IBM New Enterprise Data Center

A breakthrough approach for efficient IT service delivery

Client Success Stories

IBM's Vision for the New Enterprise Data Center

Globalization and knowledge-based economies are forcing companies to embrace new business models and rapidly emerging technologies to stay competitive in a fast-moving market. Yet the day-to-day pressure to run the business more cost effectively while also supporting business growth and innovation is very real.

Align IT with business goals

These changes demand that IT improve cost and service delivery, manage escalating complexity, and better secure the enterprise. And aligning IT more closely with the business becomes a primary goal. The new enterprise data center is an evolutionary new model for efficient IT delivery that helps provide the freedom to drive business innovation. Through a service oriented model, IT will be able to better manage costs, improve operational performance and resiliency, and more quickly respond to business needs. This approach will deliver dynamic and seamless access to IT services and resources, improving both productivity and satisfaction.

Getting Started- Enabling The New Enterprise Data Center – a holistic, integrated approach

IBM suggests that clients need to look across the enterprise and leverage technology solutions together to gain improved efficiency and responsiveness across the board. These areas include **consolidation / virtualization, energy efficiency, business resiliency and security and service management**. Each one incrementally can improve your overall operations. But improvements in one area could cause strain in another.

For example, demands for a better enterprise information architecture- providing integrated information to end users for example, could stress the issues of security and business resiliency. Creating highly virtualized resources demands a stronger, more integrated service management approach. Consolidation to optimize systems could drive up the density of systems, thereby putting more strain on the environment issues.

So in today's' world- it is critical to look at all of it together. How do things interrelate so that improvements in one area are matched with tools and techniques to support them in another?

This document provides you with examples of how IBM clients have leveraged these solutions to transform their data centers in order to drive **new levels of economics, provide rapid service delivery** and gain the type of infrastructure needed to better **align IT with the overall goals of the business.**

If you have realized success through leveraging an IBM solution, consider becoming a Client Reference as well. The benefits can include promoting your company among your peers, illuminating your achievement and showcasing your strength. By teaming with IBM, you can benefit from the promotional capability of one of the world's leading public relations teams. For more information on how to share your story with others, please go to **ibm.com/ibm/clientreference** or see your IBM representative.

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NEDC Entry Points:

BR *Business Resiliency*
CV *Consolidation/Virtualization*
EE *Energy Efficiency*
SM *Service Management*

Communications

Energen achieves half-million dollar savings by migrating Oracle and SAP software to IBM System p

Overview

■ ***The Challenge***

Energen was facing performance and support issues for its SAP ERP application, which was running on Sun Solaris servers. The company wanted to reduce the total cost of ownership – in particular by cutting its licensing costs for the Oracle databases supporting its SAP ERP application – and to stop the sprawl of servers in its data center by introducing virtualization.

■ ***The Solution***

Working with IBM Business Partner Mainline Information Systems, Energen replaced 20 Sun servers with two IBM System p5 570 servers, each with eight IBM POWER5+ processors running IBM AIX. Energen virtualized the SAP software environment into logical partitions on the p5-570s, enabling multiple systems to share the same processing and I/O resources.

■ ***The Benefits***

Saved an estimated $500,000 in annual costs, largely through reductions in Oracle licensing fees; accelerated the deployment of new servers from one month to two days; improved server utilization; boosted performance by 92 per cent, cutting typical batch runs from 24 hours to two; freed up floorspace and power capacity in data center; improved support for mid-range environment, with access to IBM Advocate program

■ ***Key Solution Components***

Industry: Oil & Gas, Utilities
Applications: SAP® ERP
Hardware: IBM System p™, model p5-570
Software: IBM AIX® 5L™, Oracle 10g
Services: IBM Business Partner Mainline Information Systems

Energen Corporation is among the Top 20 independent exploration and production companies on the basis of its US oil and gas reserves. Listed on the New York Stock Exchange, Energen has averaged more than 30 per cent annual growth in earnings and total shareholder return over the last five years. The company has proved reserves of natural gas, oil and natural gas liquids totaling 1.7 trillion cubic feet. Its regulated business, Alabama Gas Corporation (Alagasco), is the largest distributor of natural gas in Alabama, serving around 455,000 customers.

