

# Location, location, location

- cost and energy efficient protection for data centre's new premises

When OpenHosting's Docklands lease came up for renewal earlier this year and new landlords upped the rent by 600% - it was time for a rethink in terms of location.

OpenHosting's 8,000 customers rely on delivery of maximum uptime and high standards of service at a minimum price. The company does this by maintaining service levels and lowering costs, so for Co-founder and Technical Director Chris Byrd, staying put and passing the higher costs on to customers was not an option.

Instead, 30 server cabinets were dismantled, flat-packed, placed in a container (alongside 500 servers) and hauled 200 miles to new premises at state-of-the-art Cobra Court, Trafford Park, Manchester.

Riello UPS was engaged by specialist data and power solutions company INS Sudlows to provide power protection for the new facility, which was fully constructed and fitted by the North West-based business.

The primary challenge of the installation was an immovable and tight deadline of just two months for completion, which included: room construction, cabling, supply and installation of three 100kVA N+1 Riello UPS uninterruptible power supplies (UPS) and a 550kVA SDMO generator, electrical wiring, air-conditioning, fire suppression and security equipment installation. The London lease expired at the end of March 2009 - and there was no flexibility.

Darren Taylor, project manager, INS Sudlows takes up the story: "It's an obvious thing to say but we are used to working to tight deadlines. In our business, every job requires intense project planning and implementation to ensure that structured progress is maintained throughout. You can't prioritise - everything is a priority but you can schedule individual work disciplines to minimise potential holds ups."

This process is greatly assisted by the fact that INS Sudlows employs a full-time team of staff as well as contractors such as electrical engineers, air-conditioning and security specialists it can call on at short notice. "We also carry a large amount of stock and equipment which means we don't have to wait weeks for items to be delivered." Taylor adds.



Riello Master Plus UPS and generators protecting OpenHosting

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Riello, too, operates a 27,500sq/m warehouse facility in Wrexham, which it expanded by relocating to larger premises in March 2009. It enables the company to fulfill orders quickly with the latest, state-of-the-art power protection equipment.

OpenHosting has been smart in turning what could have been a disastrous situation into a positive move. Not only has it been able to lower overheads by moving away from London; installation of the latest energy efficient Riello UPS technology is set to achieve a 20% reduction in energy use. As OpenHosting has only been given 50% of the 2MV energy supply it wanted from United Utilities, energy saving is crucial. The cost implications are also significant. On a bill of £61,000/month, it equates to a saving of almost £450,000 over a three-year period. Byrd is keen to emphasize that this will be passed on to customers by maintaining competitive pricing.

OpenHosting has also exploited the opportunity to expand and upgrade its network infrastructure, which it operates through a subsidiary OHTele.com, so that it can boast greater internet capacity than any other UK-based hosting company. The network is a multiple 10G resilient ring, linking key data centres to Manchester, London and several other European cities.

"We had to install an additional 20,000Mbps from Manchester to London, which entailed laying

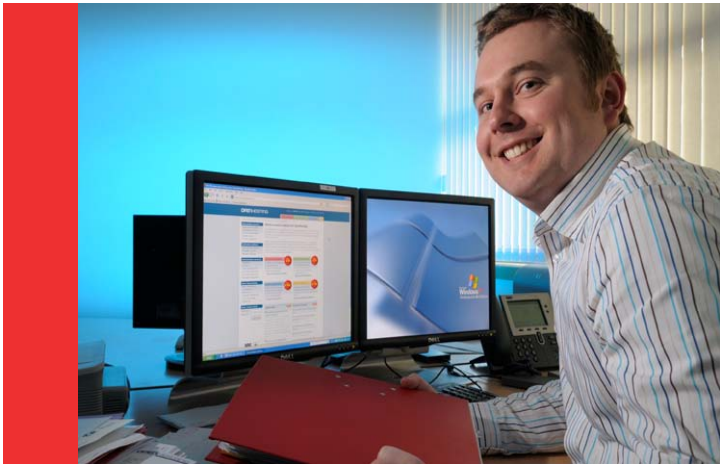
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Co-founder and Technical Director of Open Hosting, Chris Byrd

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30km of fibre – a costly but worthwhile move as it means we have full access to Manchester's network POPs (proprietary access points) and we can deliver a full range of network services at all sites." Explains Byrd.

The first thing that strikes you about the data centre is that – although it has just come through a refurbishment – it is remarkably neat; freshly painted walls, clean floor tiles and excruciatingly tidy data cabling tucked away in a 300mm overhead basket tray network. Rather than representing the spaghetti-mess associated with many server farms, OpenHosting has deployed this system of cable containment (the basket network was designed and installed by INS Sudlows) for a reason. It enables innocuous changes to the infrastructure to be made easily. Faulty cables can be replaced and new ones added at any time.

