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Developing and Implementing a Sustainable Information Technology Plan at F.I.T.

Corin Lobo

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Corin Lobo, Department of Computer Engineering

Dr. Ken Lindeman, Dept. of Education and Interdisciplinary Studies, Florida Institute of Technology

Introduction

Sustainable IT is a term that includes the manufacture, management, and disposal of information technology in manners that minimize environmental impacts. As a result, best practices in sustainable IT require diverse coordination among manufacturers, managers and technology users[1]. Green IT on many campuses focuses on purchasing, management and disposal of systems and energy costs[2].

Florida Tech does not currently have an operational Sustainable IT plan to guide and coordinate best practices on campus. Working with the IT Program at F.I.T., the objectives are to build a first campus sustainable IT plan following these objectives:

- to identify best practices to decrease IT energy expenses exclusive of purchasing.
- to identify purchasing alternatives to decrease energy expenses.
- to advance re-use and recycling practices for IT hardware.

Methods

Best Practices to Decrease Energy Use Outside of Purchasing.

Meetings are underway with senior staff at IT to characterize current practices related to sustainability and potential options to adopt best practices for energy management. A literature review of other IT plans is underway with a focus on best practices that address the specifics of F.I.T. systems and reflect SMART criteria (Specific, Measurable, Achievable, Realistic & Timebound). Opportunities that match criteria are included in a list of best practices not requiring new purchases.

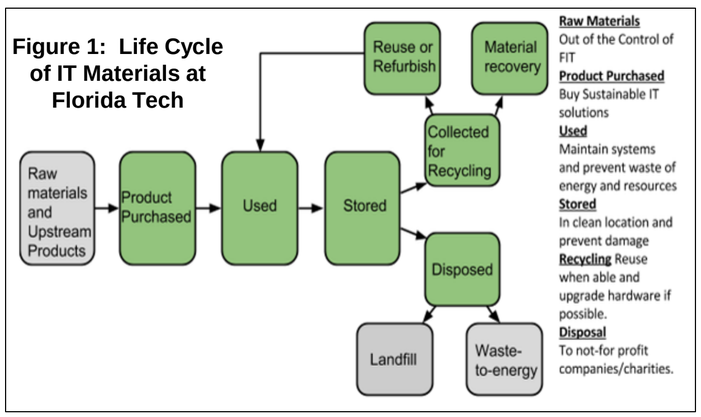
Alternative Purchasing to Decrease IT Expenses.

Literature reviews of both sustainable IT and purchasing plans from other universities are being used to identify best practices that meet IT needs. Fundamental return on investment (ROI) analyses are underway. Practices requiring purchasing are being added to the draft sustainable IT plan in a list of recommended best practices.

Reuse and Recycling Practices for IT on Campus.

An analysis of our current end-of-life-cycle planning is underway. With analysis, means to expand on current plans and devise additional initiatives are being created using the available literature. A list of recommended best practices were also included in this IT plan.

Figure 1: Life Cycle of IT Materials at Florida Tech



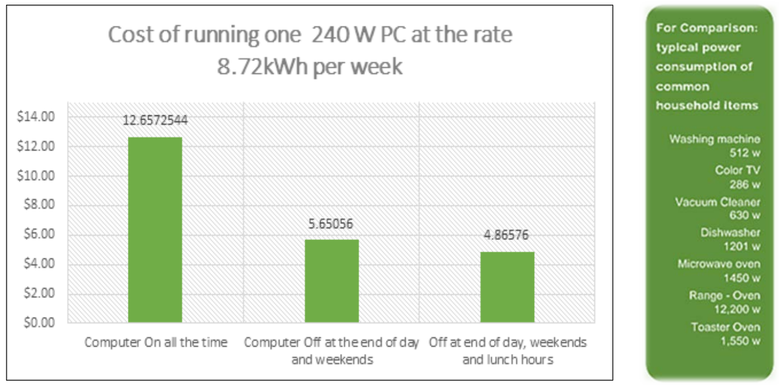
Results

From the data collected from other campus IT plans and research into FIT campus IT systems, with the assistance of the IT Program, the following recommendations are currently provided:

Best Practices to Decrease Energy Use Outside of Purchasing.

- Block out times for various labs on campus in non-prime hours.
- Maintenance upgrades on computers that draw unnecessary power (re-installations and other maintenance practices).
- Posters across campus and dormitories to promote energy saving, including potential announcements on WFIT.

Figure 2: Electricity consumption of average campus desktop (kwh).



