A LOCALIZATION FRAMEWORK FOR SUSTAINABLE BUSINESS ENVIRONMENT -GREEN IT

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Abstract- Green computing is the study of using computation devices and disposing them properly with minimal environmental effect. There are many issues to be addressed in order to attain a greener IT world and one among them is to minimize the power utilization which has direct impact on the working area of business. Moving the processor and data close to the user will reduce the computing time can be achieved using virtualization to increase the efficiency and availability of the resources and it also lower the cost. This proposed paper aims to provide a conceptual design of a framework focused on an organization doing projects for various clients as a team work. A temporary virtual pool is created and it contains components to fasten the project. Also uses power management tool to effectively utilize resource without compromising the computation speed. Resources required per team can be defined earlier is loaded to temporary virtual pool is made available to all the co-members of that same project locally instead of using the central server for all their needs frequently were the resource is primarily available will increase the computation time and use of power. Once if the project is set to be completed the temporary pool is terminated and hence it does not require extra memory space to reside ensuring these techniques will reduce the power consumption to half the rate of usage per day. Hence the saved power in turn can be utilized for the next day finally it will lower the heat and co2 emissions at the back end were we can give hands to global warming.

Keywords:-Green IT; Energy efficiency; Temporary Virtual pool; Power management tool.

I. INTRODUCTION

Green computing nowadays focuses primarily on minimizing the utilization of power for datacenters and technical equipments. The benefits of green computing in terms of reducing power consumption and corporate carbon footprints are direct and relatively rapid to achieve. To enrich the corporate sustainability internally i.e., at the level of working

environment which will rise the business value and the computing performance. An approach has been driven in this proposed paper. To use the avilable computing resources more efficiently at the same

time maintaing or increasing their overall performance for a sustainable IT .It is choosen green computing as a primary effort to be accomplished.Economics is characterised in to three major classification such as production,consumption and distribution our focussed area is about consumption here it depends on the usage of power required to complete the task and it also concentrate on the computing speed.Sustainable business practice is one which can use the available resources already exist in that environment efficiently for an effective

power storage capacity as overall for an IT organization. In the global fight against catastrophic climate change, global greenhouse gas emissions from the energy sector must have peaked by 2015 and returned to current levels by 2020. Green peace's Energy Revolution Scenario [3] provides a practical blueprint for the world's renewable energy future, and was developed in conjunction with specialists from the Institute of Technical Thermodynamics at the German Aerospace Centre (DLR) and more than 30 scientists and engineers from universities, institutes and the renewable energy industry around the world. Case Studies of cloud-based expansion. Google is perhaps the most famous cloud-based company to demonstrate the potential of a cloud platform to drive a hugely successful business model. Power consumption at different parts of server components are defined in fig [1] which has a great impact in an organization it is important to understand the power and its proper usage accordingly to achieve green IT world.

II. RELATED WORK

In this section, we provide an overview of related work pertaining to green computing

GO GREEN: Due to the immediate impact on business value,[1] it is likely that green computing will remain focused for some time on reducing costs while improving the performance of energy hungry data centers and desktop computers. However, it is not likely that this first wave of activity will fully extend to the general minimization of the ecological footprint of IT products and services for companies and their customers. Ecological issues involving IT product and service design, supply chain optimization, and changes in processes to deal with e-waste, pollution, usage of critical resources such as water, toxic materials, and the air shed will need to be more fully addressed.[3]More cloud-computing companies are pursuing design and sitting strategies that can reduce the energy consumption of their data centers, primarily as a cost containment measure. For most companies, the environmental benefits of green data design are generally of secondary concern. Hence it is defined green computing as primary effort

taken to achieve rapid performance measure.

POWER AND ENERGY USAGE: The energy consumption is not only determined by the efficiency of the physical resources, [4] but it is also dependent on the resource management system deployed in the infrastructure and efficiency of applications running in the system.[7]Virtualization makes easing the administrative burden of deploying, managing, delivering resources, and providing the ability for end users to request and use virtualized resources. Virtualized hypervisor environment and can utilize additional security tools such as intrusion detection systems. The present scenario of computing technology is solemnly focusing on providing customers with high performance with a low cost availability in market However, [9] this approach needs serious amendments because the longevity of environmental sustainability has to be maintained. This brings us to a need of green computing and making the computers friendly for the environment.

