



Sustainability

Examining Green Cloud Claims

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- By Margo Pierce
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Cloud computing is touted as a "green " technology, but this claim fails to take into consideration the full environmental impact of the scalable resource. The energy savings a school can experience by reducing its hardware can be significant, but other environmental factors such as the e-waste disposal and the sources of energy used by data centers contracted by the schools must also be addressed if the traditional green claims are declared valid.

Reducing a school 's electricity use, referred to as reducing the "carbon footprint, " is the primary recognized positive eco-impact of cloud computing. That reduction across many schools creates additional energy efficiencies, according to Greg Ganger, the Stephen J. Jatras professor of electrical and computer engineering and director of the [Parallel Data Lab](#) at [Carnegie Mellon University](#).

"In and of itself, cloud computing is not magical and it 's not necessarily a green technology," Ganger said, " but here 's where the big win comes in: If you go and look at how heavily utilized that server is at the school, you 're probably going to find that the answer is a low percentage. Ten percent of the time, maybe, the server is busy. The other 90 percent of the time it 's still on, but it 's not really doing anything useful.

"When you switch from having that server at that school working 10 percent of the time, to using server resources at a shared infrastructure... not only are you going to only pay for 10 percent of a server, that server is going to have somebody else using the other 90 percent. "

This argument casts a decidedly green hue over the cloud, but it 's a limited view of the environmental impact.

A false sense of green

"How Dirty Is Your Data? A Look at the Energy Choices That Power Cloud Computing, " a report published in April by [Greenpeace International](#) , takes the cloud computing community to task for

defining "green " merely as a calculation of saving energy.

"This approach can be understood in part by how the industry has defined the problem: power consumption, " the report says. "Thus the approach has been a strictly technical solution: improve server energy efficiency and reduce waste associated with cooling and other non-computing energy demands. What this approach fails to consider, however, is the kind of energy used to feed consumption. "

The report examines the source of the electricity used to power data centers, ranging from renewable wind and hydroelectric to heavily polluting coal and nuclear energy. While the report praises [Microsoft](#), Yahoo , and [Google](#) for locating data centers in the Pacific Northwest "to take advantage of the region 's hydroelectric capacity, " it also criticizes Google, [Apple](#), and [Facebook](#) for locating data centers in North Carolina. The state is one of the top two consumers of coal obtained through mountaintop removal, in which the tops of mountains are blown away to access the coal. Every energy company providing electricity throughout the state uses coal removed from one of the 501 mountaintops destroyed by this kind of strip mining.

A brown cloud with a green lining

The environmentally responsible disposal of computer hardware, known as e-waste, is a cloud-computing issue schools--along with other institutions --must address and, with limited recycling programs, much of this equipment ends up in a dumpster. According to the [U.S. Environmental Protection Agency](#) , 2.37 million tons of electronics were "ready for end-of-life management " in 2009, but only 25 percent of that material was collected for recycling. Five percent was stored, and the remaining 70 percent went into landfills, where it may leak toxic chemicals and metals such as beryllium, mercury and PVC (polyvinyl chlorides).

Some cloud environmental issues can be addressed by data centers themselves. One example is Google 's "Server Retirement Program, " through which Google claims to reuse or recycle 100 percent of the hardware in its data centers. The company is also seen as an industry leader in the construction and operation of eco-friendly data centers.

Ganger, who is helping to set up the Intel Science and Technology Center for Cloud Computing at Carnegie Mellon, has the advantage of looking at the cloud from the inside out. He believes the bottom line drives IT decisions, even in schools, and so-called "green" benefits are a mere byproduct.

But, Ganger added, it would be wrong to label him a complete pessimist on the issue, pointing to those internet service companies with sites in the Pacific Northwest that leverage the region's mountain air to cool data centers.

These are helpful green advances, but until evidence of the reduction of the carbon footprint is documented for the entire lifecycle of implementation, the completely green cloud simply doesn 't exist.

About the Author

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