By using blackout times, the school may save up to $1,093,092. for their estimated 3000 computers. Cost/benefit ratios must also account for desktops using 35-40% more power every two yr over their life[2].

Alternative Purchasing Options to Decrease IT Expenses.

- Promote purchases of computers, servers and other hardware with ecolabels (Energy Star and Green IT) to students and faculty.
- Purchase EPEAT registered electronic products for campus use.
- Purchase/customize PC's to increase life cycle.
- Further implement virtualization and cloud computing alternatives.

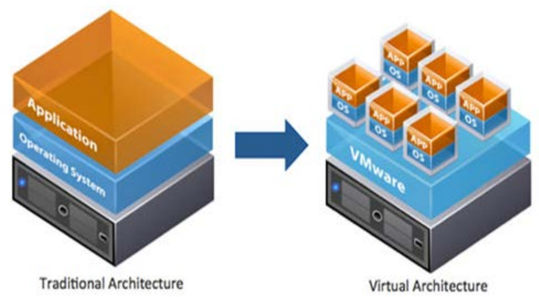


Figure 3. Virtualization of architecture to improve operations[3].

Virtualization allows one physical device to operate multiple virtual machines (VMs) using the same hardware. Stand-alone servers can use six times more power as one VM, six times the money and CO_2.

Return On Investment	8.72 ¢ per kW Commercial	10.40 ¢ per kW Residential
Standalone Power Price	$80,208.05	$95,652.05
VM Price	$13,749.95	$16,399.50
Cost Savings	$66,458.10	$79,252.55

Table 1. ROI for stand-alone and virtual architecture, calculated $.

One VM *host* can run >100 VMs in the physical space of one. Several proposed best practices can create savings for the campus by reducing the frequency of hardware purchases.

Re-use and Recycling Practices for the Campus.

- Sell or donate computers that have surpassed their life cycle to benefit worthy non-profits (e.g., Students without Computers).
- Increase and measure electronic waste reduction and recycling by coordinating with local businesses, schools and non-profits.

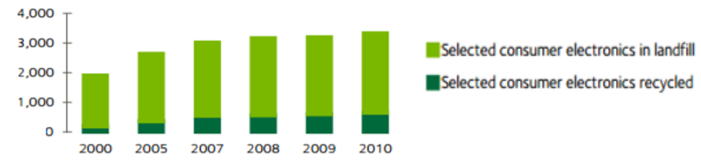


Figure 4: US electronics in thousands of landfill tons, US[4].

In response to the US EPA's electronic waste management guidance, many universities have prioritized proper disposal and recycling of IT systems. Currently Florida Tech has an IT disposal initiative that works with AERC Recycling Solutions, University Park Elementary School and a battered women's shelter. Expanding green institution partnerships in electronic recycling can also assist the community.

Discussion

Many universities allocate only a small section of their purchasing resources for sustainable IT or do not have a plan. There are many opportunities to advance best practices at F.I.T. and the developing Sustainable IT Plan will provide a heuristic framework to assist operational advances. Challenges will include initial investment costs, hence the value of ROIs. This project was limited by a lack of available baseline data, a situation which should improve with future implementation of a formal plan. Available time and resources is also limiting on several scales, for example, there may be limited direct follow-up work if not continued by a new student next year.

Literature Cited:

1. Walsh, K. (2007, October 29). Environmentally Sustainable IT Definition and Solutions. Retrieved March 23, 2015, http://www.cio.com/article/2437751/energy-efficiency/environmentally-sustainable-it-definition-and-solutions.html
2. Sustainability, Cornell University. Retrieved March 23, 2015, from http://sustainability.cornell.edu/
3. Virtualization Basics. Retrieved March 23, 2015, from http://www.vmware.com/virtualization/virtualization-basics/how-virtualization-works
4. Statistics on the Management of End of Life Electronics, U.S. Environmental Protection Agency. Retrieved March 23, 2015, from http://www.epa.gov/epawaste/conserve/materials/ecycling/manage.htm.
5. Building Sustainable Traditions. (2011, July 1). Retrieved March 23, 2015, from https://sustain.ku.edu/sites/sustain.ku.edu/files/docs/sustainabilityplanweb.pdf
6. Carl, S. (2011, August 23). Watts Up: Does Virtualization Really Save Energy? Retrieved March 23, 2015, from http://greeneconomypost.com/virtualization-data-center-energy-efficiency-19009.htm#ixzz3V9or9YGM
7. Harvard University Sustainability Plan. (2015). Retrieved March 23, 2015, from http://green.harvard.edu/sites/green.harvard.edu/files/Harvard Sustainability Plan-Web.pdf