Green Computing primarily focuses but is not limited to the following aspects: These are virtualization, Power management, power supply, storage, video card and e-materials recycling. Evolution of virtualization is directly related to the practical implementations of green computing process. "VMware" is no strange name to using virtualization technologies for implementing energy and cost savings. With Information technology spanning our reliance on it, it has become in our best interest to think of its effective use while considering the environment as a priority concern. The same direction to offer insights into paths of Green Computing that incorporates computer science and information technology pupils to implement the techniques and following the practices and methods discussed in here would help achieving a much "greener computing environment". The various paradigms of Green computing have been analyzed practically in here as

well as the current efforts along with an empirical evaluation. This paper tries to solve the intricate associated with the approaches of a greener computing environment and its futuristic dimensions. Over usage of power will decrease the business value economically.
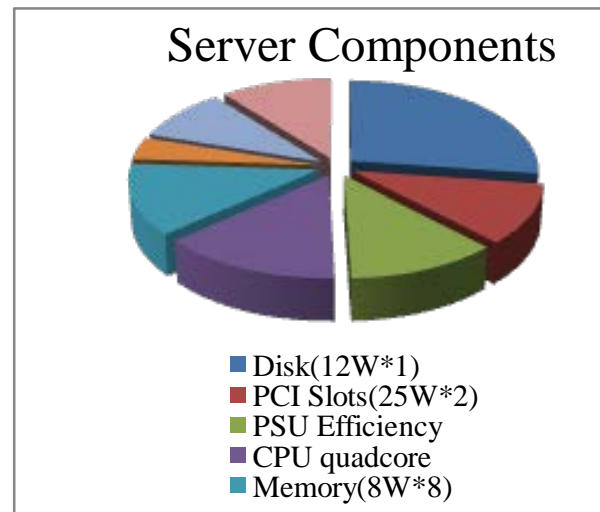

Fig1.
Power consumption by server's components [11].

III. DATA CENTER

A data centre is a dedicated space where companies can keep and operate most of the ICT infrastructure that supports their business. This would be the servers and storage equipment that run application software and process and store data and content. For some companies this might be a simple cage or rack of equipment, for others it could be a room housing a few or many cabinets, depending on the scale of their operation. Servers components are separated to perform computation which is categorized in to sectors consuming power at different ratio fig [1] define a detail note on this concern.

A. Data Centers Do the Following

Process your business transactions to the clients connected with that organisation. Host your website process when ever required to send and receive details regarding the projects and it also store your intellectual property that it may be very useful and it also hold the required informations regarding the company details.Maintain your financial records and also ensure the privacy.Route your e-mails to the respective clients and other employee of your company.The main purpose of holding data center is its "storage" capability.It has a wide ranging storage capability hold the entire resource required for that organization.

B. To Your Business

Perceive the world provides data connectivity communicate by means of e-mail,Remember the information that is data storage in a large amount and also used in research and development by providing new ideas.Designing and organizing data center mainly rely on the Physical design and construction of a data center. It requires how to customize the environment to meet your company's needs and how to organize and manage your Data Center effectively so that downtime is minimized, troubleshooting is easier, and the room's infrastructure is fully used efficiently within an organization.

C. Outsourcing Data Center

Rent server environment space from an outside company. Outsourcing is an arrangement in which one company provides services for another company that could also be or usually have been provided in house. Outsourcing is a trend that is becoming more common in information technology and other industries for services that have usually been regarded as intrinsic to managing a business.[8]In some cases, the entire information management of a company is outsourced, including planning and business analysis as well as the installation, management, and servicing of the network and workstations.

III.   FRAMEWORK MODEL

Conceptual model defines the actual moulding of virtualization technique by creating it as a virtual pool. Internal organization is defined with respect to their design and so, for many ideas are recommended for power consumption reduction at the datacenter level. i.e., within the data center .In this proposed project it is projected to address the power consumption reduction at its next level .i.e., It is lifted to the level of power consumption reduction internally focused towards the working area of the organization provided to increase the business value of IT. Major task of an IT organization is to develop a product with respect to the customers/clients requirements. A project can be driven in a hierarchical pattern were the project manager plays the major role followed by team leader who is responsible to lead the team together and responsible for the status of the project at its each phases with respect to the team members coordination. Team members are defined for each project were divided with the modules to work with it is at last integrated as a final product is aligned by team leader and finally submitted to project manager. It is considered team members who are a part and responsible for the actual outcome of the product and hence derived a concept on their basis as follows.

