

Delivering competitive advantage - efficient UPS for modern data centres

Today's data centres are concerned with energy efficiency. They have to be; increased rises in power consumption, energy costs and concerns about the environment have had an impact.

Leading UK internet service provider (ISP) Advantage Interactive is one such business. Estimating a spend of £1.4million for electricity over the next three years, energy saving is high on its agenda. So, too, is resilience and guaranteeing 100 percent uptime for its 200,000 customers. In a cut-throat business like hosting, how has the company consolidated its need for cost-cutting and efficiency without compromising on service? Riello UPS has provided a new genre of total power protection solution with energy efficiency at its heart. It enables a significant increase in resilience alongside a reduction in power consumption and carbon emissions.

Based around a completely new design of uninterruptible power supply (UPS) technology that offers high operating efficiencies, reduced energy consumption and cooling requirements, a low impact on the local electrical environment, a small footprint and lowest possible TCO (total cost of ownership), the new system gives Advantage a state-of-the-art facility that will see it well into the future. Leo Craig, sales manager at Riello UPS Ltd, takes up the story:

"A period of rapid expansion, combined with a lack of control over facilities and the escalating costs associated with being located in London's congested Docklands resulted in Advantage relocating its data centre to a more secure and manageable building in Stevenage, Hertfordshire. It also provided the perfect circumstance to re-evaluate business continuity and have a power protection solution designed, installed and commissioned specifically. As well as providing UPS, generators and all other equipment, Riello managed the project from start to finish. The new UPS system alone provides a 20% running cost and carbon emissions reduction compared to traditional UPS designs."

Everything from One Supplier

Increasingly, Riello is winning business because of its ability to provide a turnkey package like this, assume the role of project manager and oversee the whole



Master Plus UPS protection for leading Internet Service Provider (ISP)

thing on behalf of its clients. It enables a customer-focused business like Advantage Interactive to concentrate on core activities and not be distracted by managing a time-consuming and complex business continuity project and all it entails.

"Having to deal with multiple suppliers and contractors, handle deliveries, siting of equipment and so forth can be a real nightmare if you have limited time in which to do it. But it's our job. It's what we do and we do it well." Says Craig.

In the Driving Seat for Business Continuity

A clear 'advantage' for Advantage Interactive is that the company is firmly in the driving seat with regards to management of the facility.

In London, they had much less control over how this was done and were less able to take appropriate measures to secure power continuity – as they have in Stevenage. An external substation, supplied by EDF Energy and sited at the rear of the building, provides a 1MVA electrical supply.

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Advantage Interactive Managing Director, Mark Boost

Currently, 20 server racks are protected by two 160kVA Riello Master Plus UPS - the latest design of energy efficient UPS - working in a fully parallel-redundant configuration. The mains supply from the substation comes into the building and feeds the two UPS. They then convert raw mains energy (ac) into the conditioned supply that the data centre loads require. 'Conditioned' means that the UPS create a buffer between protected loads and harmful power problems such as sags, surges, brownouts and harmonics. Both UPS share the load equally, but if one fails through a fault condition or is taken out of service for maintenance, the other automatically takes over the load in a completely break-free supply.

Capacity is more than adequate to keep Advantage Interactive up and running even during its busiest periods.

The servers (and operators using them, whether internal staff or customers) remain totally unaware that there is a power problem or mains failure. This is the bedrock of power protection; that it happens automatically. Master Plus is designed specifically for this type of configuration and for data centre use and is one of the most robust UPS on the market. It uses on-line technology (VFI) with an isolation transformer on the inverter output.

It has low total harmonic distortion (THDi) values, which means equipment upstream and downstream is shielded from harmonic pollution (a common cause of problems in electric circuitry) and results in greater efficiency. It also offers high online operating efficiency and high power factor to optimize usage of mains power.

Planning for the Future – Today!

Advantage Interactive's uninterruptible power supply solution is completely expandable. Over the next three years, rack count will rise to 85 with the addition of many more servers, and so another two 160kVA Master Plus units will be added into the parallel configuration

Ensuring Back-up Power

And in case of a long duration power failure, Riello also installed a PowerBak 550kVA diesel generator, 2,500litre fuel tank and a specially constructed weather proof, acoustic enclosure. As server numbers increase so too will generator count with another 550kVA machine due to be installed within the next twelve months.

