



Comment Article

360°IT – Green data centres – more than hot air

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Although the green issue isn't a top priority for many organisations at the moment, it's likely to return to prominence as governments attempt to meet self-imposed carbon reduction targets. With data centres in the UK accounting for between 2% and 4% of all power usage (depending on whose figures you believe), they will soon become a major focus. Data centre managers, therefore, should be prepared for a new drive from the business to reduce carbon emissions.

The most obvious target is the under-utilisation of equipment. Quocirca research shows the average Wintel server runs at around 5-10% utilisation. Major improvements can be made by rationalising the number of instances of applications running and consolidating these onto a highly virtualised platform. If physical server utilisation rates can be driven up to, say, 50%, power savings would be considerable. It is slightly more complex to calculate whether replacing older, less efficient servers with new hardware is energy efficient (due to the 'embedded' carbon load involved in disposing of old, and acquiring new, kit), but certainly a full and effective asset lifecycle management policy should be put in place so equipment reaching end of life is replaced and/or recycled.

The next major area is data centre cooling. Most still work on a mass air volume approach, whereby racks of equipment stand in rows and cool air is blown through underfloor spaces into the racks, rising through them and escaping through ceiling vents one or two degrees warmer than its entry temperature. This is not an efficient way to cool equipment. Firstly, unducted cooling means most systems are attempting to cool down the whole data centre - not just the equipment. In most, the air will be at a person-friendly 18°C. Why? CPUs can run perfectly happily at a surface temperature of 60°C, and the vast majority of other IT equipment is perfectly happy at 35°C+ - provided the air is at the right humidity.

By using targeted cooling, such as hot aisle/cold aisle systems and highly ducted air systems, far less air volume needs to be cooled and the areas outside of the aisles can be left to run at their own temperatures. Within the cooled areas, the average temperature can be set to suit the equipment, rather than the humans (who should only be in the data centre to deal with exceptions anyway). Water cooling is also an option, and this has the side benefit of that heat removed can be recovered as relatively high-grade hot water for use outside the data centre.

Even with mass air volume cooling, the use of inefficient systems based around chillers prone to breakdowns can be avoided through the use of systems such as the Kyoto Wheel, an approach that has proven itself in many areas where common sense would say external air temperatures would be too high to support natural cooling. Here, a large (up to 8m diameter) wheel made from a rolled spiral of corrugated metal turns slowly through a four-chambered system. Warm air from the data centre is drawn into one chamber using low velocity fans. As it passes through the corrugations, it transfers its heat to the wheel, and is exhausted back to the data centre through the second chamber at a lower temperature. Cool air from outside is drawn into the third chamber by fans, and cools down the warm wheel as it moves through the corrugations again, exhausting back into the outside through the fourth chamber. This very simple approach has little in the way of failure-prone parts - a slow moving main motor for the wheel, and some low volume fans. The average maintenance schedule involves a quick check of air filters every month or so, and fan and motor checking on an annual basis - far less than standard chiller systems. It is also highly energy efficient, and involves no energy usage in forced cooling of any air volume.

Awareness of such approaches can be valuable when you're suddenly landed with demands from

the business to reduce the data centre's carbon footprint. Energy costs will continue to be volatile in the medium term, and will undoubtedly rise in the long term. Of course, the data centre is only one area where IT can help an organisation in its carbon reduction drive. In my next post I'll look at what we at Quocirca calls "investment green" - using IT to move towards an altogether more sustainable organisation.

About Quocirca

Quocirca is a primary research and analysis company specialising in the business impact of information technology and communications (ITC). With world-wide, native language reach, Quocirca provides in-depth insights into the views of buyers and influencers in large, mid-sized and small organisations. Its analyst team is made up of real-world practitioners with first hand experience of ITC delivery who continuously research and track the industry and its real usage in the markets.

Through researching perceptions, Quocirca uncovers the real hurdles to technology adoption – the personal and political aspects of an organisation's environment and the pressures of the need for demonstrable business value in any implementation. This capability to uncover and report back on the end-user perceptions in the market enables Quocirca to advise on the realities of technology adoption, not the promises.

Quocirca research is always pragmatic, business orientated and conducted in the context of the bigger picture. ITC has the ability to transform businesses and the processes that drive them, but often fails to do so. Quocirca's mission is to help organisations improve their success rate in process enablement through better levels of understanding and the adoption of the correct technologies at the correct time.

Quocirca has a pro-active primary research programme, regularly surveying users, purchasers and resellers of ITC products and services on emerging, evolving and maturing technologies. Over time, Quocirca has built a picture of long term investment trends, providing invaluable information for the whole of the ITC community.

Quocirca works with global and local providers of ITC products and services to help them deliver on the promise that ITC holds for business. Quocirca's clients include Oracle, Microsoft, IBM, O2, T-Mobile, HP, Xerox, EMC, Symantec and Cisco, along with other large and medium sized vendors, service providers and more specialist firms.

Details of Quocirca's work and the services it offers can be found at

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