Centralized server in an organization contains entire company database. Projects handled as a team of members keep use of those servers for their software needs all the time leads to waste of power as the entire team needs same set of data at different timing is the difference among them .Here a frame work is defined as a virtual pool to hold the required

data alone for that entire team *localized* instead of having central servers each time. This temporary residence of the virtual data can never occupy extra space or memory is the phenomenon and main objective of this proposed paper.Inaddition with this phenomenon yet there are some features which define the process of team work along with the components to enhance their performance. Virtualization is the single most effective way to reduce IT expenses while boosting efficiency and agility not just for large enterprises, but also for small and medium size businesses too. VMware virtual machines become highly portable between computers because every host looks nearly identical to the guest.

A.   VMware Virtualization Lets You

Run multiple operating systems and applications on single computer .Consolidate hardware to get vastly higher productivity from fewer servers. Save 50% or more on overall IT costs Speed and simplify IT management, maintenance, and the deployment of new applications. Virtualization is the important technique implemented used in Infrastructure Virtualization and Management. Simplify your IT infrastructure as you create a more dynamic and flexible datacenter with proven server and datacenter virtualization solutions built on VMwarevSphere, the industry's leading virtualization platform. Ensure continued IT innovation while meeting enterprise application SLAs, and increase time-to-market for application provisioning and upgrades. [9] VMware virtualization helps you reduce capital expenses through server consolidation and improve operating expenses through automation, while minimizing lost revenue by reducing both planned and unplanned downtime. To achieve the same magnitude of benefits for the datacenter as a whole, virtualize your entire infrastructure: use VMware vCloud Suite to abstract, pool, and automate all datacenter resources servers, storage, networking, security, and availability and combine them with automated operations management and policy-based provisioning. The result is a Software-Defined Datacenter: an infrastructure platform that delivers the full efficiency and agility of cloud computing. Get automated operations management for the new dynamic virtual infrastructures with VMware vCenter Operations Management Suite, so you can accelerate IT service delivery, improve operational efficiency, ensure compliance and reduce risk.

B.   Components of Virtual Pool

1) Virtualized status of co-member:

Whenever a project is assigned it is mere responsible of the team to work together on their defined module and it is integrated as a final product at last. A virtualized status enables the team members to visualize the co-member status who is working for the same project in the form of successive

module development in his working area. It provides the status of the other in a team and in turn helps us to analyze the process effectiveness to deliver the product. It allows to monitor and co-ordinate the team together. Finally it provides a team to work faster in the form of help when any one of the team i.e., co-member who has completed the assigned module earlier from other they can give hand to other. On time delivery of product within deadline.

2) Virtualized partner tool:

Once a project is assigned to a team as an initial process they analyze for their requirements specifications example: Type of platform infrastructure and required software. IT organizations working for a project already contains of defined supporting tools to simplify their task during module development. A virtualized partner tool is nothing but integration of such supporting tools that are together integrated and virtualized to team members while they developing on a module with respect to their software specifications. The tool in turn must act as a partner and help the individual of the team by providing a pillar of support in the form of defining an idea with respect to the developing module .Once if the module work is started by team member it is responsible for the supporting tool to list and help the available tools what the particular module actually needs. *"HELP IN THE FORM OF PARTNER".* It reduces the development of modules in to half the actual time required to develop. Fig [2] it enhances the performance growth in computing system. When the development time is reduced it will automatically reduces the power consumption which is ultimate target .It is easy to implement as it does not require to invest and it is nothing but the integration of existing tools for developing a project in an organization. Many of the Green IT activities due to the certain barriers are failed to achieve its real goal. Here the defined green IT framework will benefit the organization by providing reduction in power and resource consumption and make them to utilize efficiently. Provide improved operational efficiency to save cost. Finally meets sustainability demands of customers and employees. Table of comparisons by different organizations with respect to power usage and its relative impact of carbon emission is defined and it gives a clear picture and aware of saving power effectively for future use. Power and energy are measured in watts and watt-hour (wh) respectively,
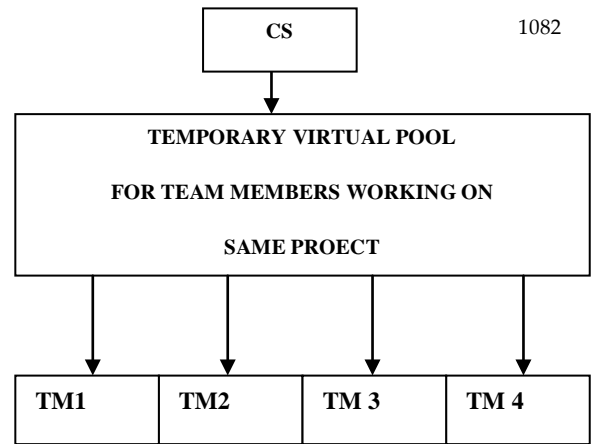

