

Nominee: Sudlows - BelleVue

Supporting Vendor: Sudlows

Nomination title: The BelleVue Data Centre

Located on a brown-field site, the BelleVue Data Centre building, at first, was set to become an office development but, during the construction phase was beefed up to enable it to be used as a Data Centre site. This combination, whilst first appearing too small a footprint, simply required some inventive space planning to fulfil the company's IT requirement for hosting and cloud based service provision. In fact, once designed the facility was capable of punching far above its weight in terms of both capacity and resilience, given its modest 400sqm footprint.

The Sudlows were engaged to design and build a new data centre facility on the site of the old BelleVue Filling Station in Manchester to house a Web hosting company. This five floor building had a uniquely square footprint that required a number of innovative design features in order to enable a large data hall and a resilient energy efficient provision both of which had to be delivered to not only deliver N+1 power Redundancy (excluding generators) but also had to ensure that the Cooling was also designed to N+1 per pod, so eleven standby units were also made available. In addition to this, a Fresh air ventilation system was employed for the UPS Room cooling (no expensive DX), and a Monitoring system installed with head end in facility engineers office.

Finally a 95% efficient static UPS system was utilised. This unique facility design, led by Mechanical Director Gary Frith and our Uptime Institute Accredited Tier Designer, Andy Hirst, combines the very best in innovative energy efficient design techniques. The challenge here was clearly going to be the space limitations within the building and the fact that the Server Rooms only had a footprint of 400m² spread over 5 floors. Not only did the building have to host over 160 racks, but the resilience required meant that a number of unique technical design features were deployed; all to ensure the facility achieved the hosting company's own high standards for resilience and energy efficiency. One of the major challenges came from the fact that the building itself only had a very small uncommissioned service lift shaft available to the construction team. Subsequently, every individual item of equipment had to be precisely measured and carefully lifted into position on to each floor, without incident. In addition to this, the Data Halls had a minimum floor to ceiling height that meant a raised floor and suspended ceiling could not be deployed. This led to the decision to look at the latest In-Row cooling technology being employed and a very detailed infrastructure of power and network basket and cable traywork had to be fitted at high level. Innovation What makes this facility so unique is the density of the equipment and the attention to detail on every aspect of the mechanical and electrical infrastructure to utilise and adapt designs to fill every square millimetre of the available floorspace, whilst still maintaining necessary service space to all equipment. The roof space itself is a testament to what can be done with innovative data centre/ mechanical design and planning, the roof is integrated with a staggering 33 x single circuit air-cooled condensers with fan speed control, plus 2 x condensing units serving both Basement Battery Room and Server Room.

Each data centre floor is fitted with 11 x Liebert-Emerson 33kW air-cooled DX "digital scroll" compressor "In-Row" cooling units providing N+1 redundancy, per pod. All heat rejection condensers are mounted on the roof of the building. This type of air conditioning unit runs on R410a

“Zero ODP” Green refrigerant in accordance with F-Gas regulations. The compressor system is also unique in this air conditioning method as the digital scroll concept allows the equipment to match the available cooling load and so provide maximum energy efficiency during the cooling cycle. This facility is a true showcase for what can be achieved when good design and engineering expertise come together to create efficiency and density. This has resulted in the completion of a data centre within a small area that has significantly higher capacity than facilities that are twice its physical size.

Benefits As Finalist at the Datacentredynamics EMEA Awards , what the BelleVue data centre illustrates, as a project, is how often smaller locations for data centres are mistakenly overlooked for a more traditional design and build layout. With careful planning and attention to detail a viable facility can be built to satisfy both the client business requirements and environmental goals. Also, it is essential to step back and look closely at what the market has to offer in terms of energy efficient small footprint products that really fit the bill in a project such as this. Gary Frith, at Sudlows added:

“This was an exciting opportunity for Sudlows to really demonstrate what can be done with an extremely innovative green data centre design. Our project delivery has resulted in the completion of a data centre within a restrictive space that has resulted in generating significantly higher capacity than facilities that are at least 100% larger in scale.”

Summary

1. The roof holds 33x single circuit air-cooled condensers with fan speed control, plus 2 x condensing units serving both the Basement Battery Room and Server Room.
2. Sudlows have managed to design and fit 53x Knurr Miracel Server Cabinets to form highly efficient cold-aisle containment pods on each of the 3 DC floors, providing an impressive capacity of 159 racks.
3. 2 x SDMO 650kVA generators installed in the Basement and combined to run in synchronisation with each other. Three Inverter driven mechanical extract fans to provide N+1 redundancy for the Generator’s ventilation system. Remote radiators were installed externally to reject heat from the generators.
4. A dedicated Electricity Board Room housing (Ring Main Unit) was built. This feeds a 2MW air-cooled transformer in the Basement. The Plant Room houses 3 x 400kVA Riello static UPS systems. ventilated/cooled by filtered fresh-air alone by 3x inverter-driven extract fans at N+1 configuration.

Why nominee should win

1. The roof space itself is a marvel of datacentre design and planning that actually holds a staggering 33x single-circuit air-cooled condensers.
2. With only 400m² available our client challenged us to keep all services within the building, with the exception of the remote generator radiator.
3. The BelleVue datacentre, is an award-winning 1.5MW facility and one of the most densely designed datacentres in the UK.
4. By converting, what was at the time a petrol station forecourt and unused office building, this highly efficient facility is a true showcase for what can be achieved when innovative design and advanced engineering techniques are used.