Flintshire shrinks its server landscape with IBM System x and VMware

Overview

The Challenge
Aiming to increase the flexibility and efficiency of its Windows server landscape, Flintshire wanted to virtualise as many physical servers as possible to VMware virtual servers. The challenge was to find a hardware platform capable of supporting numerous VMware images reliably, cost-effectively and with high performance.

The Solution
Flintshire selected IBM System x3950 servers to support its new virtualised Windows environment. The four 8-way x3950s in active use run 40 VMware servers between them, but Flintshire has successfully run more than 30 VMware servers on each one. The Council also has two IBM System x3850 M2 servers that will run up to 25 VMware virtual servers.

The Benefits
Through virtualisation, Flintshire has gained a more compact, efficient, scalable and flexible environment for its Windows servers. Flintshire has already removed or redeployed 40 physical servers, and expects to remove a further 40 over the next 12 months – which should result in major cost savings in hardware, power, cooling and maintenance. The Council can deploy a new virtual server in less than four minutes, compared with more than four hours for a physical server, and can move live environments from one physical x3950 to another with no loss of availability or performance for users.

Flintshire County Council (www.flintshire.gov.uk) provides municipal services to 150,000 citizens, and has a combined annual revenue/capital budget of £360 million. As a unitary authority, Flintshire offers around 750 distinct public services, and runs around 350 business-critical systems to support them.

Flintshire has employed virtualisation for a number of years on the IBM System i and System p platforms, and today runs IBM i5/OS, IBM AIX and Linux side by side in virtual partitions on two IBM System i 570 servers. The organisation has also virtualised its storage, using IBM System Storage SAN Volume Controller to create a more flexible and efficient SAN.

Without virtualisation, John Thomas, Operational Services Manager, estimates that the Council would require another 30 per cent more capacity on top of its existing 60TB.
John Thomas comments, “Virtualisation reduces the amount of hardware we need to buy, maintain, then dispose of, and it also significantly cuts the lifetime electricity consumption and cooling requirements at the point of use. The business perspective is that these efficiency gains translate into significant savings in capital and operational expenditure.”

Extending the benefits of virtualisation
Based on its positive experience of virtualisation on System i and on its SAN, Flintshire decided to virtualise its Microsoft Windows infrastructure to VMware virtual servers on the IBM System x platform.

“We wanted to create a more flexible, available and scalable platform for our Windows systems, so we undertook a Cobra study with IBM to determine what cost savings and other benefits we could expect from virtualising our Intel-based servers,” says John Thomas. “We also had the benefit of an IBM study tour to Greenock towards the end of the Cobra study, which provided an excellent overview of the System x technology, VMware and in particular the VMotion technology.”

Flintshire implemented four 8-way IBM System x3950 servers, currently running a total of 40 VMware servers. A further two x3950 M2s are now being implemented in preparation for new workload – a major, 500-user social care system and a new payroll solution for 7,500 direct employees.

Says John Thomas, “It’s clear that the experience and research from other IBM server lines are shared with System x – and that innovations in System x also feed back to the other lines. For us, this is one of the key benefits of working with IBM: its end-to-end capabilities create a constant cycle of improvement, as new ideas in one area tend to propagate to others. Where System x is concerned, the result is an Intel-based platform that offers much higher efficiency and reliability than ‘commodity’ hardware.”

Rapid adoption, enormous flexibility
VMware on IBM System x rapidly became mainstream technology at Flintshire – within just six weeks the internal Windows team had already virtualised 20 physical servers. This enabled the organisation to quickly benefit from its investment in the new technology, gaining greater flexibility and cost-efficiency from the very outset.

Says John Thomas: “The Windows team has total confidence in the way that all the layers of the solution work together. VMware virtualisation on the x3950 has given us a highly available, flexible and scalable infrastructure that also offers extremely rapid provisioning of new services. We can deliver a fully patched Windows virtual server, configured and ready for use as a business system, in under four minutes. Setting up an equivalent physical server would take one person at least four hours in the best-case scenario – and of course that’s overlooking the time taken to actually procure the server and get it delivered.”

