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CLOUD COMPUTING: GOING GREEN

From sustainable supply chains to scalable infastructures, the cloud offers many environmental benefits, say thought leaders in cloud services

Cloud computing is fast becoming 'the' buzzword in the business world. For many, it represents the platform for the next generation enterprise, promising low total cost of ownership (TCO), high scalability and an easy pay-as-you-go cost structure. These advantages and more are driving its adoption across businesses around the world and are causing leading IT companies to focus their energies on the cloud and the applications that can be derived from it.

Microsoft is no exception. Addressing an audience of several hundred students and professors at the University of Washington earlier this year, the company's CEO Steve Ballmer gave his strongest indication yet of the company's commitment to cloud computing: "As I like to say at Microsoft, for the cloud we're all in." With 70 per cent of its employees already focused on innovation in the cloud and its major software offerings already geared up to take advantage of it, the company is confident that this is where the future lies. "There is incredible opportunity in the cloud, incredible opportunity," says Ballmer. "There will be more inventors creating more interesting innovations and having better access to customers globally. The opportunity, and the opportunity for companies like ours to build the infrastructure to enable that is quite high."

While there are already signs of companies looking to move to the cloud, Microsoft and its counterparts still have some way to go to convince their customers of its true potential. One major benefit that isn't highlighted as much as it could be, for example, is the green aspect. By moving data centres to the cloud, companies can significantly reduce their power consumption – something that will have a considerable impact on their carbon footprint. "Few companies have the capability of tapping into US$9.5 billion of research and development that Microsoft supports (company-wide) per year," says Kevin Timmons, Microsoft's general manager of data centre services. "And we hope that by sharing our key learnings and best practices that we can help the industry, as a whole, work together to drive greater efficiencies through our cloud services infrastructures and collectively reduce our carbon wastes."

In this roundtable, we address some misconceptions about the cloud, and find out more from Microsoft and some of its key partners about why this is the path to a greener future and how it will help the manufacturing and resources sector.

Can you start by explaining the green benefits of moving to the cloud?

Rohit Bhargava, worldwide industry technology strategist for manufacturing, Microsoft: Lets take a look at the direct benefits to the environment. According to our customers and most analysts, private data centres are using as little as 20 per cent of their server capacity, but even at idle these servers consume 60-70 per cent of their power. Even without considering the additional sustainability benefits to be achieved from the scale and efficiency of commercial data centres, or the proactive monitoring of energy usage, private data centres can potentially quadruple utilisation to 80 per cent with only a 50 per cent increase in power consumption.

Colin Masson, worldwide director for ERP and supply chain, Microsoft: Beyond the direct energy and carbon footprint benefits that can be attained by migrating existing IT to the cloud, it is also a key enabler of sustainable supply chains. Not only does the cloud address the issue of providing affordable access to traditional supply chain applications, it also enables a whole new class of multi-enterprise supply chain visibility and collaboration capability, that was previously technically challenging and costly to deliver. With enhanced visibility of inventory, quality, supply capability and demand fluctuations, we can expect to see reduced inventory, increased capacity utilisation and less waste in entire industry and multi-industry supply chains.

Bernd Kosch, green IT advisor, Fujitsu Technology Solutions: Among the various green benefits of the cloud computing paradigm, there is one which is exceptionally striking: cloud computing enables small and medium enterprises (SMEs) to take full advantage of very large scale data centre technology, including the latest, most energy-efficient hardware provided in the shortest refresh cycles and leading facility-related infrastructure with advanced power utilisation effectiveness.

Steven Smith, co-founder and president, Gcommerce: Gcommerce has created an automated electronic highway for procurement using the cloud. It represents a new transformative wave of business innovation that extends capabilities beyond the four walls of a company. It's not about technology, it's about process. It's about changing cultural legacies of using the phone, fax and paper. Our Virtual Inventory Cloud (VIC), built on Microsoft's SQL Azure, is transforming the special order process. At the moment we are processing more than 25 million orders per year, creating as much as US$155 million in savings, that otherwise would be borne as cost to thousands of companies in the form of human and paper-based waste.

David Gustovich, founder and CEO, IQity Solutions: One of the primary advantages of cloud computing is for small and medium sized enterprises to instantly obtain the benefits of a complete, scalable IT infrastructure without having to implement and administer it directly. In theory, many companies can share the IT infrastructure of a few providers which, in turn, should reduce the overall energy consumption of SMEs worldwide. From a green perspective, as cloud computing gains momentum, the overall carbon footprint of SMEs should decrease considerably.