Keeping it Cool

One of the most important aspects of the energy efficiency theme is how cooling requirements have been addressed. Statistics vary but research suggests that for every megawatt (MW) required to power hardware, another 1.5MW is needed to cool it, which can have a significant impact on energy consumption. It is this fact that is being blamed in highly populated data centres for the meteoric rises in power use. States Riello's Craig: "Cooling is absolutely necessary but it should enhance a facility not add to its collective problems."

The air-cooling system Riello installed for Advantage (a Denco Free Cool system) uses cold-aisle cooling to maintain ambient temperature and dissipate the heat generated by server racks. It is noted for lowering installation and running costs, plus being more efficient than comparative solutions.

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Minkels cold aisle closure

Why the Need for Cooling – they're only computers!?

Electrical equipment can be sensitive to changes in air temperature. UPS batteries, for example, need to be housed in a temperature-controlled environment of 20-25 degrees centigrade. As little as one degree above or below this can seriously compromise design life leading to premature and costly replacement. At its simplest, the cold aisle configuration greatly increases efficiency and reduces energy use and carbon emissions by arranging server racks so that hot air from devices exhausts into 'hot' aisles and cool air is drawn in from a cold aisle. It also greatly reduces the air-conditioning's workload. Advantage Interactive's data centre has been built employing a 500mm raised floor, throughout which pressurized cool air flows and is then blown into the cold aisle through meshed floor tiles.

"We've had to be very tidy with our cabling." Explains Craig. "The power and data cabling also runs under the floor. If it were not tidy it would cause air-flow problems resulting in uneven cooling, ineffective recirculation and increased energy use."

Mark Boost, managing director of Advantage Interactive, is understandably passionate about the business and proud of what it's achieved. "Reputation is everything," he states, "we've invested a great deal in ensuring ours by putting our customers first and offering excellent service, value-for-money, reliability and resilience above all. Ensuring uptime is a must. In this industry, reputations are won and lost on that!"

Protecting a Legacy

Advantage Interactive grew from humble roots when, in 1999, Boost was eking a living designing websites and building computers for friends from a spare room. Advantage Interactive Design was established as a web design company. The astute businessmen he is, Boost recognised what customers wanted was the whole package, particularly hosting services. Sister company, LCN was established in 2000 to offer domain name registration services, since which time it has grown to be one of the UK's largest domain name companies, with well over 350,000 registered. Two other brands have joined the group, Telivo Internet Solutions, offering web hosting to over 45,000 sites in the UK, and Server Choice, which offers virtual and dedicated servers.

The business park on the outskirts of Stevenage is a prestigious facility and the building itself is new, but it was not purpose-built and this presented a few challenges for Riello.

Challenges of the Installation

The shape of the room in which the data centre is housed was awkward, not square or rectangular but an odd 'L-shape'. Clearly, it was impossible to change the room shape (without major reconstruction) but Riello was able to plan and design a layout to maximize efficiency whilst providing room for growth. Its ground floor location negated heavy lifting gear and simplified cabling and piping to the generator and sub-station, but because of the odd shape, the electricians had to be rearranged to ensure fusing levels and discrimination were accurate from the start - most important for negating potentially harmful power problems.

An added security advantage is that the data centre is shielded against visual and physical intrusion with solid, window-less walls. With no outside light, one of the first jobs on Riello's list was to install and upgrade the lighting, to energy efficient, industry-standards so that the contractors (some of whom were working at sub-floor level) had more light to work in

Riello also upgraded the electrical wiring, installed new network cabling, which was upgraded to a 10Gbit, Cat 6a infrastructure, and installed the pipe-work for the generators and fuel tank.

Not just Energy Efficiency

Says Craig: "We've concentrated on efficiency everywhere, not just energy efficiency. Where possible we've recycled, delivered several things at once instead of several deliveries of single items and been smart about the order in which things were done. The UPS is also the most energy-efficient it can be with a high on-line operating efficiency, low input power factor, and low THDi."

The last word goes to Boost: "We believe we have created a data centre that will rival any other on performance, resilience, reliability and energy efficiency. It's all part of our commitment to our customers to constantly improve the service we offer."

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