With one eye firmly on technical aspects and the other on cost savings, Byrd has even been smart about floor tiles: "There seemed little point paying for tiles that are going to disappear under the server cabinets – and potentially get ruined, so we left gaps for where the racks will go in phase II. It all helps to keep costs down." Says Byrd.

On completion, the development will support 145 47u server racks, which will, in time, accommodate up to 6000 servers thus enabling OpenHosting to expand its service and offer more hosting, dedicated solutions (such as VPNs) and infrastructure options (like co-location) to its

expanding customer-base. A customer base which now includes a growing number of corporate clients as well as hobby-hosts, web designers and internet engineers.

## Power Protection

OpenHosting operates an N+1 uptime policy, which requires redundant and resilient power protection. In this case, the three 100kVA UPS are Riello's latest energy efficient Master Plus designs and this represents the first level of power protection for the company. The second comes from a 550kVA SDMO diesel generator with several days worth of on-site fuel storage in a stand-alone, 48hr, bunded tank, which ensures the business continuity of the site is not compromised by a long-term power outage.

The three Riello Master Plus 100kVAs operate in an N+1 parallel redundant configuration, which means that there is a continuous power supply to the loads - even if one develops a fault condition or is taken off-line for maintenance. In normal operating conditions, all three UPS share the load equally.

## Energy Saving

New, energy efficient UPS like Master Plus lower power consumption – and this is where Byrd is aiming to achieve the greatest benefits in terms of energy efficiency.

"We asked for a 2MV energy supply but could only secure 50% of that capacity so energy efficiency is critical. We are currently achieving 95.6% efficiency from the UPS – and that's operating at one-third capacity. Once we are at full capacity that figure will increase. 98% is what we're aiming for." Explains Byrd.

## Cost Saving

Newer designs of energy efficient UPS also occupy less floor space, which means it can be maximized for revenue-earning server racks. They also reduce costs associated with operation and maintenance. Low total harmonic distortion (THDi) on UPS input of 3% reduces the impact on upstream equipment and a high input power factor (0.99) also aids operating efficiency.

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Riello UPS MasterPlus Protection

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So too does adaptive operation and management, in which the UPS selects a mode that matches the electrical characteristics of mains supply to power protection performance requirements. This saves on wear-and-tear of consumables such as fans and capacitors. Adaptive battery management also lengthens the time between battery replacements, thus helping to lower lifetime costs.

## Data Centre Construction

INS Sudlows has been established for over 90 years and has a successful track-record of designing, building, installing, maintaining and repairing every element of modern data centre operations. From a single data point to refurbishing an entire new office development, the company offers a truly turnkey package. Taylor explains:

"Cobra Court is one of Manchester's premier business parks and the building OpenHosting occupies is detached with a private fenced yard and its own car park. This eased the construction process in terms of getting equipment and personnel on site, it also made installing the generator and fuel storage easier and made the planning application smoother. But we could have done with more headroom. Because it's an office building, the ceilings are low but that is the way it was and we had to work with what we had. We managed to make everything fit.

Originally, it was thought we would have the data centre upstairs and the offices downstairs but floor loading issues prevented this. We then had to ensure adequate security measures to safeguard the valuable hardware, such as blacked out windows to stop prying eyes. We also installed 24/7 monitored and recorded internal and external CCTV."

Byrd adds: "We have a number of co-location customer's who have their own equipment here. It gives them added comfort knowing it is safe and secure. We take security very seriously. The only people allowed into the data room are authorized personnel. We know exactly who is where at any one time."

And for the added benefit of customers who may be required to work on-site, OpenHosting has installed a light and comfortable recreation area which will soon have the benefit of satellite TV as well as refreshment facilities.

## Air-Conditioning

The air-conditioning, which is down-flow, cold aisle cooling, has been chosen for its effectiveness in high-density environments. Research suggests that every Kilowatt (KW) of electricity required to power hardware takes another 1.5KW to cool it, which can have a significant impact on energy consumption. Cold aisle cooling maintains ambient temperature and dissipates heat generated by server racks. Hot air from devices exhausts into 'hot' aisles and cool air is drawn in from a 500mm raised floor plenum, through which pressurized cool air flows and is then blown into the cold aisle through meshed floor tiles. This greatly reduces the air-conditioning's workload.

Electrical equipment can be sensitive to changes in air temperature. UPS batteries, for example, need to be housed in a temperature-controlled environment of 21-25 degrees centigrade. As little as one degree above or below this can seriously compromise design life leading to premature and costly replacement.

## Looking Forward

There are currently 30 cabinets in situ in Cobra Court, 29 of which are active. The design of the implementation is intentionally 'scalable'. Phase II will see another 100 or so cabinets installed, a further three 100kVA Riello Master Plus UPS will expand the current N+1 configuration to 600kVA N+1, and an additional two 550kVA SDMO generators will maintain redundancy. Best of all, through intelligent power protection, OpenHosting has ensured continued expansion alongside reduced operating costs and higher than ever service levels.

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