James Butler, head of client services and strategy, Program Framework: We look at utilisation as being a critical driver for moving to the cloud and why organisations would want to go that way. Other benefits include power savings, consolidation, preventing the sprawl of the physical resources in data centres and offices and moving these to a central location, and being able to divest assets that aren't needed in organisations and instead focus on core competencies – for instance, strategic and core IT. So why have a mass of IT staff maintaining servers when actually it is possible to go to a cloud organisation and have it look after the services that we need as an organisation?

Clearly the cloud helps individual manufacturing firms to reduce their carbon footprint. However, to host the cloud infrastructure, Microsoft houses hundreds of thousands of servers in its facilities which have a tremendous impact on the environment. Can you explain why this is still a more environmentally friendly route to take?

CM: At Microsoft, our goal is to reduce the impact of our operations and products, and to be a leader in environmental responsibility. Throughout our data centre operations our approach is to build sustainability in from the ground up; run sustainably every day by managing heat in data centre environments; measure constantly; and share best practices with the industry.

SS: Microsoft has the ability to create far greater transactional efficiency in its data centres. If a train can carry one million passengers per day and one million cars carry a passenger each, which of the two transportation mediums is more energy efficient and friendly to the environment? Clearly, it's the train. Therefore, one data centre serving millions of customers is far more efficient than one million customers with their own data centres. Too often companies have slack capacity. These are an unnecessary waste of resources. Microsoft's data centres will run at full capacity offering far better use of natural and manmade resources.

DG: Even with a company like Microsoft housing hundreds of thousands of servers, I expect that the total number of servers that would be needed to supply the global SME marketplace dwarfs the number required for a much smaller number of cloud computing providers. Logically, the total number of hardware units still should decrease. A less obvious effect of the cloud computing trend could be that hardware manufacturers sell less volume, but provide more powerful hardware solutions that accommodate the requirements of the cloud market. In this regard, cloud computing may catalyse new innovations

that trickle down to consumer-level computers and laptops from the corporate-grade solutions that the cloud market dictates. This outcome would decrease energy consumption, not only for cloud providers, but also every household in the world with respect to use of consumer-level desktops and laptops.

BK: As a consequence of their large scale, power efficiency plays a much bigger role in cloud data centres than it does in a typical SME. In today's mega data centres the primary business case is about price/performance/power. This is drastically different from SME-scale IT shops where the relative importance of the power bill is much smaller. Therefore, turning to the cloud in many cases means moving to much higher levels of IT-related energy efficiency.

JB: This highlights a couple of things. Firstly, the green success or otherwise will be dependent on many factors, but given the power requirements of cloud computing organisations, such as Microsoft, they will be in a very strong market position to demand greener energy supplies from energy companies. A Greenpeace study showed that by 2020 we'll be consuming around over 1,900 billion kilowatt hours of electricity through computer offerings. If that's true, we can say that this level of demand will drive greater efficiencies in the supply of power. This can only be a positive outcome. Secondly, they will be able to further exploit their market position by demanding greener infrastructure products and designs from suppliers. This could be anything from the energy efficiency of the building, through the design of server processors.

At the recent Global Energy Forum Steve Ballmer told attendees that "You will move, there's no question, to private cloud." Does a move to the private cloud (virtualisation) still offer sustainability benefits?

RB: Yes, even though private data centres will not achieve the scale and efficiency of Microsoft data centres, the application of Microsoft virtualisation technologies still yields significant sustainability benefits by increasing capacity utilisation, and reducing servers, real estate, power consumption, costs and the company's carbon footprint. And of course by lowering TCO, they are also freeing up their IT staff from maintenance of infrastructure, and enabling a new era of innovation and productivity.

BK: Virtualisation enables increased resource use and since in all server systems power consumption is not perfectly proportional to performance, this results in improved energy efficiency. In the future, this phenomenon will be extended to the facility elements in large data centres: in periods of low overall load, virtual machines can be concentrated in physically close real servers while all others can be switched off. Also, when all servers on a cold aisle are stopped, then the respective cold air supply can be shut down too. Over time, the green IT-related scale effects in large data centres will increase (the mentioned link between server and facility controls has recently entered into standardisation efforts).