In the face of deteriorating system performance and worsening support from its vendor, Energen wanted to refresh its mid-range server environment. This environment – primarily used for its SAP and Oracle software – had grown to 20 physical machines, representing a significant investment in both hardware and software licenses.

"We were already familiar with logical partitioning and server virtualization on the mainframe platform," says Ron Payne, Director of Infrastructure

"IBM and Mainline both have a strong local presence. That was a significant selling point: given the business-critical nature of our SAP software environment, we needed to have skilled support close at hand."

Keith Jinright
Data Center Manager
Energen

Services at Energen. "Consolidating to the IBM System p platform enabled us to do the same for our Sun mid-range environment, delivering annual savings of around $500,000."

The migration from Sun to IBM System p enabled Energen to consolidate from 20 servers down to two, significantly easing the pressure on Energen's data center, where the continual addition of new physical servers was using up valuable floorspace and putting a growing strain on the electricity supply.

Choosing a supportive partner

Energen's concerns about the cost and reliability of its mid-range infrastructure coincided with a planned refresh of the platform for SAP software. Says Ron Payne, "It made sense to take a fresh look at the entire environment, to see where we could cut costs and improve service levels.

Our technology partner, Mainline Information Systems, put together an analysis to show how moving to virtual servers on IBM System p could significantly cut our Oracle licensing costs in addition to reducing our hardware costs. That, and the fact that IBM had a much stronger local support network, convinced us that System p was the right platform for Energen."

Keith Jinright, Data Center Manager at Energen, adds: "We had significant support issues with our previous vendor, Sun, which was cutting back support in the south-eastern US and laying off employees. By contrast, IBM and Mainline both have a strong local presence. That was a significant selling point: given the business-critical nature of our SAP software environment, we need to have skilled support close at hand."

Powering up with System p

Energen implemented two IBM System p5 570 servers, each with eight IBM POWER5+ processors. IBM contributed towards the cost of the migration and consolidation of the SAP software, which was carried out with the assistance of consultants certified by SAP.

Energen migrated its entire SAP ERP environment – including functionality for financials (accounts receivable and accounts payable), human resources and payroll – from Solaris on 20 physical servers to IBM AIX V5.3 on the two new p5-570 servers. The SAP ERP application now runs in logical partitions (LPARs) that dynamically share the processing power of the p5-570s.

Karl Swelling, UNIX Systems Administrator at Energen, says: "Each LPAR is configured to use up to six POWER5 processors, and the usage is uncapped, so each environment can adapt dynamically to changing business requirements. We pre-set the policy – for example, so that production environments take priority over test and development – and the system automatically allocates resources to the different LPARs."

The move to virtual rather than physical servers for the SAP software environment also means greater speed and flexibility in server provisioning. With the previous Sun server infrastructure, it would take at least a month to meet a request from the business to build a new server. Says Keith Jinright, "In the past, we needed to specify, order and await the delivery of the server, then allocate time for buying additional software licenses, installation, configuration, patching, testing and release to production. Using virtualization on IBM System p, it now takes just two days in total, and the effort is minimal."

Pushing ahead with virtualization

With server virtualization, Energen can deploy a server that is precisely the right size for a new business requirement, simply by allocating the required resources to its LPAR. Unlike implementing a new physical server, where the capacity is effectively fixed from the date of purchase and can only be varied upwards through a disruptive physical upgrade at additional cost, virtualization means that Energen can increase or reduce the size of its virtual servers instantly and dynamically to make the most efficient use of the available resources.

In addition to Micro-Partitioning – whereby a small LPAR can occupy as little as one-tenth of a single processor – Energen is taking advantage of the Virtual I/O Server feature of IBM Advanced POWER Virtualization on System p.

Says Karl Swelling: "We previously had two ordinary network cards and two fiber-channel cards in each of our 20 physical servers. With Virtual I/O Server, we now have just four network and four fiber cards in each System p server. When we need to set up a new virtual server, we simply carve out a new LPAR and link it to the virtual network – it's much simpler and more cost-effective."

