

POWER MANAGEMENT: COMPANIES MOBILIZE ON DATA CENTER POWER

By Rick Merritt, San Jose, California

Eleven companies have launched an association dedicated to lowering power consumption in data centers. The formal announcement of The Green Grid's formation coincides with the debut of a startup claiming to hit a new efficiency level in power supplies.

The Green Grid, which comprises computer systems, hardware, software and chip companies, hopes to set standards that will keep a lid on power consumption, now the chief cost issue for large data centers. Providing a small part of a possible solution, startup ColdWatt Inc. (Austin, Texas) has rolled three power supplies in the 650- to 1,200-kilowatt range with efficiencies ranging from 88 to 91 percent – five to 20 percentage points better than some existing products.

The problems in data center power consumption have been getting increasing attention in the past year from both industry and government groups. Studies have detailed the scope of the problem, which has gotten so bad that companies such as Google now locate large data centers near power plants.

To tackle the issue, The Green Grid project was launched last summer. The group hopes to address the problem in a way that includes all the system-level components of the problem, including servers, network and storage gear, and other data center equipment. While details are sketchy, the group hopes to report on its progress at an event that will most likely convene before the end of 2007.

"I would be surprised if we don't have something specific to say by the end of the year," said Jim Pappas, a Green Grid board member who manages server technology initiatives for Intel Corp.

New members can join as contributors, with the right to sit on work groups and draft technical standards for an annual fee of \$25,000, or as members who can vote on the group's actions for an annual fee of \$5,000.

"We especially want to recruit end users to roll up their sleeves, get their hands dirty and let us know what their requirements are," said Tony Pierce, a

Microsoft executive and former chairman of the PCI Special Interest Group.

To date, about 1,000 individuals have registered on the Green Grid's Web site, stating their interest in the initiative.

The Green Grid has created four work groups. They aim to define problems as well as their solutions, then articulate standards and best practices for addressing the problems and metrics for measuring progress.

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"They want to run everything in the data center, including the lights, on DC to save a couple of steps of power conversion," said Dan Artusi, chief executive of ColdWatt. The shift could boost data center efficiency by as much as 14 percent, but it could require new standards, connectors, circuit breakers and safety guidelines, said Artusi.

He added that some UPS makers already have DC links inside their systems, and ColdWatt could shift its supplies from AC to DC power with a software change. "Nevertheless, such a big shift will take time," Artusi said.

Power distribution and DC power are areas The Green Grid will explore, said Pappas. "We're not starting off, however, with an intention to push or implement DC," he said.

TIGHTER SUPPLIES

ColdWatt aims to squeeze power use for servers and network gear with a family of more efficient power supplies. The components use proprietary magnetic storage technology developed in the 1990s for the Navy by Rockwell, as well as precise digital control techniques developed internally since the startup spun out of Rockwell in 2004.

The company claims its supplies need just 353 watts of input to deliver 200 W to a system, whereas some existing supplies need 511 W of input to deliver the same output. A dual-redundant sub-

kilowatt ColdWatt supply measures 4.3 inches wide – "smaller than today's single power supplies," said Artusi.

The company claims its subkilowatt products, quietly shipping since last summer, have an efficiency of up to 88 percent on light loads (higher when systems are running at full power). They are geared for pedestal and 1- to 2U-rack-mounted servers. Its kilowatt-class products, also shipping now, hit efficiency ratings of up to 89 percent and are aimed at rack-mounted servers and network switches.

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The company is sampling a class of supplies rated up to 2.5 kW that hit efficiencies of up to 92 percent. The products target blade servers and other dense telecom systems.

Parameters of the ColdWatt supplies can be monitored and reported to end users or OEMs via a graphical user interface. "We have built a data recorder into the product for predictive failure analysis at the system level," Artusi said.

In annual volumes of 600 units or more, ColdWatt will charge \$143.51 per unit for its 650-W devices, \$211.06 for its 1-kW products and \$265.20 for its 1.2-kW components.

ColdWatt is not disclosing details of the proprietary magnetic technology the company uses to achieve its efficiency and size advantages. "The power topology we use in our magnetic subsystems reduces core loss, which helps with efficiency at low workloads, and we have superior magnetic circuitry to help at higher work loads," Artusi said.

ColdWatt has raised \$31.5 million in venture funds and expects to address a total market as large as \$1.5 billion.