Fig 2. Conceptual architecture for green – IT Where TM - Team members, CS - Central server.

$$P=w/t$$
Where,
P=power
W=total work performed
T=period of time
$$E=p*t$$
Where,
E=energy

The formula defined above illustrate that the total work performed and the time period are the two major factor that result in total power consumed .It is obvious to work on these two factors will definitely reduce the overall power consumption and thereby it will increase the efficiency of energy.

Virtual Server Pool			
SI no	Index page	Requirements obtained	Fetch source
1	Enter server name	User name	Based on requirements
2	Database available in server	Database name	
3	Request to obtain the list of tables	Schema name	

Fig 3.Table of content in virtual pool. Moving data close to user virtually.

Here in fig [3] it is illustrated with respect to the database in particular required to be used for the defined project as an example.

3) Virtualized software tools:

Software life cycle contains requirement analysis phase which is the initial phase during which the required software and other supporting tools are defined and it takes days to

completely analysis the need of the project in detail. Finally it is listed and it differ from team to team doing different projects next to this phase is design phase takes the output of the previous phase is given as input to the design phase fig [4]. The requirements gathered is defined as a pool of components along with the supporting framework component tools is virtualized to the team doing projects to support and enhance their performance of computing. Every project requires software tools and other application platform to run and debug is set to be virtualized to that team members doing projects will increase the efficiency to perform computing.

IV.   POWER MANAGEMENT

Using a power management tool the power consumption for a team of members working for the same project can be reduced discussed Understand your current IT power use. Create a clear picture of your IT power consumption, track and report progress towards green objectives, and meet sustainability mandates with minimal risk using power management tools

PUE = {**overall power/power delivered**}

A.   Components of Power Management Tools:

Assign machines to a group. If you simply want to assign the default power management to all your machines, you can put them all in one group. Open the 'Edit group' dialog. To assign the schedule, first select the group on the left sidebar. You can quickly check the assigned schedule in the preview below the group chart. Select the schedule you want to assign from the 'Edit group' .It saves the team power utilization. To help the environment globally via green IT architecture designing and to reduce the carbon foot prints it is must to concentrate on sustainability of business." *Sustainability"*

SI no	User name	Database name	Schema name
1	Kannan	Sumdb1	queries%
2	Kannan	Sumdb2	exam%
3	Tamilan	Practdb1	Question%
4	Tamilan	Practdb2	Vendor tab%
5	Divya	Meddb1	Purchase tab%

(Team leader 1 → rows 1, 2; Team leader 2 → rows 3, 4; Team leader 3 → row 5)

Fig 4. Requirements obtained by Team leader with respect to their need defining particular schema. Localizing data close to user virtually.

Illustrated using **IPAT** formula,
I = Environmental impact
P = Population
A = Affluence
T = Impact per unit of resource usage

$I=P*A*T$

The formula result in the sustainable business practice were the cost is reduced in to half the actual
Cost spends on business to address the same goal. It is power management tool added to this best practice will enhance the ROI (Return on Investment).

B.   Integrating Components of Virtual Pool:

Finally the three components are integrated together and they are made available to all the team members who are working for that project via virtualization. Here the defined components are virtualized and they are facilitated to be displayed on the working area of the developer who recognize everything as unique and feel flexible to work with it.
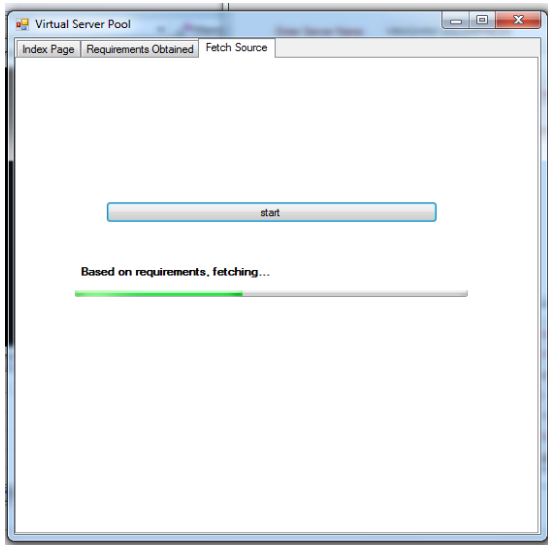
Fig5 Fetching the requirement data & software components into virtual pool

