



Mission **CRITICAL**

Data center and emergency backup solutions

NetRiver Expands Its Operations and Data Center

Don't overlook the batteries

www.missioncriticalmagazine.com

NetRiver Expands Its Operations and Data Center UPS



Don't overlook the batteries

BY STEVE VECHY

NetRiver, a leading provider of scalable and reliable network-neutral data centers and interconnection services, serves carriers, hosting firms, Internet content companies, systems integrators, network service providers, and a host of other businesses. With so many who depend on NetRiver's high-density design and network diversity, it needed a new facility to serve clients in the Greater Seattle area and throughout the Pacific Northwest.

Large Client Triggers Expansion

Shortly after opening its Lynnwood, WA, facility in 2007, NetRiver had the unexpected good fortune to contract significant work from a very large client. Consequently, NetRiver needed to expand its uninterruptible power system (UPS) capacity in order to accommodate the needs of its new client as well as for the data center to continue to grow.

That's when NetRiver contracted a large UPS manufacturer

in 2008 to install an upgraded system at its Lynnwood facility. The manufacturer recommended an energy-efficient, modular, compact UPS that offers high efficiency across the entire load spectrum. NetRiver especially liked the fact that the UPS is scalable and would allow the installation of additional modules as needed in the future.

According to Adam Vierra, NetRiver's director of sales and marketing, NetRiver added three Eaton Powerware 9395 UPSs (500 kW, N+1) and the associated batteries in a phased build out to an existing APC Symmetra Megawatt UPS (800 kW N, 600 N+1) feeding APC Type C power distribution units (PDU) and associated gear.

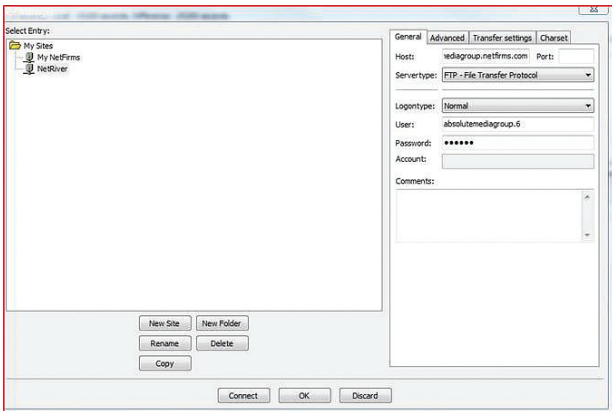
Vierra said, "We have a couple of configurations for the power distribution scheme depending on the application. We deliver N+1 distribution from an internally redundant UPS, or N+1 power delivery from separate UPSs (dual bus). All the UPSs are on separate breakers with the source utility feed to eliminate common points of failure across UPS.

"Downstream power distribution is also N+1 (three Type C Floor (480/208V/300-kVA) PDUs, and 225 kVA RPPs (provides A and B power feeds with 4 by 225 amp panels at 208V)," he said, "All this downstream Eaton equipment is associated with one colocation environment."

Generators back up this entire operation. "The swing genera-



Stephen L. Vechy is the marketing director for UPS and Utility at EnerSys. Vechy is an Institute of Electrical and Electronics Engineering member (IEEE) and has been active in the IEEE Stationary Battery committee and SCC-21.



tor setup is actually pretty cool as we are able to keep everything separate and distributed away from the common points of failure you commonly find with paralleling switch gear backup distribution schemes (common bus),” Vierra said.

NetRiver anticipates adding a generator but does not plan to lock in the third generator position until loads climb above 2 MW.

Space Limitations Overcome

NetRiver’s expansion specifications required the UPS, batteries, power distribution units (PDUs), and remote power panels (RPPs) to fit into an extremely tight space—a room measuring 16 by 31 feet. To accommodate such a small footprint, the manufacturer selected EnerSys DataSafe 16V front-terminated batteries as the solution that could provide the most back-up power in a limited area.

“Given the space restrictions and room configuration the 16V EnerSys DataSafe was the ideal battery for this application,” said a spokesperson for the UPS manufacturer. “In fact, we don’t know of any other battery that would have worked as well in this situation.”

Vierra explained that the small footprint at Lynnwood could have been problematic and would have made the expansion much more costly if the company had been forced to do a build-out and enlarge its UPS room. “We had available space to go with a higher elevation on the battery design, but not the room to go wider,” Vierra said. “Fitting the compact DataSafe batteries into new cabinets saved critical floor space, which helped make our UPS upgrade a success.”

More Power in Less Space

The high power rating of a 16V battery provides a more economical and space-efficient solution—as was the case at NetRiver. With the addition of EnerSys DataSafe batteries, NetRiver increased its capacity from 800 kW to 2.3 MW—all in the same original footprint. According to Vierra, “The DataSafe 16V batteries met our basic requirements for more power, less space, lower cost, and scalability to high capacity systems.” The expanded UPS at the Lynnwood facility now has a battery run

time of 10 minutes at full load.

In terms of ease of maintenance, long battery life, and a space-saving design, DataSafe was the best solution,” said Vierra. “Using anything else would have had a negative impact on our cost structure, and we are delighted with the results.”