The use of virtualisation aims to enable much more flexibility in the allocation of computing resources at Flintshire. Previously, some of the Council’s Intel-processor based servers were at their physical limit in terms of processing power and memory, while others were running at just 10 per cent – and there was no way to redeploy the unused computing capacity. In the virtualised environment on the x3950s, Flintshire can reallocate the available resources whenever required, so that each virtual server is the right size for its workload.
“One of the key benefits of virtualisation on System x is the ability to get additional capacity on demand – a technology available to us for a number of years on the System i platform,” says John Thomas.

“We can now ramp up the capacity and performance of a given virtual environment to meet a particular business need, so that it gets handled without any loss of performance or availability. In the x3950 environment, we’re already using this facility to speed up the year-end processing on our council tax revenue systems.”

**Distributed learning environment**
The Council also has two IBM System x3850 M2s, that will run up to 25 VMware servers between them, supporting a distributed online learning environment for primary and secondary schools. Previously, the education department was trying to run all of its virtual learning environments on two physical servers, and could not ensure adequate performance or scalability.

“The online learning system is extremely resource-hungry, and the IBM System x3850 was the only platform we knew of that could sustain it,” says John Thomas.

The IBM System x3850 M2 server has four quad-core processors and includes an embedded hypervisor capability. Combined with the VMware ESX Server 3i hypervisor, the x3850 won “Best of Show” at the VMWORLD 2007 conference.

Moving to virtual servers on the IBM System x3850 M2 platform gives the education department at Flintshire County Council the power of dozens of separate physical servers but at a significantly lower cost and with far greater flexibility.

“The education department lacked the budget to purchase 23 additional physical servers, and our data centre couldn’t have coped with the additional power requirements,” says John Thomas. “Without this virtualised option, the department would have bought a handful of dual-processor servers, some of which would have run at low utilisation while others would have run out of resources at peak times. With VMware on the x3850s, we have a pool of processing resources that we can split flexibly between the different schools, so that nothing goes to waste.”

“Flintshire’s deployment of IBM System x3850 M2 technology shows the benefits of choosing the platform that VMware itself recommends as the best for virtualisation,” says David Lockwood of IBM System x.

**Availability and flexibility**
The infrastructure at Flintshire is divided across two strategic data centres, linked by dual dedicated fibre connections. All environments – the SAN, System i, System x, IBM BladeCenter – are fully mirrored to ensure high availability and protection against disaster.

Most of the business systems at Flintshire are two- or three-tier, typically with a database running under i5/OS or AIX on the System i platform, an application layer running under Windows on multiple clustered VMware virtual servers on the System x platform, and a thin-client front-end served by Citrix running on IBM BladeCenter.

“Virtualisation provides for our Windows tier the same kind of flexibility we already had in the other tiers,” says John Thomas. “In the past, we could ensure very high availability for the database and front-end tiers, but the middle tier was more difficult. With virtualised application servers running under VMware on the x3950s, we can easily create clustered environments without the cost and complexity that clustering would entail in a physical environment.”

**Moving towards full virtualisation**
Flintshire’s strategic platform policy is that all new Windows applications and databases will be installed in the VMware environment whenever possible. More demanding applications – and in particular the organisation’s Citrix environment – will go onto IBM BladeCenter. Only as a last resort will Flintshire use rack-mounted servers.

“It’s often the case that we need to move a server from one data centre to the other, and we now do that ‘live’, using VMotion,” says John Thomas. “Users on such a system are not even aware of the move, because the VMware technology makes it totally seamless and transparent.”

He adds, “We’re moving towards an infrastructure composed of a relatively small number of very powerful and flexible servers and storage systems. Our underlying policy is to consolidate and virtualise all elements of the infrastructure, and IBM’s holistic capabilities make it the ideal partner for Flintshire.”

The total number of servers in Flintshire’s infrastructure currently stands at 150, of which a further 40 will be decommissioned over the next 12 months as the Council continues to virtualise its Windows servers.

“We’ve tested each x3950 with up to 30 VMware servers simultaneously without coming close to the limit, so there’s plenty of headroom,” says John Thomas. “Using virtualisation on the
x3950s, we've removed or redeployed 40 physical servers to date, and anticipate removing a further 40 over the next 12 months. In addition to significantly cutting the total hardware costs, power consumption and management effort, we're gaining a more flexible, scalable, cost-effective centralised infrastructure that can easily adapt to changing future requirements.”