UK Council of Data Centre Operators
Communication

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Addressing the public sector's residual data centre estate

Just over a decade ago UK government reviewed its data centre estate and discovered that it was inefficient, costly and lacked resilience. The actions that followed to redress these shortcomings included the establishment of Crown Hosting as a joint venture between Cabinet Office and a commercial colocation provider, Ark. The consolidation of a significant proportion of UK government's data centre estate into efficient, resilient and secure facilities has long been held up as an example of best practice and one of the UK's most successful IT change management projects. While it is hard to quantify energy and cost savings exactly (not least because, previously, public sector data centre energy consumption and costs had not been measured, reported or recorded systematically), there is no question that Crown Hosting has transformed efficiency and delivered huge cost savings.

While this is a major achievement, much of the public sector's data centre estate has yet to make the transition and we believe that a significant amount of activity remains on-premises, often in smaller data centres and server rooms, spread across departments, agencies and local authorities. While all this activity is eligible for Crown Hosting services, there seems to be reluctance to consolidate internally or migrate it to where it can be done more cheaply, efficiently and securely. Anecdotal evidence suggests that reasons are behavioural, cultural and may also include misplaced considerations relating to costs[i].

We are concerned that this cohort of data centres lag well behind commercial providers in terms of efficiency, resilience and accountability. In 2018 the EURECA project reviewed 337 local authority data centres in the UK and several other EU nation states. They found an average PUE[ii] of around 5 which compares poorly to commercial colocation data centres where average PUE is around 1.7. This means that in these data centres the facility overhead alone is sixfold that of a commercial provider[iii]. When they looked at the IT function, they reported low utilisation and that 40% of servers were over five years old, consumed 66% of power but only delivered 7% of compute.

Most worryingly, nobody seems to have any idea of the of the scale of these residual assets, what they do, or the criticality of the data being managed therein. While public sector bodies should monitor and report through STAR, compliance is patchy and transparency is poor. Government has also exempted itself from two regulatory requirements that would have helped identify issues and encourage action: SECR, Streamlined Energy and Carbon Reporting and ESOS, the Energy Savings Opportunities Scheme. This means that in effect there is no scrutiny of the largest data centre estate in the UK.

We are also concerned that the resilience of legacy estate may not reflect the criticality of the data housed therein. We raised this disconnect in our Sector Submission under the Adaptation Reporting Power[iv] but the issue is not limited to climate change risks.

We believe Government must lead by example. This means improving transparency and reporting within the public sector estate. As a first step some degree of review or sampling of these assets is needed to establish how many there are. Then spot audits need to be implemented to understand how well they are performing. We have seen figures in the press that the energy *wasted* by legacy on premise facilities of this type in the UK is larger than the aggregate energy consumption of the entire commercial sector. We fervently hope that this is not the case, but we, nor government, are able to refute claims of this type.

Taxpayers are weary of *"do as I say, not as I do"* style of leadership. If Government is committed to the UK achieving its net zero ambitions and protecting the personal data of its citizens, then it must, as a matter of urgency, review its own data centre estate and act upon the findings.

About the UK Council of Data Centre Operators

techUK's Data Centre Council was established in 2009 and comprises twenty individuals who represent the full spectrum of business models across the data centre sector. Members include wholesale and retail colocation providers, cloud and hosting operators and enterprise providers and range from multinationals to SMEs. Some members are professional services providers such as lawyers, analysts and advisors. The Council is a decision-making body providing strategic direction for all techUK's activity relating to data centres. Formal Terms of Reference provide governance. The UK has the largest data centre market in Europe so the Council also takes a close interest in EU policy developments impacting the sector.

