department of Computer Science Engineering, University of Moratuwa, Sri Lanka. Email: vishaka@uom.lk

ABSTRACT

The main reasons for organizations to move into Green IT are the rising energy cost and the global warming issue. Day by day energy requirement increases and there won't be sufficient energy to cater the need of that demand. Also, currently environmental friendly organizations giving strong publicity regarding global warming issue and encourage organizations to be more environmental friendly. Therefore all the organizations want to take active steps to reduce their electricity consumption, emission of Green House Gases (GHG) to the environment and reduce their carbon footprint level. In Sri Lanka, many organizations haven't implemented Green IT, however, looking forward to move into Greenness, but they are lack of required knowledge. This paper discusses the factors affecting environmental performance through IT based processes and the areas where Green IT can be initiated in an organization with simple practices.

Key words: Green IT, global warming issue, GHG, carbon footprint level

5. INTRODUCTION

'Green IT' refers to the idea that how organizations which are involved with IT can and should implement practices that are environmental friendly [1]. It is basically refer to environmental sound IT. It's the study and practice of designing, manufacturing, using, and disposing of IT components such as computers, servers, monitors, printers, storage devices, networking and communications systems and etc.in an efficient and effective manner with minimal or no impact on the environment.

By moving on to 'Green IT', it would benefits the environment by improving energy efficiency, lowering greenhouse gas emissions, using less harmful materials, and encouraging reuse and recycling [2].

6. METHODOLOGY

The study was mainly conducted with the help of many valid literature. Most of the literature are based on case studies the authors have conducted and they have specified how we can implement Green IT concept through different paths to have an environmental conscious business environment.

7. RESULTS

The results shows that by moving on in following four paths we can achieve total

environmental sustainability from the IT side and make IT greener throughout its entire lifecycle [2].

Green Use: Reduce the energy consumption of IT components and other associated subsystems and use them in an environmentally sound manner.

Green disposal:

Refurbish and reuse old IT components such as servers, computers, monitors and etc. and properly recycle unwanted components.

Green design:

Design energy efficient and environmentally sound IT components, and cooling equipment.

Green manufacturing:

Manufacture IT components and other associated subsystems with minimal or no impact on the environment.

Also there are different areas where IT professionals can implement Green practices:

Data Centre:

1) Eliminate energy leaks and use innovative and more efficient cooling methods-By using liquid cooled racks, active and passive rear door cooling units, pumped refrigerant-based systems, and direct-to-chip or board cooling [3].

2) Replace high-density servers with virtual servers.

3) Use alternative and innovative storage tactics- By minimizing the amount of data stored and by optimum usage of the server for its running applications [4].

4) Reconfigure data centre floor layout-By adopting hot aisle/cold aisle layouts and distributing power across racks [5].

5) Explore alternative energy sources- By using kinetic uninterruptible power supplies (UPS) system [6] and by power up the servers directly from a central direct current (DC) supply [4].

End-User Computing:

1) Alter purchasing practices for IT assets-Make sure IT equipments you are purchasing have met energy or environmental certifications, ISO 14001 certification and Restriction of Hazardous Substances (RoHS) & Waste Electrical and Electronic Equipment (WEEE) compliance for fewer toxic materials [7].

2) Encourage adoption of energy-saving settings on computers-Turnoff whenever they are idle [4], using a blank screen saver and by moving into thin clients [2].

3) Practice proper disposal and recycling practices of IT assets-Using E-waste management system. "E-waste" is an informal name for electronic products when their usable life time is getting closer to expire [2].

Use of Electronic Communication and Navigation:

Using methods such as videoconferencing whenever possible [7] and home working (Telecommuting) [8].

Other:

We can reduce paper consumption and paper waste with smaller practices like setting printer to print both sides of the paper, make smaller paper margins and font sizes and without putting test printouts, make the changes within the screen and put the printouts to reduce the consumption of papers.

Verdiem Corporate has introduced three steps that organizations need to be followed when

moving toward Green IT. Following are the steps necessary to follow when developing a Green IT plan [9]:

1) Creating a baseline of the environmental footprint:

Understand the elements of Green IT that are within the control of your organization, and those that are not and understand the current practices.

Energy Consumption Analysis-

Create an energy consumption baseline based on the hardware (Desktop PCs, Laptops, Monitors, Servers, Printers, Scanners, Switches and etc) in an organization. This will used estimate the annual energy consumption of the hardware in the organization.

Catalog disposal practices-

Create organization's footprint baseline to catalog hardware disposal practices. Eg: Whether the organization return the parts for your server manufacturer for reuse purpose.

Examine acquisition and hardware lifecycle-

Understand the lifespan of the hardware in the organization which will help to determine the environmental impact of manufacturing that hardware.

2) Defining your green objectives:

The organizations must focus on developing green IT objectives. If your organization replace the desktops with those that operate more energy efficiency will not be a good solution to move into green IT, the main objective is to keep the current equipments and use them in a more efficient manner.

3) Implementing green best practices:

We have to always start with existing environment and implementing small actions instead of moving towards for a brand new setup within over night. Following can be practiced:

PC Power Management, Extend useful life of IT Hardware, Truly Green Recycling Programs, Considering green in acquisition.

