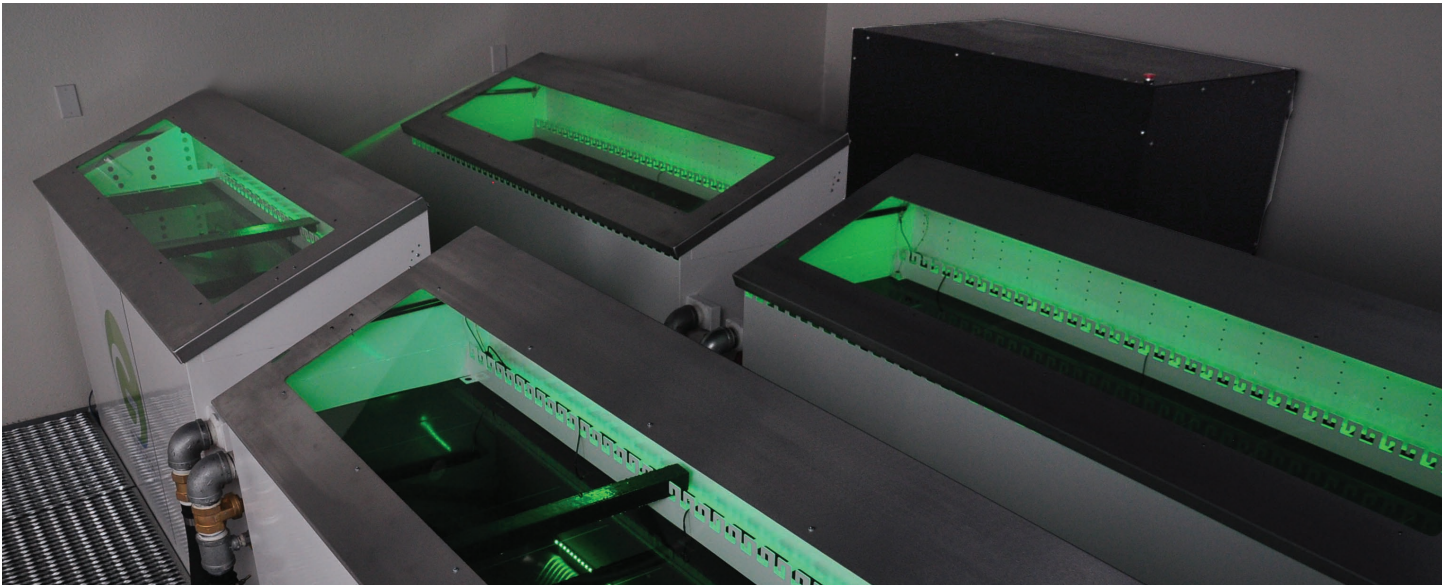




The Clear Solution for Data Center Cooling™

Extreme cooling performance with low-cost dielectric fluid submersion cooling



CarnotJet™ Four Rack Installation

Midas Networks, Austin, TX, January 2011

ABSTRACT: Midas Networks purchased a four rack CarnotJet™ system instead of a traditional air-cooled system and reduced upfront data center build costs by nearly 50% while reducing ongoing power costs by 50% annually to accrue a total lifetime savings of over \$600,000 for 100kW of server capacity.

Midas Networks is a hosting, collocation, and information technology solutions company based in Austin, Texas, that provides an array of hosting services for more than one hundred businesses in Central Texas and nationwide. As Midas Networks has grown its data center capacity, it has faced the challenges of keeping expenses low while preparing for the future in an increasingly competitive market. This case study follows the company's thought process as it expanded its data center infrastructure in early 2011. Midas Networks was initially focused on finding suppliers of equipment with the following traits:

- » Low upfront cost
- » Low annual energy expense
- » Room for future expansion

Initial Cost Comparison: In 2010, a high profile air-cooling vendor quoted Midas Networks \$120,000 to purchase and install two twenty-ton Computer Room Air Conditioners (CRACs). All told, Midas Networks would have to spend \$180,000 to increase load capacity by 100kW, which includes the CRACs, the cost of optimizing a new room for air-flow and heat management, and a new generator outside to back up the new systems [see Table 1].

Table 1: Quoted cost of infrastructure improvements at Midas Networks for standard air-cooled system

CRACs	\$120,000
Generator	\$49,000
Space/Land	\$26,500
Total	\$195,500

Midas Networks also determined that the high peak power draw of an air-cooling install would require their local utility provider to upgrade the transformer outside company headquarters, which would require shutting down the main power feed into the complex for an extended period.

Expanding air-cooling capacity was proving impractical and fiscally burdensome. Understandably, Midas Networks went looking for alternative options. They soon found Green Revolution Cooling (GRC), just down the road in Austin.



We wanted the ability to cool blade servers and other next generation technology, and that was not going to be practical with air-cooling.



--Kenneth Tooke, President, Midas Networks

Because the CarnotJet™ doesn't need CRACs, chillers, climate control, insulation, or large amounts of electricity, GRC was able to offer Midas Networks installation and implementation of a 100kW system for nearly half the price of an air-cooled alternative.

Midas Networks found the difference compelling: GRC's system, the CarnotJet™, requires only a level floor and access to an external heat exchanger. While the upfront infrastructure savings are large, CarnotJet™ continues to save energy and money when the servers are powered on.

Ongoing Energy Savings: Midas Networks wanted to make an investment that would provide significant long-term reductions in operating expenses. By comparing previous energy usage and costs to the CarnotJet™, they found that energy savings for four racks will be close to \$70,000 per year and more than \$500,000 over the lifetime of the system.

“ I am excited to save money and to show customers that we are one of the most forward-thinking data centers in the world. ”

--Kenneth Tooke, President, Midas Networks

Table 2 shows energy usage as a function of server power. (Please note that servers in GRC's systems use 15% less power on average because internal fans are removed during installation.) Now and in the future, GRC's system will conserve significant amounts of power for Midas Networks.

Table 2: Energy usage with values normalized to server power usage

	Before	CarnotJet
Servers	1.00	0.85
UPS*	0.08	0.07
Cooling	0.9	0.03
Total Power	1.98	0.95
PUE	1.98	1.12
Power Savings		-52%

*Estimated

Expansion/High Density: Midas Networks also gains the ability to support blade servers and other high-density servers, which are typically more energy-efficient and space-saving than normal servers. And with other local data hosting centers exclusively supporting standard power density loads, Midas Networks can stake out a competitive advantage in the industry.

Performance to Date: The system and servers continue to perform flawlessly. Cooling energy used shows a PUE of around 1.1, as expected (even with UPS power loss), and the servers are consuming 15% less power than they did when cooled by air.

Conclusion: By electing to install the four rack CarnotJet™ system, Midas Networks reduced upfront data center build costs by nearly 50% while reducing ongoing power costs by 50% annually to accrue nearly \$100,000 in upfront equipment cost savings as well as an estimated \$500,000 in energy cost savings over the next decade. As prices and hardware densities continue to rise, Midas Networks will benefit from Green Revolution Cooling's highly efficient and cost-effective cooling solution.
