Making IT Green

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As the world's climate heats up, causing potentially disastrous consequences, and as environmental problems become global, a new spotlight appears on IT. It turns out that IT is both a solution and problem for environmental sustainability. As businesses and governments try to balance growth with environmental risks, we're called upon to make IT systems and work practices greener and to use IT in innovative ways to address environmental problems.

Green IT, also known as Green Computing, refers to the study and practice of designing, manufacturing, and using computer hardware, software, and communication systems efficiently and effectively with no or minimal impact on the environment. Green IT is also about using IT to support, assist, and leverage other environmental initiatives and to help in creating green awareness.

Environmental Impact

While the use of IT has exploded in all areas of our activity, offering great benefits and convenience and irreversibly transforming businesses and society, it has also been contributing to environmental problems. Unfortunately, most people—including many IT professionals—don't realize this.

IT affects our environment in several different ways. Each stage of a computer's life—from production and use to disposal—presents environmental challenges. Manufacturing computers and their various electronic and nonelectronic components consumes electricity, raw materials, chemicals, and water, and it generates hazardous waste. All of this impacts our environment.

Globally, the total electrical energy consumption by data centers, servers, and computers is steadily increasing. The increase in energy consumption results in increased greenhouse gas emissions as most of the electricity is generated by burning coal, oil, or gas. Countless old computers and other electronic hardware, which contain toxic materials and are discarded within a couple years after purchase, end up in landfills, polluting the earth and contaminating its water.

The increased number of computers in use and their frequent replacements make the environmental impact of IT a major concern. Consequently, there's increasing pressure on us to make IT environmentally friendly.

Greening IT

To build a greener environment, we must modify or end some of our old and familiar ways of doing things. To comprehensively and effectively address IT's environmental impact, we must adopt a holistic approach and make the entire IT life cycle greener. We can do this by addressing environmental sustainability along the following four complementary paths:

- *Green use*—reduce the energy consumption of data centers, computers, and other information systems and use them in an environmentally sound manner;
- *Green disposal*—refurbish and reuse old computers and responsibly recycle unwanted computers and other electronic equipments;
- *Green design*—design energy-efficient and environmentally sound components, computers, servers, cooling equipment, and data centers; and
- *Green manufacturing*—manufacture electronic components, computers, and other associated subsystems with minimal impact on the environment.

Green IT spans many focus areas and activities, including power management; data center design, layout, and location; the use of biodegradable materials;

Special Issue: Green IT

The trendy topic of Green IT is the focus of *IT Professional*'s January/February 2011 issue. For more information, see www.computer.org/itpro/cfp1. I invite you to share your research, views, and ideas on this topic as well as best practices and your experiences in greening IT.

regulatory compliance; green metrics and green labeling; carbon footprint assessment tools and methodology; and environment-related risk mitigation.

A growing number of IT vendors and users have begun to turn their attention toward Green IT. Triggered by the imminent introduction of more green taxes and regulations, there will be a major increase in demand for green IT products and solutions. The Electronic Product Environmental Assessment Tool (www.epeat.net) helps buyers identify green IT products by labeling computer hardware as bronze, silver, or gold, based on its environmental attributes.

There's great promise in the Green IT movement. Those in the IT profession as well as IT users have a responsibility to help create a more sustainable environment.

IT for Environmental Sustainability

In addition to IT being green, IT can also help create a more sustainable environment by

- coordinating, reengineering, and optimizing the supply chain, manufacturing activities, and organizational workflows to minimize the environmental impact;
- making business operations, buildings, and other systems energy efficient;
- analyzing, modeling, and simulating environmental impacts;
- providing platforms for eco-management and emissions trading;
- auditing and reporting energy consumption and savings;
- offering environmental knowledge-management systems, decision-support systems, and environmental ontologies; and

- integrating and aggregating data from environmental monitoring networks.

Green IT will be a hot topic for years to come, because it's imperative that we develop environmentally sustainable IT, from both an economic and environmental viewpoint.

Green Prospects

We thus need to educate IT professionals and students about Green IT and its prospects. Many IT professionals and senior IT executives don't know how or where to begin when it comes to implementing Green IT.[1] Furthermore, there's a disparity in the level of Green IT understanding across companies, IT professionals, and IT users.

Realizing this, a few universities and training institutes have taken the lead and started offering courses on Green IT. Furthermore, Leeds Metropolitan University in the UK now offers a master's course on green computing (www.leedsmet.ac.uk/inn/090924_6790_Green_Computing_Web.pdf). I expect other universities and training institutes will soon offer similar programs.

Several organizations and agencies also actively promote environmentally sustainable IT, including the Uptime Institute, Computing Impact Organization, Climate Savers Computing Initiative, and Green Electronics Council.

There have been major developments in recent years in terms improving the energy efficiency of computers, virtualization, data center design and operation, power-aware software, and so on. However, there are several Green IT areas that demand further research and development: technology adoption, environmental impact assessment, standards and regulation, and harnessing IT for environmental sustainability.

Also, the Green IT agenda has opened new career opportunities for IT professionals with skills in this area. Some organizations have created new positions and divisions to embrace this upcoming trend.

The Green IT agenda represents a dramatic change in priorities for the IT industry. Until recently, the IT industry was primarily focused on IT equipment's functionality and processing power and its cost. Going forward, however, the industry will also need to deal with the environmental impact of IT and its use.

IT professionals, educators, researchers, and users can make a difference and help create a sustainable environment that benefits current and future generations. I hope you'll join the green wave and do what you can to make IT and its use greener and to harness the power of IT to improve environmental sustainability. 𝕚𝕋

Reference

1. "Economic Crisis to Have Limited Impact on APAC Green IT Adoption," Biztech2.com, 17 June 2009, http://biztech2.in.com/india/news/green-it/economic-crisis-to-have-limited-impact-on-apac-green-it-adoption/58322/0.

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