

Future Trends: Impact on IT Hosting Costs

Executive Summary

- Traditional IT infrastructure for data storage is too expensive in running costs and housing.
- There are considerable weaknesses in operating static data centres which leave organisations vulnerable in a digital and online age.
- Large data centres are not conducive to an environmentally conscious society.
- The BioDigitalPC® offers highly effective solutions to the challenges presented by traditional data centre installations.

Introduction

A paradigm shift has occurred during the past decade in the way data is stored both privately and professionally. In commercial and industrial sectors, the provision of cost-effective and environmentally friendly IT systems has ascended the list of business priorities to meet tighter budgets and maximise profits. One of the most demanding aspects of this is the availability of space within business premises. For many organisations, locating their premises in a prestigious or publicly accessible location is vital, however this comes with considerable costs - particularly within highly competitive markets like London. The traditional IT plan of a computer and telecommunications network supported by a server room with racks of servers and data centres is no longer fit for purpose. They are expensive in both energy costs and real estate as well as being fundamentally unsustainable in a more environmentally conscious society. Furthermore, they lack the flexibility required by dynamic organisations that have both fixed offices and mobile or temporary workplaces.

Energy Costs

Due to the increasing demands from a rapidly growing middle class in developing nations, energy costs are climbing. If current trends continue, it is predicted that globally there will be up to a 135% rise in energy requirements to meet demand.

In addition, many of the UK's electricity generation plants are closing down due to the EU's Large Combustion Plant Directive - which focuses on anti-pollution legislation. This will result in a reduction of energy supply, as coal and gas-fired plants are retired². According to a recent Npower report, the cost of transporting energy will also have risen 124% between 2007 – 2020³ as infrastructure is updated to accommodate lower carbon technologies.

On top of this, policy and regulation costs are expected to rise by 78% between 2013 and 2020. This cost will help pay for the UK's move to a low carbon economy and significantly



¹ Exxon Mobil, 'ExxonMobil's Outlook for Energy Sees Global Increase in Future Demand', Dec 14, <<http://news.exxonmobil.com/press-release/exxonmobils-outlook-energy-sees-global-increase-future-demand>>.

² Terry Macalister, 'Price of electricity could double over next 20 years, says National Grid', July 14,

<<https://www.theguardian.com/environment/2014/jul/10/price-electricity-double-next-20-years-national-grid>>.

³ Npower, 'The changing cost of UK energy', Jan 14, <http://www.npower.com/idc/groups/wcms_content/@wcms/@corp/documents/business/ee_latest_report.pdf>.

improve the energy efficiency of the UK's housing stock.

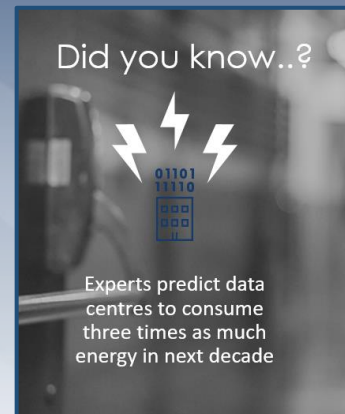
The culmination of the above means that the average annual UK energy bill will have risen from £954 in 2007 to £1,487 in 2020, as energy suppliers pass these increasing costs on to the end consumers. To further demonstrate, in 2014, wholesale electricity cost below £50 per megawatt hour - but this could soar to over £100 by 2035 under a 'high case' example used in the 4National Grid's UK Future Energy Scenarios report. The group, which is the main pipes and pylons operator in England and Wales, also predicts the wholesale gas price could rise from 70p per therm to around 100p per therm under another high case scenario.

These high prices will be a continually growing burden on the budgets of organisations of all sizes that use traditional data centres. To maximise profits and outputs, organisations need to use the space they have as efficiently as possible. Traditional data centres use large amounts of space, require lots of energy to operate and are often completely static. All of this is counterintuitive in the twenty first century.

Costs of housing data centres

According to Accenture, 50% of energy expenditure on server infrastructure maintenance is estimated to go on cooling, and only 50% on powering them. One server can use between 500 to 1,200 watts per hour. If the average use is 850 watts per hour, multiplied by 24 that equals 20,400 watts daily, or 20.4 kilowatts (kWh). Multiply that by 365 days a year for 7,446 kWh per year.

The average commercial electricity costs range between 10 to 13 pence per kilowatt/hour. If we took the low-end costs of 10 pence per kWh, it would cost £745 to power the aforementioned server for one year.



A 7University College London study placed average office costs per square foot per month in London at £52.50. The average size of a small telecommunications/server room (up to 5 racks) is 40 sq ft, and a large telecommunications/server room (up to 30 racks) is 120sq ft. This means, the cost of housing even a small server room in a London office could be approximately 8£25,000 annually.

