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† "Business Partner" is used informally and does not imply a legal partnership.

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070827 IBM Server for Text 100

Sustainability Victoria finds IBM blade servers a powerful solution to a heated issue

Overview

- ***Problem***
  Sustainability Victoria wanted to build a model office that achieved the highest energy-efficiency rankings from the Australian Business Greenhouse Rating and the Green Building Council Australia. Recognising that office technology accounted for 75 percent of energy usage, it looked for ways to reduce power consumption in its data centre.
- ***Solution***
  Working with a variety of consultants and IBM Business Partners† IQT Systems and Southern Cross Computer Systems (SCCS), Sustainability Victoria designed and built a new data centre based around IBM BladeCenter blade servers. It further reduced power consumption by consolidating server roles. It now aims to make more efficient use of its resources through virtualisation.
- ***Benefits***
  Moving to an IBM blade server environment and consolidating server roles allowed Sustainability Victoria to reduce server power consumption by 68 percent.
  The resulting reduction in heat also allowed it to install a smaller climate control system. Through this project, the government agency developed a set of best practices that other organisations across the state could follow.
- ***About Sustainability Victoria***
  Sustainability Victoria is the Victorian Government's lead agency on climate change. It is dedicated to helping Victorians to build sustainability into everyday decisions and showing the way to use resources more efficiently. to reduce our environmental impact.

Sustainability victoria

Following the Green Star to the server room

An organisation that practices what it preaches, Sustainability Victoria tries to minimise its ecological footprint by increasing energy efficiency, reducing waste, recycling and minimising water use.

After its formation in October 2005 from an amalgamation of two different government agencies with three separate locations, in October 2006 Sustainability Victoria moved to a new office. The agency saw a chance to create a model office for energy-efficient technology usage. It hoped to achieve the five-star Australian Business Greenhouse Rating and six-star certification from the Green Building Council Australia.

Sustainability Victoria engaged consulting firm Sinclair Knight Merz to manage that process. Sinclair Knight Merz's analysis found that office technology such as PCs, printers, faxes, phone systems and servers accounted for 75 percent of the organisation's power consumption, more than half of which was taken up by the server room.

Sustainability Victoria also engaged HP's consulting division to gain a better understanding of its servers' power consumption.

"HP told us it would be difficult to achieve the Green Star ratings we wanted while still meeting our existing technology requirements and maintaining the systems we had in place," said Geoff Mabbett, Chief Executive Officer, Sustainability Victoria.

"HP's report also showed us that our servers were massively underutilised," explained Patrick O'Brien, ICT and Facilities Manager at Sustainability Victoria. "The highest level of usage was 25 percent, while some were averaging as low as five percent. HP said this was fairly standard across the IT industry but we knew there had to be a better way to do things."

Finding a vendor that understood sustainability

An obvious place to start was removing some duplicated servers, a legacy of the time Sustainability Victoria was two agencies in three offices. However, beyond this basic level of consolidation, most vendors could not to come to terms with the organisation's core requirements.

"We sat down with a number of vendors and tried to work out how we could build a new server room from scratch that was designed to minimise energy usage," said Mabbett, "None of the vendors we spoke to really grasped what we were getting at. Even though sustainability was a really hot topic, they really didn't understand our needs. But when we spoke to IBM, they got the idea straight away."

> *"Sustainability is something we're very passionate about, so it was a relief to find a vendor that spoke the same language."*
>
> *– Geoff Mabbett*

IBM BladeCenter blade servers deliver superb energy efficiency

Sustainability Victoria called on IBM Business Partner† IQT Systems to review the figures provided by Sinclair Knight Merz and HP and develop a plan to reduce power consumption in its server room.

Sustainability Victoria then worked with IBM and Business Partner Southern Cross Computer Systems to design and build a new datacentre and migrate the servers from its previous offices into the new environment. It comprised:

- One IBM BladeCenter chassis
- 14 IBM BladeCenter HS21 blade servers
- One IBM System x346 server
- One IBM TotalStorage DS4700 storage area network
- One IBM tape library
- Two APC 5KVa uninterruptible power supplies.