Mary Jo Mercer, manager of major accounts for EnerSys, said DataSafe 16V batteries typically use 20 percent less space than installations using other valve regulated lead acid (VRLA) monobloc batteries. In fact, DataSafe 16V batteries require only 44 square feet to support a typical 750 kVA UPS system for a 15-minute run time. When compared to flooded batteries or stackable 2V VRLA batteries, the Datasafe 16V battery can typically reduce space by 50 percent or more.

Regarding the NetRiver expansion, Mercer explained that using a 12-V battery would not have been feasible due to the additional cabinet headspace required for a top-terminated battery. She also pointed out the DataSafe 16V batteries have up to 50 percent fewer connections, which, in turn, simplifies wiring, minimizes the number of strings, and reduces installation time. Additionally, front-terminal batteries allow easy access, which enhance safety and reduce maintenance costs.



The DataSafe 16V battery fits within many existing cabinet designs and is easily retrofitted into existing cabinets, eliminating additional expenses for costly slide-out trays or to upgrade from 12-volt batteries. And with the 550 WPC rating, it can offer more power in the same cabinet.

NetRiver Expands Its Operations and Data Center UPS

750 kVA, 100% Load Comparison 240 cells, 0.9 PF, 94% efficiency 1.67 VPC at 77°F			
Traditional 12 V, 500 WPC Bloc		Front Terminal 16 V, 800 WPC Bloc	
Run Time	# Strings	Run Time	# Strings
N/A	1	N/A	1
N/A	2	N/A	2
N/A	3	9	3
7	4	16	4
11	5	23	5
15	6	30	6

Start to Finish

The NetRiver UPS expansion started in August 2008 and was completed in March 2009. Battery installation highlights include a total of 240 batteries housed in eight cabinet systems, each with a footprint measuring 50 by 32 by 84 inches. The batteries were arranged in 240 cell (30 unit) strings on five shelves within each cabinet. There were four strings of batteries per UPS. As growth opportunities arise in the future, NetRiver can add modules as needed, evolving seamlessly to support its clients' needs. The total cost of the expansion was approximately \$5.6 million.

NetRiver took the opportunity to build cooling efficiencies into its facilities. The Lynwood facility includes high-efficiency variable-speed Smardt chillers, variable-speed AHU fans, and variable-speed chilled water pumps. Together with the air-side economizers, these technologies help NetRiver reduce its energy for cooling by 40-70 percent (~158 million kilowatt-hours) compared to typical high-density server rooms and providing \$103,000 in savings. For this work, NetRiver received \$380,000 incentives from Snohomish County PUD.

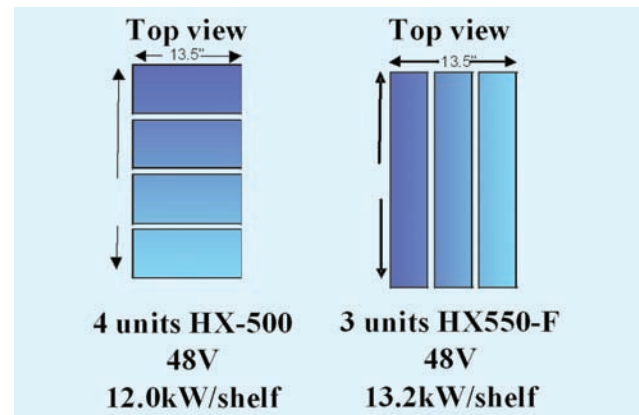
Higher Demand

EnerSys adapted to the growing and shifting demand of larger and more powerful data centers in the UPS market. EnerSys was the first company to introduce a 16V front-terminal battery designed specifically for UPS applications. The 16V addresses many of the desires of the UPS manufacturers and users alike: more power in less space, easier access and operating cost benefits.

Until now, monobloc batteries were limited to 12-V top-terminated batteries that required approximately 57 square

feet for six cabinets configured in six parallel strings which is beyond the typical IEEE recommended maximum number of parallel strings for UPS applications. The largest 12-V top terminated bloc is rated around 540 W per cell for 15 minutes to 1.67 VPC at 77°F.

By designing a higher rated cell (like 800 or 925 WPC), EnerSys minimized the number of strings needed for larger capacity UPS systems, which in turn saves space and reduces installation, operation, and maintenance costs. With front access, maintenance is easier and safer. Unlike top-terminated battery cabinets where connections are difficult to access due to the limited headspace above the batteries, the 16V front terminal battery cabinets have all connections front accessible. This reduces maintenance time and enhances safety for main-



tenance personnel. Additionally, the high power and voltage of the 16V battery requires up to 50 percent fewer connections (30 units instead of 40 in a typical 240 cell configuration combined with fewer parallel strings), simplifying installation and maintenance.

Front terminal designs had not been used significantly in the UPS segment of the market, but EnerSys recognized it as a solution to optimize valuable space, which ultimately affects cost and footprint—two of the main drivers in the industry.

Most cabinet configurations of top terminated blocs are about 32-in. deep, measuring two cells wide by four cells deep. Most 12-V front terminal batteries are only 21-22-in. deep, leaving a significant amount of unused space, which costs valuable real estate. To effectively use this otherwise wasted cabinet space, EnerSys developed a front terminal 16-V configuration with a higher capacity rating (as shown above). ■