



Dhaani Systems DhaaniStar™



Berkeley Campus

Overview

The Need

With a new focus from the highest levels of the University to reduce energy consumption, the IT manager for the UC Berkeley Mechanical Engineering department decided to take the lead for the university in reducing electricity consumed by his IT equipment, but without compromising the availability of the computers in the several labs.

The Solution

The DhaaniStar is industry's first predictive-analytics-based network appliance for managing energy consumption of PCs and Servers in campuses and data centers that delivers over 80% energy savings **WITHOUT** disrupting user and/or business productivity.

The Benefit

Over the past 12 months, electricity consumption in the Mechanical Engineering Department computer labs was reduced by **over 83%** compared to the cost during the same period without the DhaaniStar installed.



About the University of California, Berkeley

The University of California was chartered in 1868 and its flagship campus — envisioned as a "City of Learning" — was established at Berkeley, on San Francisco Bay.

Today, it is the world's premier public university and a wellspring of innovation. UC Berkeley occupies a 1,232 acre campus with a sylvan 178-acre central core. From this home its academic community makes key contributions to the economic and social well-being of the Bay Area, California, and the nation.

In the of Fall 2012, there were 25,774 undergraduates and 10,125 pursuing graduate degrees.



The Problem

Electricity use at the University of California was not a departmental expense, and was growing. The senior management of the University decided to make energy reduction a campus wide objective. They gave out energy reduction quotas based on baseline usage by department. The IT staff of the Mechanical Engineering department took this challenge as an opportunity for providing leadership in reducing electricity use by their IT equipment.

Conventional power management solutions for computers work in an autonomous fashion. For example, the computer may automatically enter a low-power mode based on how long the machine has been “idle” (which is defined differently in different operating systems). But in a large university department, it is impractical to determine what the duration of inactivity should be for any particular computer. Each machine is used by a diverse set of students and teachers with vastly different schedules, which may change on a daily basis. In addition, IT staff requires remote access to all computers, (frequently at night) in order to install emergency/routine patch updates and initiate such tasks as virus scan or back-up. All this has to be taken into account in order to develop a power management solution that can be used effectively without disrupting current usage patterns or adding to the IT workload.

The problem becomes significantly more complex for servers deployed in Data Centers. The users, in this case, are applications that are running in redundant, high-availability, perhaps virtual environments. However, typical Data Centers are over-provisioned, up to 10x the average load, and the servers are always powered up. The problem in this case is also how to predict the arrival of the next peak demand and ensure adequate computing resources are available when needed, without any delay. Consequently, Data Center managers run all servers at all times, even though the average utilization might be only 10%.



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“The DhaaniStar has been a great solution for helping us reign in our IT costs while still providing a very agile and dynamic IT environment for our students, permitting 24x7 use of our lab computer systems.”

- Rene Viray, IT Manager, Mechanical Engineering Department, University of California, Berkeley

DhaaniStar

- *An appliance for intelligent energy management of IT Equipment*
 - *No overhead once installed*
 - *No intrusive software installation or updates required on end-points to obtain energy savings benefits*
 - *Automatically adapts to users' behavior and usage patterns*
 - *Automatically adapts to applications' usage pattern*
 - *Easy installation procedure*
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Earlier Attempted Solutions

There are multiple challenges in deploying energy management solutions. The IT staff surveyed solutions available at the time. Each solution was given an opportunity to state their case. But each had many limitations, such as requiring client installation on each system in order to gain the benefits of maximum energy savings.

Although the Mechanical Engineering department does have a remote desktop management system in place, the effort is to minimize the number of applications deployed by this system – as a new image has to be generated and distributed every time a new release of any one of the installed applications is received. However, the main problem is that once installed, the client software has to be manually configured for each machine. The IT staff has to estimate weekday and weekend usage; determine what levels of sub-component activity levels constitute “IDLE”; and specify a FIXED period for the client to wait prior to issuing a power reduction step. In a dynamic classroom environment, where students can come and use any unused computer at any time, and class timings change every semester, IT staff found it too laborious to change these settings frequently in order to receive any significant energy cost reduction benefits.

Similar barriers exist in most environments, where the client software is configured to save energy only for certain hours at night.

For some solutions, IT needs to configure the power management client running on each machine based on applications that are running at all or certain times. The list of such applications may also change over time, and it may become very labor intensive to keep the list up-to-date.

The next problem for current products is to make sure the target device is remotely awakened before the device is needed. All such products available today are client-server solutions which require at least 2 machines to be always up in each VLAN. This can be very unreliable as users of these machines may turn them off.