These significant energy and office space costs quickly add up, and have a detrimental effect on a company's performance. This is particularly significant when you consider that a 20% cut in energy costs represents the same bottom line benefit as a 5% increase in sales in many businesses. 9

Future Technology Trends

As the world moves increasing amounts of its interactions online, it is absolutely critical for organisations to have reliable and robust IT infrastructure. For businesses to function effectively, they need to be able to communicate with their clients and customers quickly, efficiently and at all times. The rising

⁴ National Grid, 'Future Energy Scenarios', Jul 16, <<http://www2.nationalgrid.com/uk/industry-information/future-of-energy/future-energy-scenarios/>>.

⁵ Barrett, J.T, 'How much electricity does a computer use per hour', Nov 16, <http://www.ehow.com/info_8763694_much-computer-use-per-hour.html>.

⁶ Schneider Electric, 'Reducing the cost of cooling server rooms', Nov 16, <http://www.kellsystems.co.uk/cost_of_cooling.asp>.

⁷ UCL, 'Capital of Entrepreneurs', Feb 16, <<https://www.mgmt.ucl.ac.uk/capital-of-entrepreneurs>>.

⁸ Zoopla, 'Office Space Calculator', Nov 16, <<http://www.zoopla.co.uk/commercial/space-calculator/>>.

⁹ Auditel, 'Energy Management Facts and Figures', Nov 16, <<http://auditel.co.uk/costs-sectors/energy-management/energy-facts/>>.

costs of operating on-site data centres is clear, but what must also be considered is the additional costs associated with these data centres breaking down. In a society that relies so heavily on the internet of things, there are huge risks associated with breakdowns in infrastructure: ¹⁰Productivity declines as employees cannot perform their regular duties. Recovery costs can be considerable both in terms of restoring lost data and the loss of opportunity while systems are down. Customer loss is one of the longest lasting as the effects of this can be felt long after the breakdown is fixed. Reputation damage can occur quicker than ever in the age of social media and this can have a further knock-on effect on shareholder value.

Furthermore, as traditional IT costs rise, organisations must look for cost-effective ways to deliver the services which provide the daily support to their business operations. For example, ¹¹big data analytics are absolutely essential in competitive markets to make faster and better business decisions, as well as giving companies the ability to listen to customers and provide for their demands. This, however, is something that will take up huge amounts of server space and power. A McKinsey and Company report found that the average data centre uses just 6 to 12 percent of its electricity for actual computation. The rest "was essentially used to keep servers idling and ready in case of a surge in activity that could slow or crash their operations". This further demonstrates the necessity for businesses of all sizes to rethink their IT

¹⁰ Stratus Technologies White Paper, 'The Cost of Critical Application Failure', Nov 16, <<http://www.stratus.com/assets/Cost-Of-Critical-App-Downtime1.pdf>> .

¹¹ Oremus. W, 'Big Data's Dark Side: A Massive, Polluting Drain on the Nation's Power Supply', Nov 16, <http://www.slate.com/blogs/future_tense/2012/09/24/big

operations and look for cost-effective, cloud-based, lower maintenance solutions to the growing problems of data storage in the 21st century.

Finally, the rapid growth of new technologies and their introduction into mainstream

society must also be considered.

Artificial Intelligence (AI) is gradually climbing out of the pages of science fiction and

into reality as the biggest tech companies throw themselves into research and development of this ground-breaking technology. AI and other forms of machine intelligence are already transforming numerous fields including ¹²medicine, communications, manufacturing and transportation. However, these developments require enormous computing power to simulate even tiny proportions of the power of a human brain. It has been stated that to simulate just one second of human brain activity requires ¹³82,944 processors. Clearly not every organisation that uses AI is going to require this enormous amount of processing infrastructure. However, as technology trends continue to evolve in this direction, it is not unreasonable to suggest that any organisation wishing to utilise AI is going to require an exponential amount of computing power as it develops.

Conclusions

It is abundantly clear that IT operating costs are only going to grow if organisations fail to evolve and consider new alternatives to static data centres. Electricity costs will continue to rise until demand is comfortably met on a

There is an increasing demand for cloud based infrastructure, flexible and mobile IT services and data security

_data_pollution_cloud_servers_waste_electricity_on_massive_scale_new_york_times_finds_.html>.

¹² Hof. Robert.D, 'MIT Technology Review, Deep Learning', Nov 16 <<https://www.technologyreview.com/s/513696/deep-learning/>>.

¹³ Whitwam.R, Extreme Tech, Aug 13, <<http://www.extremetech.com/extreme/163051-simulating-1-second-of-human-brain-activity-takes-82944-processors>>.

global scale. This will eat into any organisation's bottom line at a considerable rate if they continue to operate the same resource-thirsty IT infrastructure.

Therefore, the most effective solutions will be those that offer cost-effective and flexible hardware with no loss in computing power or storage and are sustainable long-term.

