Vidyawarta™

International Multilingual Research Journal

Special Issue, January 2018

Shailendra Education Society's

Arts, Commerce and Science College
Dahisar (E), Mumbai

Department of Mathematics and Information Technology,
Organises

National Seminar

on

Symbiotic Correlation of Mathematics and Information Technology Pan-Industry

20th January 2018

Reg.No.U74120 MH2013 PTC 251205
Harshwardhan Publication Pvt.Ltd.
At.Post.Limbaganesh,Tq.Dist.Beed
Pin-431126 (Maharashtra) Cell:07588057695,09850203295
harshwardhanpubli@gmail.com, vidyawarta@gmail.com
All Types Educational & Reference Book Publisher & Distributors / www.vidyawarta.com

Planning-As-An-Application-Of-Graph-Theory.pdf.

• Ojekudo, Nathaniel Akpofure (PhD), Department of Mathematics and Computer science, Ignatius Ajuru University of Education,Port Harcourt, Rivers State, Nigeria. Akpan, Nsikan Paul (PhD),Department of Mathematics and Statistics, University of Port Harcourt, Nigeria, IOSR Journal of Mathematics (IOSR-JM), Volume 13, Issue 3 Ver.1 (May-June 2017), PP 20-32, e-ISSN: 2278-5728, p-ISSN: 2319-765X, An application of Dijkstra's Algorithm to shortest route problem. Retrieved from http://www.iosrjournals.org/iosr-jm/papers/Vol13-issue3/Version-1/C1303012032.pdf

❑❑❑

17

"EMERGENT NEED OF GREEN SOFTWARE TOOLS IN THE DEVELOPMENT AND USAGE OF ELECTRONICS SYSTEMS IN THE NEW GREEN COMPUTING ERA" ....A COMPREHENSIVE STUDY

G. B. Hemalatha
Research Scholar, Shri. J. J. T. University,
Jhunjhunu, Rajasthan
gb_hl@yahoo.co.in

Hiren J. Dand
Adjunct Professor,
Department of Computer Science and Engineering, Shri. J. J. T. University
Jhunjhunu, Rajasthan
dandhiren@yahoo.co.in

****

ABSTRACT

We are living in the era of Information Technology. Massive usage of electronic devices such as mobile ,laptop become our emerging need in our day to day life. But the emission of carbon from the devices cause severe damage to our health system, for example even the desktop are made of poisonous chemicals like pvc and BFR. We can remove the poisonous chemicals from the electronic devices by recycling and we can minimizes the exposure of life threatening chemicals to the nature .In today's world its not sufficient enough for the application software developersthat they can rely on old legacy of applications but they so has to transform to take the help of expertise green software tools and to embed into the hardware in all suspects of device usage with

fast changing business needs. hereafter the application development teams need increased agility, new skill sets, distributed teams, and more complex green software engineering methods and tools to apply on all kind of software development.

keywords: pvc(polyvinyl choride), BFR (brominated flame retardents)

Section-I of this paper will be on of green software and its achtecture to developreen software tools" for thevarious aspects of software usage in the techno savy world.

section –II will specify the software tools used in various aspects of software development by personals associated with the software developmentlike conducting online meeting,Providing training t work placesii) applying tools in case of minimizing the worktime by finding the orphaned code non executable code etc...iii)usage of software tools to ,migrate the data,knowing free space in disc and to monitor the power consumption in devices etc

Section –III will be on the multiple techniques used for go green by context awareness in usage handling computer resources.

