
Data Centres, Carbon and Clouds

Balancing in-house with cloud services

By David Tebbutt, September 2008

In a nutshell:

Commercial and environmental pressures on businesses and IT are leading to profound change

Key points:

- Cloud-based computing can tackle environmental and commercial issues. For some.
 - This requires a rethink of why organisations need large data centres
 - Space and energy savings and lower IT complexity will contribute to the bottom line
 - Almost as a by-product, an organisation would improve its environmental standing
-

The purpose of this paper is to set the data centre and its future evolution into a broader perspective. But, don't expect 'magic bullets'. We don't believe they exist. Your data centre evolution depends on things like the nature of your organisation, the type of data centre or centres, the applications you run, the kit you use, the sensitivity of your data and, indeed, the availability of resources - people, energy, connectivity and so on.

It also depends on where you are on the evolutionary scale, from a rats-nest of silo'ed applications on a jumble of servers to a fully virtualised, consolidated and harmonised environment which is aligned with the business, delivering secure computing services to any authorised user, anywhere in the world, on any device.

Data centre pressures

Power is an issue from both the ballooning cost perspective and from an availability one. Energy costs continue to rise and, unless UK Ltd can sort out its energy strategy or consumers can dramatically cut demand, we are likely to run into power constraints. When push comes to shove, will the government treat data centres as essential services, like hospitals? Unlikely.

The mad side effect of all this power consumption is the heat it generates. CRACs also have to be powered and the waste heat put to good use. Some companies use it for space heating, others for warming the car park in freezing weather. Anything is better than venting it to the atmosphere.

Many organisations have space constraints. Virtualisation may have eased the pressure, but future demands on your services may increase them again. Assuming you can lay your hands on the power.

Organisational pressures

The organisation, too, is under pressure from various sources and these usually find their way down to the data centre. Three things generally rise to the top of organisational concerns – their sequence varies by organisation type and size but they are money, image and regulations.

Regulations have a nasty habit of placing new demands on the data centre for processing and storage. Have you ever encountered a regulation that involves less work? Sarbanes Oxley, Basel II, EU data protection, Freedom of Information, anti-terror laws and so on all add to the administrative burden.

Now we have a biggie on the horizon: the Carbon Reduction Commitment or CRC. It starts in 2010 and could cramp your energy use if you are in the top 5,000 or so companies. It offers rewards to companies that improve their greenhouse gas emissions, paid for out of fines from those companies which do the opposite. That's the theory, anyway.

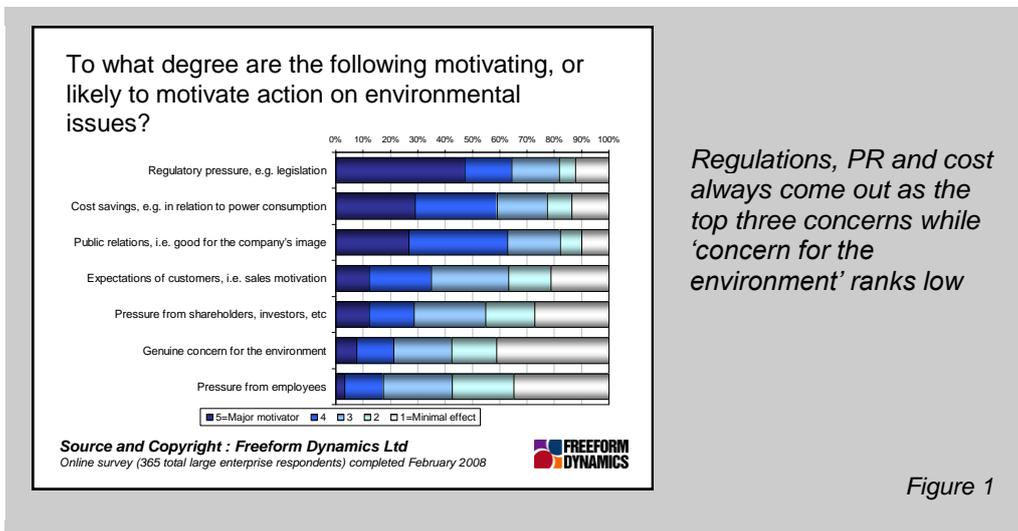
The regulations target indirect emissions caused by the creation of the energy you use, and the direct emissions which result from running the business. This would include fleet vehicles, but not private cars for business use. However, most of the companies I know who are taking this stuff seriously are including business travel of all kinds in their calculations.

If you are a supplier to one of these companies, you are likely to be asked to prove your own environmental credentials in order to continue doing business with them. If your own organisation decides to act responsibly then, sooner or later, you will have to make choices about the equipment you buy and how you dispose of it.