There by we can fasten the work and the working environment. Ultimately our target is achieved in the form of reduced power consumption in to half of the actual power consumed by a team. Consider if it is possible for one project. Imagine for a big or midsize organization   it is a healthy approach to reduce their power and use energy efficiently as possible fig[3] shown present the comparisons ratio on using the green IT framework and its importance which has direct impact on reducing power consumption.

Finally the fetched data fig [5] is extracted and localized to the respective team to do their projects effectively Once if the project is completed the virtual pool components and virtual copy of data and software's are erased and uninstalled which in turn reduce their space it occupy to reside and their by enhance Return of investment.

RESULT AND DISCUSSION

An example is defined here to illustrate the concept of localization and thereby it is assumed similar to be driven as a framework integrated with components of server in an organization working as a team for a project. A virtual server pool is created at the client side as a framework is added with software components as per their requirements. Here it is assumed as a particular schema might be their need from the entire database is said to be localized temporarily throughout the project completion as defined in fig [6].

Organization working on number of projects is broadly divided into number of teams' they were differing with their

requirements in accordance with their projects specifications.fig [7] is defined with two different teams doing projects is shown with their localized database tables as per their requirements. Here it is schema tables were listed and they are verified to fetch accordingly is defined with username, database name followed by schema name particular to refine the search table of particular need for their project. Fig [8] defined with different teams with their list of requirements.

Green-IT for an organization is must to be implemented to address the present and future power consumption. A framework is defined along with the different tools which also add the fast and efficient way to build a project is compared with various power consuming factors and it seems to be proven fig [9] is corresponding with green practices to save power and time. Also deals with the computation speed and effective use of resource utilization comparatively this green framework sound high for good business practices also has **direct impact** with *ROI (Return on Investment).*
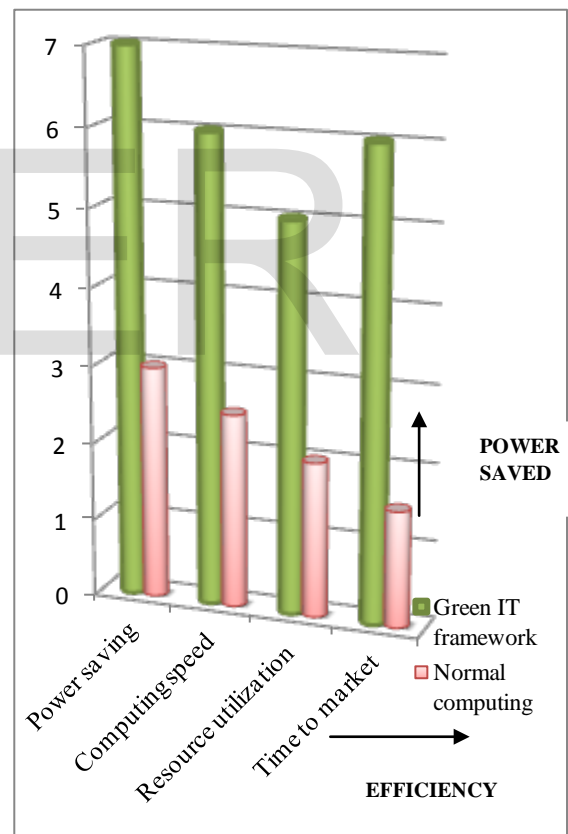

Fig 6. Efficiency of Green IT framework in comparison with normal computing

V.   CONCLUSION

In this paper a framework is formulated for the purpose of green IT. It does not require capital investment at high sound.

The challenges of reengineering process and business practices revising procedures are simple and purely flexible to handle. Reluctance to change cultural and behavioral practices is not needed. There is no need to learn new green IT practices which is one of the major challenges in implementing green IT practices. It was shown detailed comparisons on various power usages and their ratio of impact on carbon footprint. Further defined with the proper usage of computing resources with green IT framework.

As a result for every computing there is pros and cons and it depends on their proper usage likewise green IT consists of different activities to be implemented to reduce the environmental impact. Here a framework is defined to address green IT practices in an organization and thereby to give hands to global warming.

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