Energen has also embraced virtualization for its Microsoft Windows environment, using VMware technology to consolidate from 60 physical servers to just four, for an estimated $600,000 in cost savings. The company plans to consolidate a further 15 Intel-processor based servers running Linux to Linux partitions on one of the p5-570s. Says Keith Jinright, "We run a number of Linux-based open source applications for Web serving, network services and so on - by consolidating to partitions on System p, we will improve the ease of management and further shrink our Intel-based environment."

Cutting costs for Oracle

Energen's previous licensing deal with Oracle was on a "named-user" basis, and each CPU used for Oracle

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> Karl Swelling
> UNIX Systems Administrator
> Energen

accounted for 25 licenses from a central pool of 1,000. Looking at the entire environment, including all development, test and quality assurance instances, Energen had already reached the limits of this licensing deal with its previous infrastructure. By consolidating its 20 Sun servers to just two p5-570s and switching to a server-based license with Oracle, Energen was able to reduce its software licensing costs by 40 per cent.

"We certainly made a saving on hardware costs, but the reduction in Oracle licensing costs was the main contributor to the total $500,000 annual savings we achieved by migrating to IBM System p for our SAP software environment," says Ron Payne. "Migrating from Solaris also produced software cost savings, because with IBM AIX we no longer needed a separate volume management solution from Veritas, saving around $100,000 annually."

"The server consolidation project was hugely successful," says Brunson White, VP and CIO of Energen. "We have never completed a project that has so quickly generated as much return on investment as this one."

Greater flexibility and efficiency

In addition to the reduction in costs for software, hardware acquisition and maintenance, Energen's migration to the IBM System p platform for its SAP software environment has improved performance - a typical batch processing run went from 24 hours down to just two hours – an improvement of more than 90 per cent. The IBM solution has also simplified server administration and enabled more efficient utilization of the available computer resources.

Says Karl Swelling, "The mid-range environment is now much easier to manage. Administration on AIX is great – the command set is very consistent, and it's tied in very tightly with the hardware. With Solaris, we needed to buy a lot of additional software."

Average processor utilization on the p5-570s now stands at 25 per cent, with peaks between 50 and 75 per cent utilization for overnight batch runs of non-SAP workloads such as Oracle and data warehousing applications.

"In the old environment, many servers were running at less than 10 per cent utilization, so much of our growing investment in hardware was sitting idle and not delivering any value back to the business," says Keith Jinright. "We're now doing a much better job of utilizing the assets, and reliability is better too. Since going into production with our SAP ERP environment on IBM System p, we've experienced no unplanned outages."

The IBM solution has significantly improved the support available for Energen's mid-range server environment, as Keith Jinright explains: "We are in the IBM Advocate program – it's like adding a highly experienced employee at a fraction of the cost. If we have a technical question, we can get the right answer very quickly – the advocate really knows the product."

Ron Payne concludes, "Migrating to IBM System p for our SAP software environment has given Energen a more compact and efficient infrastructure that combines significantly lower capital and operational costs with better performance and flexibility."

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> Ron Payne
> Director of Infrastructure Services
> Energen

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

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Gruppo AE-EW expands into new markets with SAP and IBM System i

Overview

■ ***The Challenge***

Following energy market deregulation, Gruppo AE-EW has grown rapidly both in the electricity and gas markets – a new venture. Existing servers were struggling with the workload, and did not have the capacity for the new SAP applications required to support its new gas sales operations.

■ ***The Solution***

Gruppo AE-EW implemented an IBM System i 550 Standard Edition server, with three active processors and a fourth available on demand. Using IBM virtualization technologies, production applications sit in a separate logical partition (LPAR), and computing capacity from development and test LPARs can be reallocated to help ensure excellent response at all times.

■ ***The Benefits***

Preparation time for invoicing has been cut from 20 days to less than five days. System i virtualization technology allows to run the entire application landscape on one single server. The i550 offers ample capacity for the current SAP systems, plus enough spare capacity for workload peaks and potential new applications. New applications can be added without investing in additional servers, helping to keep operational costs low.