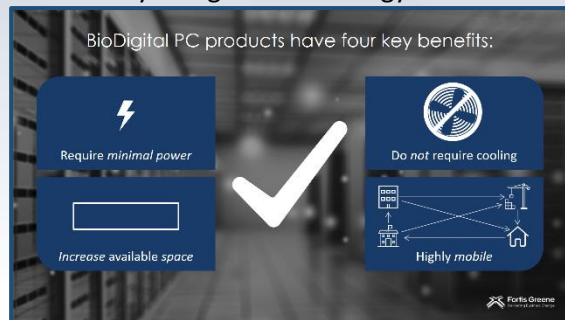
¹⁴Industry leaders state that it is becoming widely accepted that most businesses will eventually move away from on-premises data storage and IT solutions. From a financial, technical and social point of view, the requirements for IT services are changing due to modern users requiring greater flexibility and mobility from their IT infrastructure. As it stands, the amount of energy used by data centres is ¹⁵doubling every four years. This is an unsustainable level of growth, and highlights the need for a technological shift.

The BioDigitalPC® Solution

As companies move to more flexible workforces with global reach, static IT solutions with their location-based constraints are no longer keeping up. They require high fixed costs with large demands on valuable space – particularly in city centre offices. This is where the BioDigitalPC® range will prove to be invaluable. The different products on offer will provide flexible and value-for-money solutions for businesses of any size.

The BioDigitalPC® is the first fully functional, credit-card-sized x86 computer on the market. With up to a 1.91GHz quad-core Intel processor, 8GB of DDR3 RAM and dimensions

of 84 x 54 x 6.5mm, you can carry your entire computer in your wallet. It uses 90% less power than a regular desktop and server, meaning the average user will save approximately £670¹⁶ per year, per server in energy costs, (when switching from standard servers). These savings are likely to increase even further year on year if we consider the aforementioned predictions from both Npower and the National Grid on the continually rising costs of energy.



It incorporates a host of security features; including a biometric fingerprint reader and epoxy encapsulation and it can run on all operating systems. As soon as it is plugged into a docking station it is ready to use as a powerful computer. It is also built to military specifications, making it extremely durable.

The BioDigitalPC® provides a scalable technology, as it can be integrated with other products in the range to produce mobile datacentres to fit businesses of every size

The MDC8 is a mobile alternative to server rooms and data centres for small businesses. For example, allowing building sites having a copy of their data centre on site for easy immediate access to files and applications. It

measures 7.12" x 13.25" x 8.62" and runs off the power of 3 light bulbs.

The MDC22 will suit businesses replacing a server room in an office block to free up space. It measures 21.7" x 14.1" x 8.9", and

¹⁴ Mincov. R, '10 steps to understanding your IT before moving to cloud', Apr 16, <<https://www.ibm.com/blogs/cloud-computing/2016/04/10-steps-to-understanding-your-it-before-moving-to-cloud/>>.

¹⁵ Bawden. T, 'Data centres to consume three times as much energy in next decade', Jan 16,

<<https://www.ibm.com/blogs/cloud-computing/2016/04/10-steps-to-understanding-your-it-before-moving-to-cloud/>>.

¹⁶ Assuming a use of 7,446kWh per year, at a cost of 10p per kWh.

can hold up to 22 BioDigitalPC® cards. This results in 22-88 CPU cores, 88 CPU threads 44-176GB DDR3 RAM and up to 2.8TB on board SSD.

The SR-90 is a direct replacement for large scale data centres. Each rack takes up one eighth of the space of a standard data centre rack, meaning a London-based company housing 30 data racks could save around £66,000¹⁷ in annual office rental space costs by making the switch. Its specification includes: 2U retractable shelf server, 90 to 360 CPU cores, 180 to 720 DDR3 RAM and up to 11.5TB on board SSD storage.

When it comes to upgrading, the only part you'll need to replace is the card itself – whereas historically an upgrade has involved the disposal of significant hardware, all at a high replacement value. You can even re-use cards used as servers in the MDC8, MDC22 and SR-90 as a desktop computer, providing further cost savings.

In summary, the BioDigitalPC® products have 4 key benefits:

- Highly mobile
- Space saving
- Requiring minimal power
- Do not require cooling

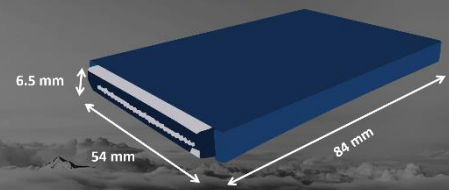
All of the above add up to higher profits, and a reduction in environmental impact.

[Click here to find out more about Fortis Greene and BioDigitalPC®](#)

¹⁷ Assuming a monthly rental cost of £52.50 per sq ft. Space required would drop from 120sq ft for 30 racks to 15sq ft for 30 SR-90s.

The BioDigitalPC® Product Range:

The BioDigitalPC is the first fully functional, credit card sized x86 computer on the market



Once it's plugged into a docking station it's ready to use as a powerful computer



MDC8

A mobile alternative to server rooms and small data centres for small businesses



MDC22 (data centre in a box)

A mobile alternative to server rooms and small data centres for medium businesses



SR-90

A direct replacement for large scale data centres