Regulations and reality

Regulation may be the stick, but self-interest is definitely the carrot.

We researched 1474 IT professionals earlier this year and asked them about their organisation's environmental attitudes and initiatives. Guess what? Green as a primary motivator came almost nowhere. No surprise that the top three drivers were money, regulations and PR. Here's the chart for large companies (more than 5000 employees) which represented just under 25 percent of the sample:



We did, however, notice quite a contrast in attitudes to environmental issues between the business and the employees. Employees were generally more willing than management to do things for environmental reasons alone. This does suggest that if management were to introduce green measures for commercial or regulatory reasons, their initiatives would still be readily supported by staff.

What can IT do to help?

IT and the Data Centre can play a key role in supporting the organisation's environmental initiatives. Indeed, a decrease in the Data Centre's environmental efficiency could well deliver a greater environmental benefit to the organisation.

You may have heard mention of some Gartner research which estimated that IT was responsible for two percent of the world's environmental emissions. Effort applied in reducing this is good, and purely in economic terms, worthwhile. However, this does leave another 98 percent to be addressed.

We asked our respondents to tell us how they thought IT might help with their organisation's broader environmental agenda:



It didn't matter which cut we took by company size, the top three positions always involved travel substitution. Whether it's home working, flexible working or videoconferencing, something needs to pump those electrons. And that's IT.

Such measures not only improve the organisation's environmental standing, they can also save money. So this one focus hits the three top drivers: money, regulations and image.

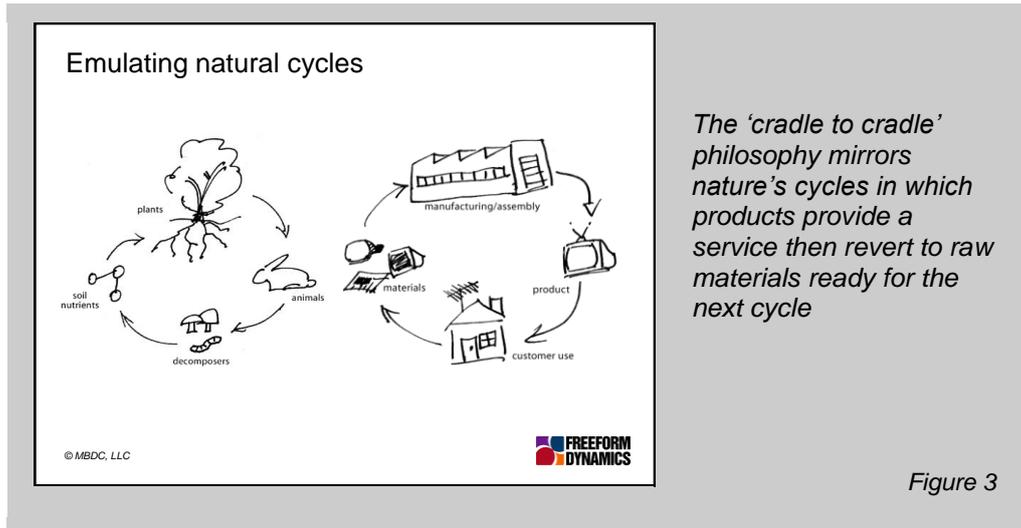
Sustainable development and self interest

If we care about leaving a planet worth living on for future generations, we have to adopt sustainable development practices, globally. The most commonly used definition of sustainable development is that, 'which meets the needs of the present without compromising the ability of future generations to meet their own needs'. That came from the Brundtland report, published in 1987.

It's easy to say the words. What is needed is practical guidance followed by action.

In 2002, William McDonough and Michael Braungart - an architect and a chemist published a book about how to translate the sustainable vision into practical action. It introduces the idea of industrial cycles which mirror the cycles of nature. Rather than "Dust to Rust" or "Cradle to Grave" , their book, called "Cradle to Cradle" emphasises the point that, in the ideal version of their world, industrial processes are closed loops, creating only products and technical nutrients. And products, at the end of their lives, are dismantled back into technical nutrients, hopefully reducing the cost and environmental damage of fresh raw materials.

William McDonough's illustration below makes the point very clearly:



The 'cradle to cradle' philosophy mirrors nature's cycles in which products provide a service then revert to raw materials ready for the next cycle

Figure 3

This has interesting implications because if the product is returned to the manufacturer through a kind of 'unshopping' then what the customer actually buys is the service given by the product during its working life.

Some computer makers are returning to metal casings because of its reusability as a raw material. Others are choosing their plastics carefully to ensure that they can be easily recovered and reused.