JB: One of the criticisms you could level at cloud computing is that although it drives greater efficiency, because of that efficiency it is driving greater demand for new services, so its overall impact increases. However, a private cloud can be specifically 'right sized' for the organisation in question. Private clouds also offer other advantages such as organisations having more direct control of their IT operations and thus greater security, and the ability to personalise as necessary.

SS: We are currently running a private cloud that doesn't differentiate between a private and public cloud. There is a need for both due to the local machine access requirements of some of our transactional middleware. We believe that we will run a hybrid model for a long time.

DG: Given concerns about security and reliability, many larger enterprises are hesitant to entrust their IT operations to a publicly shared infrastructure, even if it's cheaper. Those companies increasingly have another alternative, the private cloud. On the surface, the move to private clouds seems that it would not provide the same level of green impact as publicly shared solutions. This perception is driven by the idea that virtualisation simply dictates a larger number of cloud implementations and hence more hardware. However, if providers of private clouds leverage subject matter expertise in IT infrastructure, then these implementations could perform with greater efficiency and require less energy.

Do you really think there will be a day when 100 per cent of companies across all manufacturing and resources sectors will be working in the cloud? What are Microsoft and its partners doing to ensure a seamless path forward from today's traditional data centre environment?

CM: First, let's consider what the analysts are saying. IDC predicts increasing adoption of software as a service and believes that the most successful approach to the market is to offer flexibility in licensing, pricing and deployment models as customers increasingly demand options. According to Gartner: "Microsoft's single-biggest differentiator, from an enterprise IT perspective, is its enterprise installed base and ability to deliver services that span the enterprise and the cloud (for example, an organisation can choose to host the central Exchange implementation on-premise and can use Microsoft's cloud-based Exchange Online services for branch offices). A mixed environment will be the norm for most enterprises for many years."

At Microsoft, we've fully embraced cloud computing. We see the huge opportunity that it represents for our customers, yet at the same time we truly believe that enterprises want choice. What we're talking about here is an industry shift to software PLUS services, not software OR services. At Microsoft, we aren't going to force you to choose one or the other. Instead, you can choose whatever combination works best for you, and we give you the flexibility to change that combination as your business needs change.

DG: If the performance, reliability and security of cloud computing solutions meet the high standards of the marketplace, then I believe that this is a distinct possibility. Microsoft partners are standardising their solutions on Microsoft's array of cloud enabling software technology, such as ASP .NET technology. Microsoft is clearly developing its technology as a foundation for cloud computing providers to satisfy the requirements of performance, reliability and security. I believe that Microsoft's innovation in this area is essential to the growth of the cloud marketplace as a whole and for significant benefits of a greener world.

BK: Even in the very long term, there will be some technologies that reside outside of any form of cloud. When concerns about security and privacy have disappeared, there will be other reasons to have some very specific parts of IT on premise under direct control of all infrastructure, although this may create incremental cost. The major task and challenge for the IT industry will be to enable smooth transition and co-existence of cloud and the traditional deployment paradigm, thus supporting the most rational choices of IT users.

SS: Without question, the cloud delivers the agility, efficiency and scalability needed to transform supply chain processes. Nearly 100 per cent of all companies will work in the cloud, but to what extent remains to be seen. People use apps that are cloud based today, so the barrier to entry and the hesitancy to embrace the cloud get lower every day. Eventually, we will not differentiate between on premise, private and public cloud. It will be one seamless experience that connects the enterprise inside and outside its four walls.

GCommerce's VIC promises to allow millions of customers to connect to hundreds of thousands of installers and jobber stores connecting to thousands of commercial buyers and suppliers. VIC, and many solutions like it, will become the lingua franca of the future of offline and online commerce.

JB: I'm optimistic about the future uptake of cloud computing in the sector, but with the caveat that it won't really take off until manufacturing companies put fundamental and organisation-wide environmental strategies in place. What I mean by that is if an IT director in an organisation wants to move to a greener solution, such as the cloud, it is generally perceived as an IT-driven green policy, which may not be enough to garner support across the whole business. However, in organisations that have developed an overall environmental strategy that is tied to driving improvements not only in the carbon footprint of the organisation but also in its bottom line performance, you get a situation where green IT becomes a strand of this policy and enjoys support at CxO level. An example of this is Plan A at the leading UK retailer Marks & Spencer. It is at this point that the cloud will start to have a real impact and only then will organisations be convinced of its true potential.