For more information see: https://www.techuk.org/data-centres-programme/data-centres-council.html

Further Reading

- EURECA project results at https://cordis.europa.eu/project/id/649972/results
- Resilience risks: Sector Readiness for Climate Change Risks: Data Centres: ARP report to DEFRA 2021
- Estimates for on premise energy use: Data Centre Energy Use: The Viking Helmet (2021)
- Energy reporting of different data centre types: Data Centre Energy Routemap (2019)
- Operational efficiency comparisons: Lost in Migration: Attributing Carbon to Cloud (2019)

You can find more in our Data Centre Programme, Directory of Publications: https://www.techuk.org/data-centres-programme/data-centres-resource-index.html

Contacts

Emma Fryer
Associate Director, techUK
Tel: 01609 772 137
Mob: 07595 410 653
emma.fryer@techuk.org

Lucas Banach
Programme Assistant
Tel: 020 7331 2006
Lucas.banach@techuk.org

Author

Emma Fryer

About techUK

techUK is the UK's leading technology membership organisation, with more than 850 members spread across the UK. We are a network that enables our members to learn from each other and grow in a way which contributes to the country both socially and economically. www.techuk.org

Endnotes

[i] There are plenty of reasons why this happens. One is the business model (see table below). Commercial operators are incentivised to optimise the infrastructure. In house operators with large facilities who are treating the data centre like a business unit are also strongly motivated to optimise both IT and infrastructure. However, distributed IT and small data centres are often just run as part of operational costs. Moreover, they may be starved of the investment needed to make them fit for purpose. They may also be run like private fiefdoms - anecdotal evidence from local authorities includes one that refused to consolidate and outsource because the costs would be €30,000. Their current arrangements were "free". In fact, their current arrangements cost them €150,000 a year: they had just never segregated them from the overall overhead.

Incentives	Commercial	In-house	Distributed
Cost drivers for efficiency: energy as % turnover	Electricity is a high proportion of turnover as data centre operation is the only thing they do	While data centre energy costs may be high, they may not represent a significant proportion of turnover.	Data centre electricity costs are usually not segregated but likely to be a lower proportion of turnover than commercial facilities.
Extent of efficiency measures available	May not own the servers so efficiency measures limited to infrastructure	Own and operate the IT so efficiency measures apply across both infrastructure and IT hardware and software.	Own and operate the IT so efficiency measures apply across both infrastructure and IT hardware and software
Data centre function run as a business unit?	Always run as a business unit.	Data centre may be run as a business unit- costs often transparent.	Data centre activity rarely run as a business unit – costs often hidden in organisational overhead.

The EURECA project's dataset demonstrated that implementing better energy stewardship in multiple individual small data centres could deliver marginal improvements, but consolidating the same activity into larger, purpose-built facilities could be transformational. So the emphasis on changing lightbulbs and adopting variable speed drives in individual data centres is misplaced. It is the equivalent of encouraging 30 people travelling to the same place to drive their cars more conservatively instead of taking a bus together. The real gains are in changing the business model.

[ii] PUE means Power Use Effectiveness and is the ratio of total power delivered to the facility to the power consumed by the IT within it. A high PUE is undesirable as it indicates a high energy overhead and low facility efficiency. PUE cannot go below 1 but the closer to 1 a facility can get, the more efficient it is considered to be. PUE does not indicate overall data centres energy efficiency as it excludes the efficiency of the ICT that it houses. Nevertheless it is a useful trend analysis tool, especially for colocation providers who provide the infrastructure only.

[iii] What this means in practice is that for each KWh used by the IT in these public sector data centres, there is a facility overhead of 4KWh. Compare that to PUE in the colocation sector where the facility overhead is 0.7. This seems to indicate that the on-premise approach to computing is roughly six times less efficient than outsourcing.

[iv] Areas of concern include asymmetric interdependencies, potential gaps within existing industry standards in terms of scope and adoption, access to skills, supply chain bottlenecks and managing climate change risks when activity is offshored. The most pressing concern, however, relates to on-premise data centres and server rooms where resilience may not match the criticality of the activity. This is compounded by lack of transparency and reporting within this cohort and the data that does exist suggests that operational best practice lags far behind the commercial sector. Recommendations include greater scrutiny of on-premise data centres and a review of standards and practices to ensure climate change risks are accommodated.

This is addressed in more detail in our ARP report, section 5.3, page 22: https://www.techuk.org/asset/B31FA710-EEEA-4B88-BA1A0581EB4AE644/