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# Ecolibrium



## Cooling the cloud



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# Virtuous reality

Following the successful outcome of its first data centre in 2009, Virtus commissioned Norman Disney & Young to develop its second data centre, London2.

As the UK's fastest-growing data centre provider, Virtus has a reputation for its hyper-efficient, ultra-high-density and interconnected facilities. So, it will come as no surprise that the company's brief for its second data centre in Hayes, West London, presented engineering firm Norman Disney & Young (NDY) with a few tricky design parameters.

On the surface, the directive from Virtus for London2 was clear: provide a flexible cost-effective data centre space that was extremely energy-efficient. However, dealing with a fairly compact site meant a phased build and fit-out needed to be achievable from the outset. This resulted in the building being formed into two data hall wings with a perpendicular common spine, which houses plant and landlord areas.

"Virtus had a clear objective to achieve a load density of up to 2kW/m<sup>2</sup> at a very low PUE using a Tier III topology to provide over 65,000 sq ft (6040 m<sup>2</sup>) of data hall space," says NDY director Brian Waddell. "To achieve this brief we worked closely with Virtus to engineer solutions that met, and in some cases, exceeded their brief."

## AN EVOLVING VISION

NDY's initial schemes for London2 looked at using direct fresh air, but this vision evolved after extensive reviews of the indirect cooling options. Evaporative indirect air coolers (EIC) were eventually chosen as the cooling solution and the building's construction was centred on this.

“The installation cost is very similar to a traditional chilled-water solution, but uses around half the energy”

Other key building design decisions included housing the generators inside the building, locating the transformer remotely from the LV switch panel and naturally cooling them, and also providing a dedicated A&B power plant to each data hall.

"Our design solutions included initiatives such as high-efficiency self-scaling modular UPS systems and sophisticated

Indirect fresh-air cooling was used at the Virtus London2 data centre.

## FEATURE

optimised control and monitoring systems,” says Waddell. “But it was the indirect fresh-air cooling supplemented by adiabatic cooling which was key to underlining energy efficiency at Hayes.”

The main mechanical services plant area can accommodate up to nine EICs. These EICs are rated at 400kW net sensible cooling, and feature a compact unitary air handler with integral heat rejection.

At its core, the unit is a high-efficiency plate heat exchanger, and its internal configuration is the key to keeping plant room space optimised.

Outside air enters the unit in through mesh filters, and enters the heat exchanger. The adiabatic sprays are located just behind the filters. The air then passes through the heat exchanger into the outdoor fan plenum (passing over a DX condenser coil) and is exhausted at high velocity through the facade. The entire facade is louvred to handle both the intake and discharge air.

The supply-air temperature set-point for the room is 24°C, with service-level agreements set between 18–27°C. This enables a PUE of < 1.2 to be achieved. According to NDY, the installation cost is very similar to a traditional chilled-water solution, but uses around half the energy.

## POWER AND CAPACITY

The use of free cooling and the subsequent lowering of the load-to-site energy ratio gives Virtus more power to use or capacity to spare.

“We can put a 40kW rack next to a 1kW rack – we just blow cold air into the room and let the racks take as much as they need,” says Virtus construction director Simon Anderson. “If someone has a deployment where they need to mix and match, we can accommodate that. Free cooling has made us more flexible.”

Waddell expects free cooling to bring about better IT load-to-site ratios for power.

“The facility is not operating energy and maintenance-intensive pumps and chillers day in and day out, so Virtus can expect reduced energy costs,” Waddell says. “Virtus will also be saving on the looming emissions taxes. By not incorporating a chilled-water mechanical system, we are able to generate approximately 30 per cent savings on energy expenditure.” ■

### Would you like to know more?

For more info on the London2 project, check out NDY TV on YouTube.



A PUE of less than 1.2 has been achieved.