The energy efficiency of IBM blade servers brought Sustainability Victoria a long way towards meeting the targets required for the five- and six-star ratings it sought.

IBM BladeCenter servers are designed to reduce power consumption for high-density data centre environments, with efficient power supplies and advanced cooling technology," said Patrick Lee, IBM Certified Consulting Technical Specialist. "By using one set of common power, networking and storage connections in the BladeCenter chassis, our blade servers have fewer duplicated components than the same number of rack-mounted or stand-alone servers."

However, Sustainability Victoria wanted to go further. It aimed to set a leading example of energy conservation practices that other businesses in the state could follow. In doing so, it challenged a number of orthodoxies in data centre design.

"IT engineers are trained to think about risk reduction and issues such as reliability, flexibility and costs," said O'Brien.

> *"We wanted to show by example that by extending this awareness to include environmental impacts and implications, such as energy consumption, heat generation, efficiency of air conditioning systems and operating innovations. This is an approach that will become much more important in the future."*
>
> *– Patrick O'Brien*

The energy efficiency of IBM blade servers brought Sustainability Victoria a long way towards meeting the targets required for the five- and six-star ratings it sought.

The benefits of understanding the options available and including them in their strategic planning can have real benefits to an organisation's operating costs as well as their environmental footprint, said O'Brien.

IBM, IQT Systems and Southern Cross helped Sustainability Victoria find additional opportunities for efficiency by consolidating the roles of common servers such as databases and web servers.

"IT engineers are trained to use a single server for each application, but this isn't always necessary," said O'Brien. "If we had four different applications, we could host them all on a single server rather than four separate ones."

In addition to these server room changes, Sustainability Victoria reviewed other aspects of its office operations to see where it could reduce power usage. For example, it replaced its desktop computers with notebooks and ergonomic stands that allowed staff to use the notebooks' built-in displays. Notebooks typically use around 80 percent less power than desktop PCs.

Power consumption cut by 68 percent

Sinclair Knight Merz estimated that before the migration, Sustainability Victoria's servers consumed more than 120 MWh of electricity per year.

"By migrating to IBM blade servers alone, we would have reduced power consumption by 53 percent," said O'Brien. "Through consolidation, we reduced the number of servers we needed from 20 to 13 and managed to get power consumption down to around 39 MWh a year – that's a saving of 68 percent."

With fewer servers and a smaller uninterruptible power supply, Sustainability Victoria also significantly reduced the heat generated by its server room. IBM provided figures that allowed Sustainability Victoria to accurately estimate the cooling requirements of the new data centre.

"Air conditioning is a major source of power consumption," said O'Brien.

> *"The ability to better manage heat meant we were able to install a much smaller air conditioning system than we originally thought we would need."*
>
> *– Patrick O'Brien*

Most importantly, Sustainability Victoria developed a range of practices and principles that could be applied to just about any organisation wishing to reduce power consumption in its data centre.

"For instance, commodity servers running Microsoft Windows or Linux usually have vast amounts of unused processing power," said O'Brien. "That capacity can be taken up by co-hosting multiple applications on a single server or running several virtual servers on the one machine."

Future plans

With these basic elements in place, Sustainability Victoria aims to turn another conventional wisdom on its head: that all servers need to run full bore 24 hours a day.

"There's no point running servers that aren't being used, particularly outside business hours," said O'Brien. "We're planning to use IBM's management tools to reduce the power consumption of non-critical servers at nights and on weekends by capping the power consumption of server processors.

"We plan to continue to use server virtualisation technology to achieve further consolidation and more efficient utilisation of technology resources.

"We are also evaluating the best temperature for the server room. Most organisations keep them at an arbitrary figure of 20°C (68°F), however hardware vendors recommendations for the operating temperature is between 10° to 35° C (50° to 95° F). We have made significant power savings by adjusting the temperature of the server room by 5°C warmer."

> *"We have made significant power savings by adjusting the temperature of the server room by 5°C warmer."*
>
> *– Patrick O'Brien*