Next we have come up with a Green ICT Framework which is known as Envirability-RMIT

Green ICT Framework (Fig. 1). The Envirability-RMIT Green ICT framework takes a holistic view of Green ICT and sustainability across the enterprise and then move into the individual technologies business best practices. The 4 vertical pillars are based on different functional components of Green ICT and the 5 horizontal components or “actions” describe separate approaches to vertical pillars. This is used by organizations to categorize the aspects of Green ICT, to conduct surveys in Green ICT usage patters and in conducting Green ICT benchmarking [10].

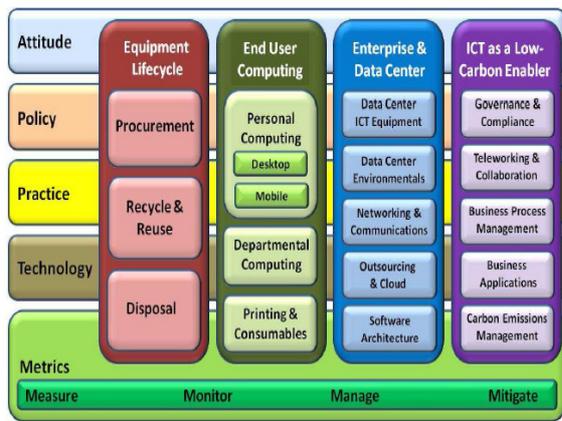


Fig. 1: Envirability-RMIT Green ICT Framework

Finally it is important to have a method to measure organization’s level of capability in implementing Green-IT. Green ICT capability maturity level model (CMM) which is shown in Figure 2 is built to measure organization’s level of capability in implementing Green ICT. CMM defines 5 levels of maturity in the use of any technology or system. By applying 5-level CMM across each of the 5 aspects of Green ICT Framework mentioned above, we can obtain a useful framework as below.

Green ICT Capability Maturity Model



Fig 2: Green ICT Capability Maturity Model

8. CONCLUSION

Green IT can be easily implemented in organizations using above considerations and practices. It is very important to understand the organizations capabilities in implementing Green-IT and then move on with the required steps when implementing.

Immediately organizations may not get the benefits from Green-IT, but with the time they will be able increase their revenue by reducing electrical consumption and efficient usage of IT and other IT related equipments/resources.

From above discussion organizations will be able to get a clear idea about the Green-IT concept. It will also be a motivation factor for them to move towards environmentl friendly IT.

In future research we are planing to conduct few case studies and benchmark the IT processes in order to reduce the carbon footprint and move towards greenness.

9. REFERENCES

[1] GeneSys, Technology & Systems Club of IIM Ahmedabad, “Green IT: An Overview,” *TechGENE Journal*, issue. 02, pp. 1-2, Sep 2010. [Online]. Available: http://stdwww.iimahd.ernet.in/genesys/data/TechGENE_Sep10.pdf. [Accessed: Feb. 01, 2011]

[2] San Murugesan, “Harnessing Green IT: Principles and Practices,” *Green Computing, IEEE*, vol. 10, no. 01, pp. 24-30, Jan-Feb 2008. [Online]. Available: IEEE Xplore, <http://www.ieee.org>. [Accessed: Feb. 05, 2011]

[3] D. Kennedy, “[Understanding data centre cooling energy usage and reduction methods,](#)” *bdstrategy.asia*. [Online]. Available: <http://www.bdstrategy.asia/data-center/power-and-cooling/68-understanding-data-centre-cooling-energy-usage-and-reduction-methods>. [Accessed: Oct. 03, 2010]

[4] K. Francis and P. Richardson, “Green Maturity Model for Virtualization,” *Architecture Journal-Green Computing*, vol. 18, pp. 10-15, 2008. [Online]. Available:

<http://msdn.microsoft.com/en-us/architecture/dd393308.aspx>. [Accessed: Oct. 23, 2010]

[5] D. Cottingham, "Seven Design Considerations for a Green Data Center," *Dimension Data*, Jan 2010. [Online]. Available: http://www.dimensiondata.com/Lists/Downloadable%20Content/SevenDesignConsiderationsforaGreenDataCentre_129092358848348750.pdf [Accessed: Oct. 04, 2010]

[6] J. Thomas, "Green data centre concerns vs. high-tech IT infrastructure," *searchvirtualdatacentre.techtarget.co.uk*, Nov. 17, 2009. [Online]. Available: http://searchvirtualdatacentre.techtarget.co.uk/tip/0,289483,sid203_gci1374641,00.html. [Accessed: Sep. 30, 2010]

[7] D. Tebbutt, M. Atherton, and T. Lock, *Green IT for Dummies*. West Sussex: John Wiley &

Sons Ltd Publication, 2009. [E-book]. Available: Hewlett Packard

[8] D. D. Bois, "What is Green IT?," *energypriorities.com*, June. 04, 2007. [Online]. Available: http://energypriorities.com/entries/2007/06/what_is_green_it_data_centers.php. [Accessed: Sep. 25, 2010]

[9] Verdiem Corporate, "3 Building Blocks to a Green IT Strategy," *Verdiem Corporate*, Feb 13 2009. [Online]. Available: http://www.verdiem.com/docs/3_Building_Blocks_to_a_Green_IT_Strategy.Updated.pdf. [Accessed: Jan. 16, 2011]

[10] Graeme Philipson, "A Comprehensive and Practical Green ICT Framework," in *Handbook of Research on Green ICT: Technology, Business & Social Perspective*, Vol. 01, Bhuvan Unhelkar, Ed. New York: Information Science Reference, 2011, pp. 131-144.