



## Comment Article

### 360°IT – PUE? Phoey!

By Clive Longbottom, Service Director, Quocirca Ltd

In an attempt to drive greater energy efficiencies, the EU and the US have both recommended data centres drive towards a PUE of 2 or less. "A *what?*"

PUE, or 'power usage effectiveness', is a simple measure of the overall energy efficiency of a data centre, calculated by dividing the total power a data centre consumes by the amount used just for IT (servers, storage, networking kit etc). The second figure should not include any losses through back-up power systems, cooling, lighting etc. The target PUE of 2, therefore, indicates half your energy is used in powering "useful" IT services, and half in providing ancillary services. Simple, effective... and completely misleading.

Why? Take a data centre with 1,000 servers running one application per server on Windows or Linux. According to Quocirca research, each will be running at around 10% resource utilisation. Let's say you have a pretty well-run data centre - for every watt used by the servers / storage / network, you are using 1 watt for cooling and ancillary services. Your PUE is 2 - right on the button.

Now business management says: "Look, guys, the data centre is a very large part of the organisation's total energy budget. We've heard virtualisation can help. Look into it." A reasonable request: if a server estate is completely virtualised, it is possible to drive utilisation rates up to 50% without really trying. (In fact, some have managed to go beyond 80%, but let's keep within the realms of what's easy.) Now the data centre has the capability to run existing workloads on 20% of the original number of physical servers. Throw in data deduplication and the same can probably be done for storage. So you can drive down the energy use of IT equipment by, say, 50% - erring on the conservative side.

Now let's look at the data centre facility. Big operational savings could be made if it was a new build, but capital costs tend to dwarf operational savings, so let's assume it's being retro-fitted. The data centre could be switched to a 'lights out' environment - only using (low-energy) lighting when someone has to go in - this might save a percentage or so of the facility's energy needs. We may also be able to turn off a couple of cooling units, if we're lucky. So let's assume we can lower the facility's energy usage by 20% - a big saving overall, but proportionally less than we've saved on the IT equipment. All this means 50% energy saved at the IT level, and 20% at the facility level.

But as part of last year's annual report, the organisation made much of having a PUE of 2 and said it was committed to leading the world with state-of-the-art data centres. Recalculate the PUE for this data centre - it is far more efficient in all ways, has a lower carbon footprint, and is saving the organisation massive amounts of money. Yet its PUE has gone from 2 to 2.6 - an apparent 30% drop in effectiveness. How do you tell the organisation its next annual report will have to show data centres are nominally less efficient than last year?

The problem is PUE takes no account of how efficiently equipment is being used, so measuring re-architected or refurbished data centres can give shock results. For example, if you run a data centre without any cooling, your PUE will be excellent. However, IT kit will fail often and need replacing - hardly "green" given each item of kit has an associated carbon footprint for manufacturing, transportation and disposal. If, however, an 'effective' PUE was used instead, the measure would be a far more useful means of comparison.

For an effective PUE, take the 'standard' PUE as calculated here and then divide it by the overall utilisation of the equipment used. In this case efficiency is now 50%, so the effective PUE

becomes 2.6/0.5, or 5.2. Previously, with an efficiency of only 10%, it would have been 2/0.1 (i.e. 20 not 2). Using the revised criteria we see a four-fold improvement. (The nominal aim remains the same - the "perfect" data centre would have an effective PUE of 1.)

The standard PUE measure is only really useful for pulling the wool over people's eyes. However, effective PUE (ePUE) would help those who want to optimise data centres in the best way within existing constraints. PUE must die - long live ePUE!

## 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.

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