Smart Energy Management:
Harness the Internet of Everything

Cisco IT Insights

What

The Internet of Everything (IoE) is estimated to generate US$13 trillion in annual sales by 2020, touted by Cisco as one of the most prolific business opportunities of the century. In effect, the IoE will drive significant energy cost savings. Worldwide, organizations are considering ways to save energy by reducing energy consumption and managing energy in more efficient ways. We have smart energy initiatives in action across multiple campuses to reduce and control power consumption and overhead expenses, especially within data centers and our offices, in an effort to reduce our carbon emissions. Understanding where energy is being consumed and controlling that consumption are two areas of focus for our IoE team.

Our proposed smart energy solutions integrate and build on current technology, including Cisco EnergyWise Management (formerly JouleX). EnergyWise Management monitors, measures, and manages the energy of many IP connected systems. We develop policies and embed them in EnergyWise to drive energy consumption savings on those systems.

"A few projects of note are carving out a path for the future of the Internet of Everything in power consumption savings through the use of sensors," explains Clif Deanhardt, Cisco architect, Global Infrastructure Services. While some initiatives are already in flight, the smart energy deployment, in pilot phase, tracks energy use and savings in areas where our policies have been introduced. Currently, 1977 devices are being tracked for energy consumption in our Tokyo campus, including:

- Printers, where device reporting capabilities allow
- Power over Ethernet (PoE) monitors
- Wireless network infrastructure
- Personal telepresence
- PoE telephony

Cisco replaced approximately 295 LCD monitors in its Tokyo site with LCDs using PoE technology. Passing electrical power along with data over Ethernet cabling allows us to monitor power consumption and control systems through policy. In the late evening, for example, ports can be set to automatically shut off rather than going into standby mode, which saves approximately US$1800 annually in energy costs. The realized annual energy savings from using these policies are approximately 64,000kWh or US$24,000.

EnergyWise Management and the benefits of PoE

Over the next two years, EnergyWise will be deployed, 48 buildings at a time, across all Cisco locations. It is currently deployed at a number of campuses, including the company headquarters in San Jose, California, where several innovative initiatives are showcased. EnergyWise gives us business-changing information and offers us a better, more unified understanding of our power consumption. We are then able to fine-tune and customize the company's energy usage, and drive more centralized policies across the company. Anything consuming power will ideally be able to query its power consumption over the Internet.

"Our story is about interconnectivity," says Deanhardt. "It's about the network. Being a network-driven company, more devices are going to be connected to the network and powered by the network. Part of our advantage is that we're unifying the management of all connected devices into one interface."

**Figure 1.** All Networked Devices and Systems
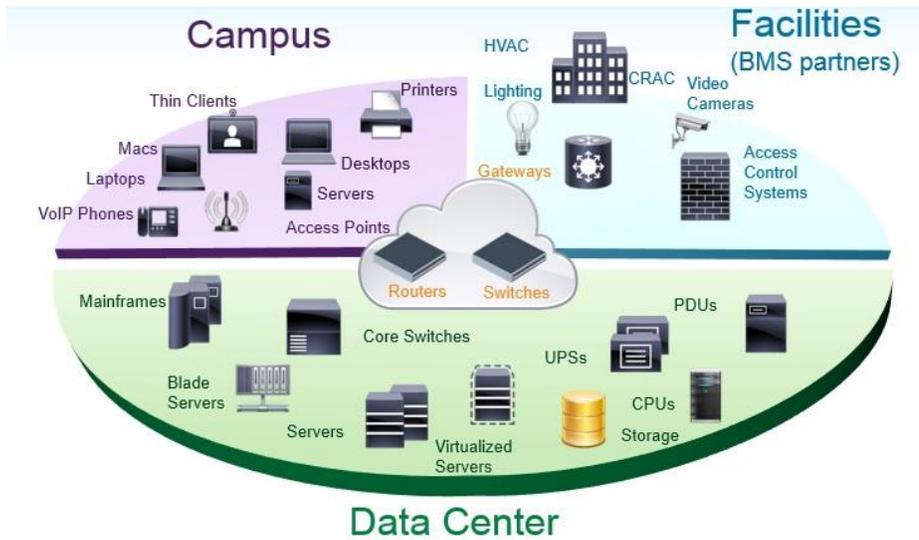
At a high level, smart energy horizontally integrates into all our architectures, from data centers to unified communications, all of which are powered by electricity (see Figure 1). By examining the hardware involved in switching the routers, access points to telephone and telepresence systems, we can track how much energy these systems are consuming. Changing the way those systems are powered through power schedules helps to reduce overhead costs.

Why

Energy is one of the largest unmanaged expenses in any organization (see Figure 2). Organizations worldwide are quickly discovering the power of enterprise energy management systems for gaining detailed visibility and control, the vast majority of which is composed of IT equipment. The implementation of smart energy management enables better business decisions and lower operational expenses.

Figure 2. Average Enterprise Energy Consumption
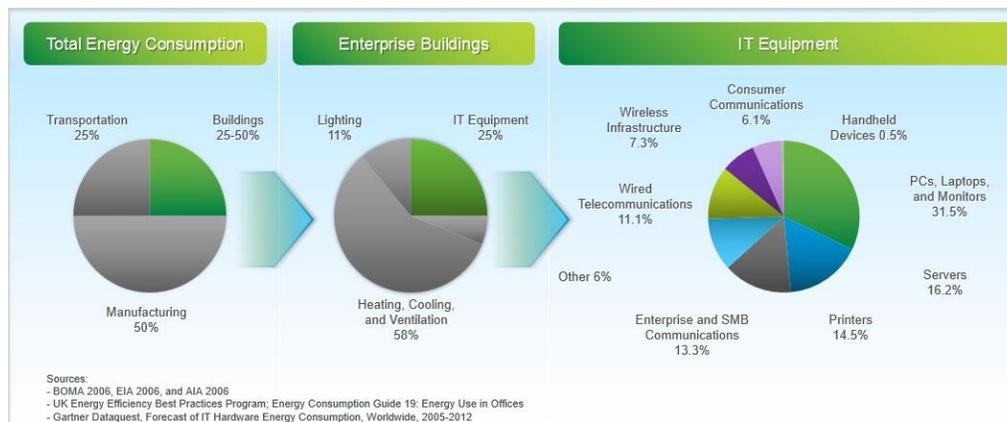
From a cost perspective, our data center operation teams have installed intelligent power strips to monitor all power consumption, and enable better management and logistics.

"We use these power strips for reporting and governance. They offer us increased efficiency and data center resiliency. The monitors allow us to manage the data center's electrical load more effectively," says Deanhardt.

In other parts of the organization, Cisco is working toward a well-integrated IoE space. Using the mobility services engine (MSE), Cisco can triangulate the position of WiFi emitters based on access points. It is already incorporated into Cisco corporate access points. The ability to triangulate devices enables a system to track where a person is within a 20- to 30-foot radius. Combined with sensors and smart lighting, the ability to light quadrants of a building based on a person's location would lead to greater efficiency, lowered power consumption, and higher energy savings. We also used MSE to enable our Cisco Maps solution, an interface that allows us to search for people, locate resources on a map (including meeting rooms, workspaces), and take action.

"Smart energy is one of the first uses that comes to people's mind when they think about the Internet of Everything, which has led to a lot of innovation in that space," says Deanhardt. "We will continue to build on our smart energy initiatives to both reduce our carbon footprint and reallocate savings to other areas of the company."

For More Information

How Cisco IT Deployed Cisco Maps

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