# What Is Green Switching?

**Mark:** Hello, everyone. I'm Mark Leary, Senior Strategist for Routing and Switching Systems for Cisco Systems. Thanks for tuning in to this edition of our online campus switching update. This session is one in a series of monthly campus switching podcasts where we talk about business and deployment considerations in focused 5- to 10-minute topics.

The topic of today's session is one that is at the top of everyone's mind now: What is "green" when it comes to switching?

As enterprises look to make changes to their networks to reduce both operating costs and their carbon footprint, they are seeking guidelines and measurements to help them make not only the most effective choices, but also the ones that are the most resource efficient. IT decision makers must consider the overall environmental impact of their switching infrastructure: How these systems use, control, and conserve resources. But what are the components to be considered, and how can they be quantified?

In other words, how should the environmental impact of network switching infrastructure be measured?

Let's look at power consumption first: At first glance, power consumption appears to be a straightforward and easily quantifiable way to measure the ecological soundness of a switch. Lower power consumption equals less environmental impact, right? It may be only one aspect of what constitutes green, but at least it is easy to measure. Or is it? Because . . .

Determining how to measure power consumption is a problem in and of itself. Is the correct metric power per port, power per user, power per unit of bandwidth, or power per service delivered per user? Each measurement yields a different figure and a different interpretation of what is optimal power consumption. And again, any power consumption measurement can be manipulated by varying the configuration of the switch to yield an optimal but meaningless number.

Consider the car that achieves a hundred miles per gallon, but carries only a single passenger, can't pass government safety tests, and takes forever to get up to highway speed.

So, where does an IT decision maker get accurate power consumption information anyway? Generally, this information is most readily available from product data sheets, but the power consumption figure given on data sheets isn't actual power draw, but rather an "average" power consumption calculation based on the maximum possible power that can be delivered by the switch's power supply. In other words, the power consumption listed on the data sheet isn't the actual average power usage, but rather the theoretical maximum that network managers should use to plan the network power plant.

To complicate matters further, different vendors use different formulas to calculate this average for the product data sheet, resulting in a typical range of anywhere from 58 to 80 percent of the maximum power the power supply can deliver.

To draw a relevant warning from the auto industry, “mileage may vary”. Make sure you’re comparing apples to apples, when making power consumption comparison. And just to keep things interesting, technology generation is a factor in power consumption. Each year or so a new generation of technology appears that is more efficient than the last—this is just as true in the switching infrastructure industry as it is in the automotive industry. And just as you can’t assume that just because a 1988 model car is more fuel efficient than a 2008 model car, just because the older car has a smaller engine, you can’t assume that older, slower line cards consume less power than higher performance cards of newer design. For example, 10/100/1000 ports often actually consume less power per port than 10/100 ports. This is largely due to the fact that 10/100/1000 connections are of newer and more advanced design than 10/100 cards.

By the way, a 1988 Honda Accord with a four-cylinder, 2.0L engine and a manual five-speed transmission gets an average of 23 in the city and 31 on the highway. By comparison, a 2008 Honda accord with a larger four-cylinder 2.4 liter engine is easier to use automatic transmission gets 22 miles to the gallon in the city and 31 in the highway. The source is: http://www.fueleconomy.gov.

But does that mean that IT purchasers should aggressively replace their older equipment with newer, more energy-efficient models? And even if power consumption could be measured accurately according to an industry standard, should that be the sole green measurement?

The answer to both questions is a resounding no!

And why is that? Because there is also the net green effect to take into consideration. Replacing old equipment with newer, more energy-efficient equipment lowers power consumption. But after the discarded equipment is recycled (or worse yet, dumped), is the end result truly more green than extending the life of the existing equipment through investment enhancement?

And there are other factors to consider when calculating the net green effect. On the cost side, IT planners must consider the heat dissipation caused by the equipment and the resulting cooling resources needed to compensate. One should also take into account, resources consumed in manufacturing and distribution of network equipment, as well as e-waste production and recycling costs of the equipment to be replaced.

On the benefit side, IT planners should consider how the technology can improve the carbon footprint of the business. For example, does implementing a high-performance network to support video and TelePresence reduce employee business travel significantly? Does it enable more effective and more frequent telecommuting, thus reducing commuting travel?

Finally, IT planners should consider how well the switching infrastructure supports integrated services. This is related to the power measurement challenge we spoke of earlier in this podcast, as well as the net green effect challenge. On a per service basis, switching systems that leverage software-enabled services or integrated service modules use fewer materials and consume less power than deploying separate appliances to provide such services as security and unified communications. In addition, using integrated services modules and software-based services, rather than separate appliances to provide services reduces the resources consumed in manufacturing and distribution of the equipment.

 

It should also be noted, that intergrated services, whether provided via software or service modules, enable switching systems to readily adapt to changing requirements. This prolongs the service life of the installed networking equipment, saving on replacement costs, and further reducing the burden of e-waste disposal and equipment manufacturing.

As you can see, there is no easy answer to the question of "what is green switching?" Lower power consumption; lower heat dissipation; fewer materials and resources used in manufacturing cable plant, and distribution; better power management, integrated services, and prolonged service life: all are components of green switching. How each of these components is implemented and managed determines the overall ecological soundness of a solution.

In its Catalyst switching portfolio, Cisco is taking all aspects of green into consideration, looking for the best combination of these components to deliver the greenest solution possible to its customers.

Well, that wraps it up for today. If you would like a transcript of this session or would like to listen to other podcasts in this series, you can go to: http://www.cisco.com/go/switching for more information.

Thanks for listening. Stay tuned for another session on the latest in switching news.



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