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Go SaaS, Go Green
Green Computing Using Software as a Service

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Abstract— **Green computing means the study and practice of designing, manufacturing, using and disposing of computers, servers and associated subsystems efficiently and effectively with no impact on the environment. Power consumption is one of the best area where we found that Software as a Service (SaaS) is greener than on-premises. Using Software as a Service (SaaS) Technology 89.31% reduction in overall energy consumption for a four physician practice using SaaS Electronic Medical Record (EMR) software over on-premise software!**

Keywords: Green Computing, Software as a Service, Electronic Medical Record (EMR)

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I. WHAT IS GREEN COMPUTING?

In the article Harnessing Green IT: Principles and Practices, San Murugesan defines the field of green computing as "the study and practice of designing, manufacturing, using, and disposing of computers, servers, and associated subsystems—such as monitors, printers, storage devices, and networking and communications systems — efficiently and effectively with minimal or no impact on the environment.i

II. MANY CORPORATE IT DEPARTMENTS

Have Green Computing initiatives to reduce the environmental impacts of their IT operationsii. Research continues into key areas such as making the use of computers as energy-efficient as possible, and designing algorithms and systems for efficiency-related computer technologies.

III. WHAT IS SOFTWARE AS A SERVICE?

Software as a Service (SaaS) is basically a form of cloud computing that launches software in the cloud (internet) which will be later used as a service. Software as a Service is a new model of how software is delivered. SaaS refers to software that is accessed via a web browser and is paid on a subscription basis (monthly or yearly). The great trend in software is the evolution from traditional "on-premises" software (e.g. client/server software installed at the office) to Software as a Service (SaaS) (i.e. web-based applications that are managed in the vendors' data center and accessed "on-demand" through a web browser). SaaS is faster and a cost effective way to getting implemented. There are no hardware, implementation or acquisition costs involved to run the application from the customer's side.
Best SaaS Examples:
1.   SalesForce CRM
2.   Google Apps
3.   ZOHO Support
4.   Deskway
5.   ImpelCRM
6.   Wipro w-SaaS

But the important point is which model is "greener;" that is, better for the environment. Power consumption

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is one of the best area where we found that Software as a Service (SaaS) is greener than on-premises.

I.   Comparison Between Software as a Service And On-Premise Software

A.   **On-premise software**

a)   *Understanding the Models*: On-premise Software is what most people think of when they think of a software system. You pop in a CD or download a big file from the Internet and the install begins. Files are copied to your computer or a server machine, where they are stored and run. Because the client and server software components are both doing a lot of computations, a fair amount of power is required.

b)   *Energy Consumption:* Now let's dig into the power consumption of the on-premise model. We'll use the example of a typical physician practice, since Electronic Medical Records (EMR) software is a market we know well. The "On Premises" side of the graphic below Figure 2. illustrates a four-physician medical practice, running EMR software on their own in-house server. The HP ProLiant DL server, one of the most commercially popular servers on the market today, will consume 7,008 KW of server energy per year. That's running 24 hours a day, 365 days a year. iiiIn addition, each user is using a Dell desktop 546, Dell's most popular starter desktop. A single 546 Dell desktop will consume 600 KW of energy a year, running 8 hours a day for 250 days a year (an average work year).

A four - physician practice will consume 9,408 KW of power each year just to run EMR software on-premise. Each user will personally consume 2,352 KW of power each year per physician. It is shown in Fig 2.
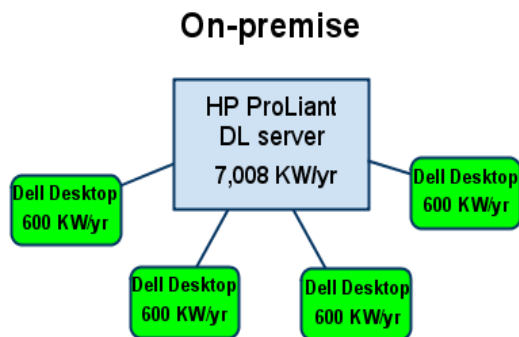
On-premise

Fig. 2 Example of an Image with On-premises Software

B.   SaaS Based Software

A.   Understanding the Models : With SaaS, there is no local installation of software because the vendor manages all the code and the data in their data center. Users access the system through a web browser and its primary role is to present the user interface – not a very computationally intensive function.

B.   Energy Consumption : Now let's see how the energy consumption of SaaS software stacks up. Rackspace, one of the largest providers of cloud computing hosting services, lists the Dell PowerEdge 2950 III as one of its most popular server choices. And since a data center would have a redundant server in addition to the PowerEdge, our SaaS applications are powered by two of these servers. Running 24 hours a day for 365 days a year, the total energy consumption for these two Dell servers running SaaS applications would be approximately 6,570 KW/yr each, or 13,140 KW/yr total.

Now our physicians are only using 131.4 KW (1/100th) of the Dell PowerEdge server energy each year because of the multi-tenant architecture. Also, because SaaS applications require less computing power on the client, the physicians are able to switch to more efficient Dell netbooks, which only consume 120 KW of power each per year.

Using SaaS, our four physician practice now only consumes 1005.6 KW per year running their EMR software.

$$= (120 * 4 + 131.4 * 4)$$

$$= 251.4$$

That's 251.4 KW per year, per physician. It is shown in Fig 3.

That's an 89.31 % reduction in overall energy consumption for a four physician practice using SaaS EMR software over on-premise software!

C. Beyond Power Consumption :
Power consumption isn't the only area where we found that SaaS is greener than on-premises. "The study also showed that cloud computing platforms, like salesforce.com's, are substantially more energy – and carbon – efficient than on-premise data centers."iv

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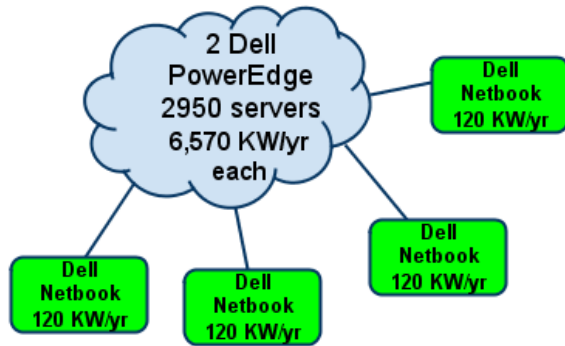
IV.   CONCLUSION

By implementing Software as a Service we found that using SaaS, it reduce overall consumption of energy instead of implementing On-Premises software.

V.   ACKNOWLEDGEMENT

VI.   REFERENCES

^ a b c San Murugesan, "Harnessing Green IT: Principles and Practices," IEEE IT Professional, January–February 2008, pp 24-33.

^ a b c d e "Green Trade & Development" (.html). Green Markets International, Inc. Retrieved January 2008.

http://www.dell.com

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