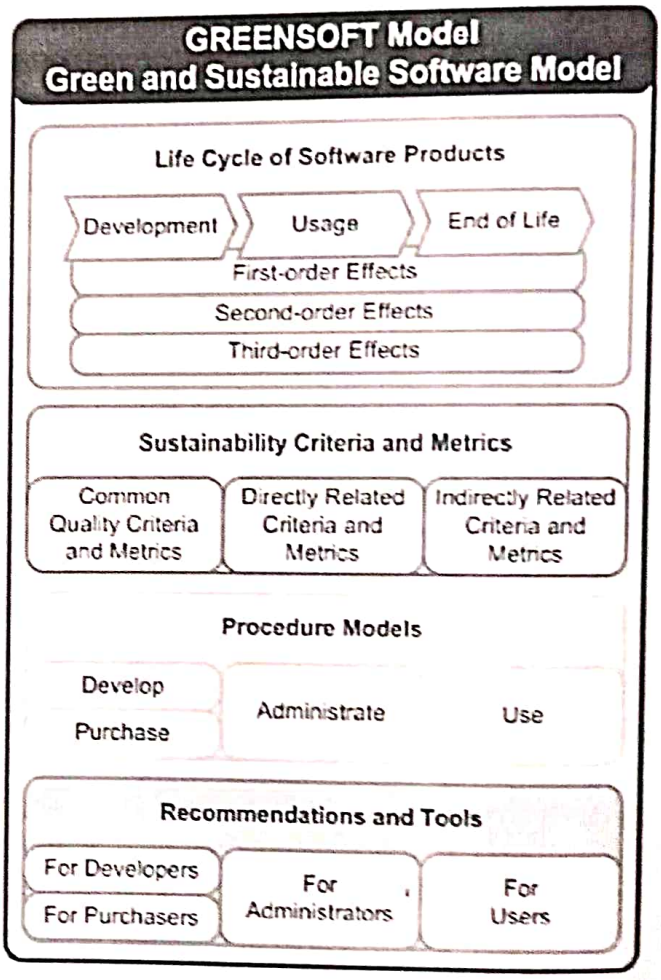
I. Green Software Engineering

Green in software engineering is part of green in software and therefore of green software Its main goal is to include green practices as part of the software development process, as well as the rest of activities that are part of software engineering (see Fig. 1.1).Based on this definition of software engineering by IEEEE and ISO software engineering as 'the application of a systematic, disciplined, quantifiable approach to the development, operation, and maintenance of software.

To demonstrate different aspects of Green and Sustainable software the GREENSOFT Model [Naumann et al. 2011]was developed. This "Green and Sustainable Software", was designed to support software developers, administrators, and end users in creating, maintaining, and using software in a more sustainable way.

Why Green Software Engineering?

Software Engineering without Sustainability requirements = significant risk.United Nations Sustainable Development Goals (SDGs) = strong, holistic sustainability agenda to 2030



1.1. green soft model

Green engineering adheres following principles to be implemented by the designer while developing green software tools.

a) Engineer processes and products holistically, use systems analysis, and integrate environmental impact assessment tools.b) Conserve and improve natural ecosystems while protecting human health and well-being c) Use life-cycle thinking in all engineering activities

d) Ensure that all material and energy inputs and outputs are as inherently safe and benign as possible e) Minimize depletion of natural resources f) Strive to prevent waste g) Develop and apply engineering solutions, while being cognizant of local geography, aspirations, and cultures h) Create engineering solutions beyond current or dominant technologies; improve, innovate, and invent (technologies) to achieve sustainability i) Actively engage communities and stakeholders in development of engineering solutions.

II. SOFTWARE TOOLS USED TO GO GREEN IN CASE OF WORKING PEOPLE,LOAD MANAGEMENT AND INFRSTRUCTURE :i)Green Tools used in Optimizing People Software enables organizations to optimize people resources and collaboration beyond boundaries to drive business growth while reducing travel and physical real estate costs. and so,the people doesnt need to commute to and from the office and can reduce the physical space required in the offices.few tools used are

➢ IBM Lotus® Sametime® It is used for conducting online meetings through Web conferencing .the meeting will be more advisable than a typical face-to-face meet

➢ IBM Rational®. Rational Team Concert allows your development process activities to be defined and will track completion of tasks and activities, keeping global team members current on completed and pending process steps.

➢ IBM Learning Accelerator for WebSphere® Portal, we can deliver training and provide learning environment online to customers and employees at the locations that are convenient for them

Benefits Gained: Nearly 42% of IBM's 350,000 employees do not regularly come into a traditional office, but instead work from remote locations like home or on the road, saving the company $100 million annually in real estate

ii)Green software tools in workload management :

Business workloads are executed by people on the infrastructure within organizations, and their underlying processes and applications directly influence energy needsIBM Software enables efficient execution of business workloads with processes and applications designed to maximize energy efficiency while meeting business needs few tools used are:

➢ **The IBM Rational Transformation** Workbench performs analysis on your application source code, looking for code that will never get executed. For large applications it has been estimated that Rational Transformation Workbench can be used to eliminate 15% to 20% of code from the application that would never have been executed,

➢ **DB2® for z/OS®** and IMS leverage System z™ servers' virtualization capabilities to run hundreds of DB2 data servers on a single server, thus leveraging the cost benefits of data center asset consolidation. IBM Informix® Dynamic Server with extremely fast OnLine Transaction Performance (OLTP) means fewer servers, less power, and reduced space requirements.