We can make choices too. Once you have a shortlist of equivalent machines, you could bring 'lifecycle' considerations to bear.

At the moment these decisions are difficult because sources of objective information are few. But they are growing. Two groups from The British Computer Society are building information bases and simulators to measure the effect of different system choices. Hewlett Packard has similar aspirations. All these databases are planned to be open and extensible.

You can get further guidance from the maker's declarations of Energy Star, EPEAT or Carbon Disclosure Project credentials but, frankly, that's a bit like going into Marks and Spencer and trying to investigate the provenance of the shirt you're about to buy. And, anyway, style, fit and price are likely to influence you more than its embodied carbon or the maker's ethical employment practices.

So what do you do? If you're truly concerned you go to organisations which have made public pledges about environmental responsibility and you trust them. You need to be reasonably certain that they're not just slapping on the greenwash. Companies like IBM, Hewlett Packard and Kyocera have a long-standing commitment and their actions largely follow their words.

However, I would also keep an eye on what organisations such as the Environmental Protection Agency, the Carbon Disclosure Project, the Carbon Trust, the British Computer Society, Intellect, Greenpeace and the World Wildlife Fund are up to.

So where will growth come from?

Here's another worrying fact. Your organisation probably wants to grow. It demands ever more IT services from you and you know that data centre expansion is likely to wipe out any gains over time, certainly in environmental terms.

You've virtualised and consolidated to within an inch of your life. You've shrunk the data centre but consume more power. The space savings help a bit, as long as you have liberated them for something else. But you're at the limits of what you can do. More power isn't available. And, because you're doing everything in-house, you have to be equipped to cope with peak loads and demands keep coming.

One option is to move some or all of the work elsewhere. By virtualising applications, servers, storage and so on, you have made it easier to redistribute your computing resources. And the

internet provides the reach. We are already seeing global companies building data centres near sustainable sources of energy such as geothermal, hydro and solar.

An alternative is to outsource part or all of your work to hosts and service providers. What we probably lack is sufficient trust in hosting providers and in our main connections to the internet. Many European organisations would also need to know exactly under which country's jurisdiction their data is being stored and processed.

The idea (and, 'yes', we are talking about cloud computing here) is that single or multiple data centres at various points on the planet can absorb any workload and provide reliable computing services at a lower environmental and actual cost than we can do it ourselves.

We believe that cloud computing services will become a natural part of the IT mix. Even if we just offload mundane applications, we will liberate local capacity, reduce energy bills and the organisation's carbon footprint.

Sure, the cloud and the related communications equipment will expel their own share of greenhouse gases but, because of the greater efficiencies, these will be lower overall.

The harder part of the equation is the psychological one. Who wants to preside over a shrinking department? Even if that department is delivering more bangs per computing buck? Perhaps a parallel could be drawn with in-house lorry fleets versus the use of logistics companies. They don't make the shipping department any less important but they do take away the non-core activities of buying and maintaining motor vehicles.

We think that companies in general will look to the cloud to carry out non-mission-critical applications, while keeping core activities in-house in a reduced data centre. It means that workload spikes and growth in general can be paid for out of the operational budget.

Taken to the extreme, the company could shed the responsibility for buying and maintaining power-gobbling, complicated and expensive equipment. Not to mention operations staff who don't come cheap. (In the future, a career with a cloud company could be a lot more interesting and rewarding for those who want a decent computing career.)

Everything could, in theory be done in the cloud. But, understandably, the considerable trust that's needed would have to be earned long before this is likely to happen.

About Freeform Dynamics



Freeform Dynamics is a research and analysis firm. We track and report on the business impact of developments in the IT and communications sectors.

As part of this, we use an innovative research methodology to gather feedback directly from those involved in IT strategy, planning, procurement and implementation. Our output is therefore grounded in real-world practicality for use by mainstream business and IT professionals.

For further information or to subscribe to the Freeform Dynamics free research service, please visit www.freeformdynamics.com or contact us via info@freeformdynamics.com.

Terms of Use

This document is Copyright 2008 Freeform Dynamics Ltd. It may be freely duplicated and distributed in its entirety on an individual one to one basis, either electronically or in hard copy form. It may not, however, be disassembled or modified in any way as part of the duplication process. Hosting of the document for download on the Web and/or mass distribution of the document by any means is prohibited unless express permission is obtained from Freeform Dynamics Ltd.

This document is provided for your general information and use only. Neither Freeform Dynamics Ltd nor any third parties provide any warranty or guarantee as to the suitability of the information provided within it for any particular purpose.