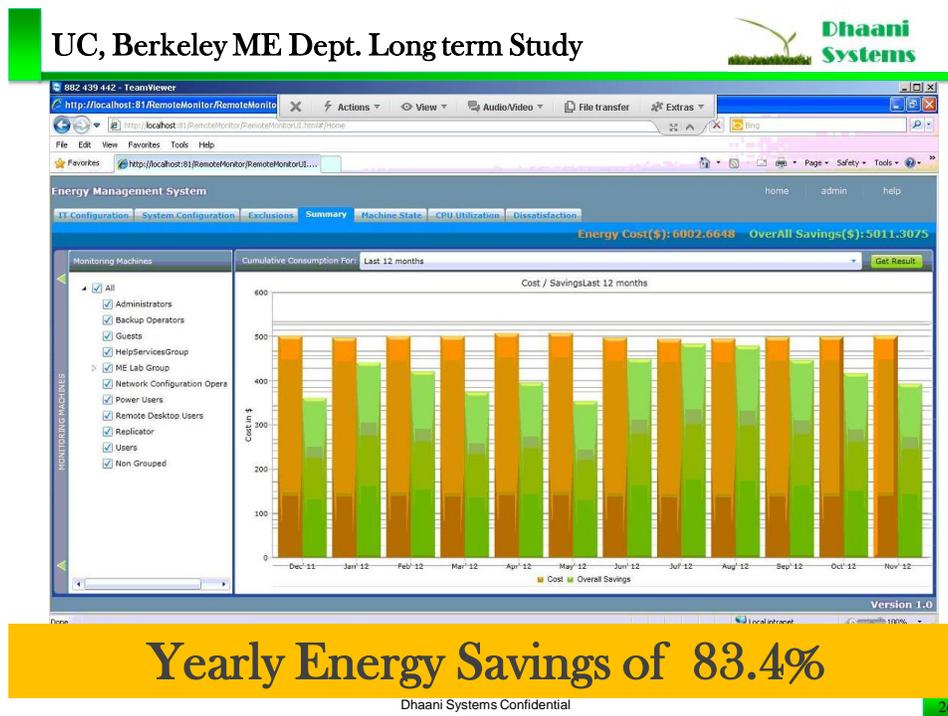
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DhaaniStar, THE CURRENT SOLUTION

The Mechanical Engineering (ME) department computer labs have regular hours for students during the semester, which changes from semester to semester. The labs are open throughout the day (sometimes all night) for students to work on their projects.

A DhaaniStar was installed in the Fall of 2011 as a pilot to actively manage the power consumption of 88 desktop computers used in the 3 Mechanical Engineering computer labs. Rene Viray, the IT manager for the ME department wanted a pilot because he had tried other power management products but had run into various problems. First and foremost was the problem of installing clients in all the desktops. Even with the use of desktop management platforms, creating and distributing a new image with yet another application was time-consuming. However, configuration and setup of the clients to realize appreciable savings was quite cumbersome, and ultimately, impractical. Since this experience, he had been on the lookout for a power management tool that was easier to deploy and manage.

Once the appropriate DhaaniStar management account was setup, the actual deployment for all the desktops in the lab took only 10 minutes to automatically discover, access, and configure the power management settings.



The average electricity cost per year per desktop was \$68. The reduction in electricity usage per desktop for the last 12 months was \$57. This corresponds to a direct savings of over 83%. There were other, indirect savings as well, such as reduced air conditioning load, and reduced IT installation and support time. The system is now in full production mode having lived up to the expectations of the IT group.



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SUMMARY OF DhaaniStar BENEFITS

Greatest Energy Savings

The DhaaniStar is able to achieve greater energy savings compared to traditional client/server products because of patent-pending technology that accurately predicts energy savings opportunity for each individual device under its management, regardless of the number of users using each device or the applications be used, including background applications. Where traditional approaches can save 20-30%, DhaaniStar saves as much as 50-80% on certain IT equipment, such as PCs and servers.

Elimination of User Inconvenience

The DhaaniStar implements the industry's first patent-pending technology that models usage of each device under its management over a long period of time and predicts the usage of the device for the next several hours.

Using this technology, DhaaniStar automatically adjusts its prediction mechanism in case its prediction doesn't match the current activities on the target machines; The DhaaniStar also makes adjustments in case of any manual activation any machine. Consequently, on-going IT support needed is minimal.

Maximize user satisfaction

The DhaaniStar not only delivers 2-4x greater energy savings compared to other solutions, it is the ONLY product to optimize end-user satisfaction while doing so in order to ensure no end-user productivity loss occurs. With patent-pending technology it is the ONLY solution that can consistently save power during business hours and interface with Demand-Response systems and provide further savings for the customer.

Ease of Installation and management

The DhaaniStar is a plug-and-play appliance that requires NO client installation on the devices under management. The appliance can be located either in the aggregation layer of the network or in the closet. The appliance automatically discovers most devices on the network, the ones that are not can be easily added manually as well. The IT manager can put the devices in different Energy Management Policy categories.

The DhaaniStar is architected to eliminate the above-mentioned problems, and other common problems, to ensure ease of deployment, management, and maintenance while being invisible to the users.

For example, usage patterns for computers used by the Human Resources department are likely to be different than for an Engineering group. Once installed, the appliance manages all devices automatically without requiring any IT or user intervention.

Energy savings reports can be created on demand by authorized personnel. In future, automated report generation will be provided, including transmission to appropriate authorities in the company without manual intervention.

High Availability

Based on organization needs, the hardware can be configured to support high availability. A second DhaaniStar appliance can be placed in a hot standby mode in the unlikely case of the failure of the primary unit. The standby unit has the same information as the primary unit and is able to



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instantaneously take over operation at any time. Alternatively, a second unit can operate concurrently, redundantly managing the same end-points as a first unit.

Scalability

The DhaaniStar is the only network-based energy management solution that can scale with the number of employees, number of buildings and campuses across geographic boundaries.

One platform for ALL IT equipment

The DhaaniStar currently supports Windows, Linux and Macintosh workstations, desktop/towers and laptop/notebook machines in the Enterprise, plus Windows and Linux Servers for Data Centers, both native and under VMware. In the future, support for other IT equipment will be provided on the same platform.

About Dhaani Systems

Dhaani Systems developed industry's FIRST network-based energy management platform for IT equipment. Dhaani Systems is a Silicon Valley-based company, founded by seasoned executives with successful prior start-up experience. Development is in India. Sales and Support are provided locally.

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