➢ **IBM WebSphere Studio Asset Analyzer** can be used to analyze the source code across your enterprise and can help you gain intellectual control over your code assets, enabling you to discover code that may be orphaned, code that can be moved to more efficient platforms, and code that may require change due to a proposed update.

Benefits gained The United States alone releases 27 tons of CO_2 per person per year; worldwide, the average is estimated at 5.5 tons.3 It is also estimated that 44% of this CO release is due to driving and flying.3 2 Any actions taken to reduce these emissions will have a direct and positive impact on an organization's green efforts.

iii) Green tools used to Maximize infrastructure efficiencies Customers are instituting a range of solutions to improve their energy efficiencies by ,"Smart" consolidation, virtualization and optimization , Integrate management of your IT and facility equipment , Efficiently compress information to reduce storage requirements , Model energy usage by asset and location , Monitor energy usage against thresholds.few tools used are

- DB2 version 9. This improves energy efficiency by reducing the physical storage needed to support the application, which has the ripple effect of reducing energy and facilities space needs, plus the indirect reduction of future e-waste by not having to dispose of the storage in the future.
- The IBM Information Server Blade is a completely integrated offering comprised of IBM BladeCenter® hardware, the IBM Information Server data integration software platform, and implementation services. This capability consolidates and moves massive amounts of data to increase business insight and manage growing information overload problems
- Tivoli Monitoring for Green Energy integrates with the IBM Systems Director Active Energy Manager™ capability to provide monitoring and management for IBM and selected non-IBM hardware,
- IBM Lotus Insight Manager and IBM WebSphere Business Monitor, one can construct dashboards to reflect, analyze, and report on metrics and events relative to their green initiatives.
- IBM's TotalStorage Productivity Center software helps reduce wasted disk space and conserve disk space by identifying duplicate data, orphan data, temporary data, non-business data, and access frequency of data files that could be migrated to less expensive secondary storage platforms. Together with IBM's Tivoli Storage Manager, automated processes can be established to move aged data to tiered storage platforms like tape media, thus saving energy costs from all infrequently accessed spinning disk drives.
- The IBM System Storage SAN Volume Controller is designed to migrate data without disruption, making it easier and quicker to implement more energy-efficient storage. New space-efficient functions significantly boost storage utilization while providing the greatest flexibility in managing storage utilization

Benefits Gained A major education institution reported a reduction in floor space of 40% – 50%, and a 30% reduction in power and cooling costs • With DB2 9, a financial institution is seeing compression rates up to 83% on the data warehouse tables, with projected cost savings of more than $2 million USD initially, and projected ongoing savings of $500,000 USD a year

III.METHODS TO GO GREEN BY GREEN AWARENESS:the trough knowledge bout handling the system ,support green in software usage

Idle Efficiency :A computer processor is described as idle when it is not being used by any program .Every program or task that runs on a computer system occupies a certain amount of processing time on the CPU. If the CPU has completed all tasks it is idle.

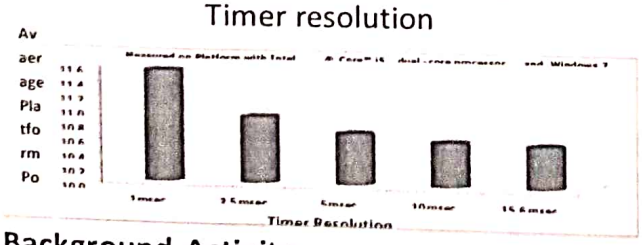
Modern processors use idle time to save power. Common methods are reducing the clock speed along with the CPU voltage and sending parts of the processor into a sleep state. On processors that have a halt instruction that stops the CPU until an interrupt occurs, such as halt instruction, it may save significant amounts of power and heat if the idle task consists of a loop which repeatedly executes HLT instructions. Most operating systems will display an idle task, which is a special task loaded by the OS scheduler only when there is nothing for the computer to do. The idle task can be hard-coded into the scheduler, or it can be implemented as

a separate task with the lowest possible priority. An advantage of the latter approach is that programs monitoring the system status can see the idle task along with all other tasks.

The challenge is to lower the idle floor by improving application idle efficiency which will lead to a significant increase in battery life. This also benefits average power scenarios and helps all but the most demanding (TDP-like) workloads.

OS Timer Resolution : Many applications use time begin period with a value of one to increase the timer resolution to the maximum of one millisecs to support graphical animations, audio playback, or video playback. This not only increases the timer resolution for the application to 1 ms, but also affects the global system timer resolution, because Windows uses at least the highest resolution (that is, the lowest interval) that any application requests. Therefore, if only one application requests a timer resolution of one millisecs, the system timer sets the interval ,Windows performs two main actions: it updates the timer tick count if a full tick has elapsed, and it checks whether a scheduled timer object has expired. A timer tick is an abstract notion of elapsed time that Windows uses to consistently track the time of day and thread quantum times. By default, the clock interrupt and timer tick are the same, but Windows or an application can change the clock interrupt period.

Figure 3: Power Impact of increasing Periodic Timer resolution



Background Activity

Frequent periodic background activity increases overall system power consumption. It impacts both the processor and chipset power. Long running infrequent events also prevent the system from idling to sleep. Background activity on the macro scale (minutes, hours) such as disk defragmentation, antivirus scans, etc. are also important for power. Win7 has introduced a unified background process manager (UBPM) to minimize the power impact from background activities. The UBPM drives scheduling of services and scheduled tasks and is transparent to users, IT pros, and existing APIs. Some of the other Win7 improvements to minimize frequent idle activity are: i)Elimination of TCP DPC timer on every system timer interrupt ii)Reduction in frequency of USB driver maintenance timers iii)Intelligent timer tick distribution iv)Timer coalescing

Future enhancement:

Awareness and implementation of of green software is very much essential in the world as people are heavily depend on electronic devices to perform task.in case of green software engineering the problem is that the software developers shoud hve the sound knowledge about of logical as well as green techniques so that they can develop and implement the green tools. Energy-efficiency will be essential for the computing industry in the future both to increase battery life for mobile platforms and to reduce energy expenses for desktop and server platforms. Software state of behaviour can have a significant effect on platform power consumption and battery life. There are many free tools from Intel and others to help you get started. Even small improvements when amplified across millions of systems can make a dramatic difference.

References:

http://green-software-engineering.de/en/reference-model/lebenszyklus/development-phase.html

https://link.springer.com/chapter/10.1007/978-3-319-65687-8_23

https://blog.axosoft.com/rules-for-being-a-green-software-engineer/

https://en.wikipedia.org/wiki/

Telepresence
https://en.wikipedia.org/wiki/The_Green_Grid
http://green-software-engineering.de/fileadmin/user_upload/Downloads/ei-2013_cf-and-ci-measurements_greensoftware_web_kl.pdf
http://green-software-engineering.de/fileadmin/user_upload/Downloads/green-web-engineering-measurements-and-findings_web.pdf
http://green-softwareengineering.de/fileadmin/user_upload/Downloads/measurement_of_software-induced_energy_consumption_web.pdf

❑❑❑

18

GREEN CLOUD COMPUTING: MINIMIZING CARBON EMISSION

Mr. Ashish Shah
B.Sc.I.T. Co-ordinator
J. M. Patel College of Commerce,
Goregoan West.

****

Abstract:

Cloud computing is a model for enabling convenient, on-demand network access to a shared pool of configurable computing resources (e.g., networks, servers, storage, applications, and services) that can be rapidly provisioned and released with minimal management effort or service provider interaction. However, the growing demand of Cloud infrastructure has drastically increased the energy consumption of data centers, which has become a critical issue. Cloud Computing leverages many existing technologies such as web services, web browsers, and virtualization, which contributes to the evolution of cloud environments. Therefore, any vulnerability associated to these technologies also affects the cloud, and it can even have a significant impact. Due to large number of equipments, datacenters can consume massive energy consumption and emit large amount of carbon.

A **cloud datacenter** could comprise of many hundreds or thousands of networked computers with their corresponding storage and networking subsystems, power distribution and conditioning equipment, and cooling infrastructures.

Even though there is a great concern in the community that Cloud computing can result in higher energy usage by the datacenters, the