■ ***Key Solution Components***

Industry: Energy
Applications: SAP® ERP, SAP Strategic Enterprise Management®, SAP NetWeaver® Business Intelligence, SAP for Utilities Solution Portfolio, SAP NetWeaver Exchange Infrastructure, and SAP NetWeaver Portal
Hardware: IBM System i™ 550 Standard Edition
Software: IBM i5/OS® with integrated IBM DB2® for i5/OS

Gruppo AE-EW (Azienda Energetica SpA-Etschwerke AG) has been producing, distributing and selling electricity energy since 1897, from hydroelectric plants in Alto Adige/ South Tyrol. Since 2004 the company has also sold gas to the two cities of Bolzano and Merano. The liberalization of energy markets across Europe is increasing competition, and with it comes the opportunity to sell to new customers and grow the business.

The company serves about 120,000 customers in 32 regional municipalities (about half the population of Alto Adige), distributing 900 million kW/h per year, with a further 40,000 customers in Bolzano and Merano buying 110 million cubic meters of gas. A total of 1,683 medium and high-voltage electric substations, with 2,800 kilometers of cable and overhead lines makes this a complex industry, yet Gruppo AE-EW achieved an annual service continuity index of 10 minutes' outage a year in 2006.

Emiliano Lutteri, Chief Information Officer, comments, "In 2001, preparing for market deregulation, the

"Our expectations were met in terms of stability and we are very satisfied with the i550. Invoicing for our trading company is now much easier and we have seen a huge improvement there."

Emiliano Lutteri
Chief Information Officer
Gruppo AE-EW

company selected SAP software. We chose servers from the IBM System i family because we needed a stable, reliable solution, with the ability to grow as the business increased. We had used the System i platform for the previous 15 or so years, and it had given us great performance. The IBM DB2 database platform is embedded in the operating system, which is a big advantage. In summary, our focus was on reliability with an adaptable product over time, since with the deregulation process underway, we didn't know what the future would hold for us."

Running out of time

Some 150 users access SAP software and other applications to manage both consumer and business accounts, which collectively generate almost one million invoices annually. The company operates a comprehensive set of SAP applications, including SAP ERP, SAP Strategic Enterprise Management, SAP NetWeaver Business Intelligence, SAP NetWeaver Portal, SAP NetWeaver Exchange Infrastructure, and the SAP for Utilities Solution Portfolio – causing the existing production server to approach capacity. For example, the time taken to prepare monthly bills was almost 20 business days – almost the entire month, clearly an untenable situation.

Emiliano Lutteri continues, "The software landscape consisted of many SAP applications as well as the SAP for Utilities solution portfolio, implemented in 2003 and 2004. The strategic choice for SAP software to support the company through the enormous transformation to a deregulated marketplace had proven itself to be correct. We now needed to find the right server infrastructure to carry the business through the next ten years and to withstand the test of time in a turbulent and always-changing marketplace."

The ideal approach would be to continue to exploit the IT team's existing expertise on the System i platform, and find a way to introduce a scalable solution that would allow the company to grow business capacity without further modification. With very different workload profiles from the SAP applications, the infrastructure would also need to manage very high peak transaction volumes – such as the monthly billing.

Selecting IBM System i for flexibility

To meet these challenges, AE-EW selected a new IBM System i 550 Standard Edition server, with four processors – of which three are active and one is available on demand. To provide yet more flexibility, IBM

virtualization technologies allow the server to be divided into logical partitions (LPARs), one for production applications and one for development and test services. Compute power is automatically allocated from the test and development LPAR to production applications as required to ensure service level agreements are met without additional expenditure.

"All our expectations were met in terms of stability and we are very satisfied with the i550," says Emiliano Lutteri. "Invoicing for our trading company is now much easier and we have seen a huge improvement there. With SAP software on the i550, the preparatory work concerning invoicing for our trading company that used to take about 20 business days now only takes four or five working days, which is obviously a great improvement. On average, invoicing time for the distribution and retail company has decreased by about 50% thanks to the speed and capacity of the P5 processor."

Reducing operational costs

Competitive pressures ensure that Gruppo AE-EW is keen to find new ways to automate its billing and account management systems to help reduce operational expenses. With the IBM System i solution in place, extending the SAP application environment to handle accounting, management and reporting tasks will also allow the business to serve more customers more effectively, too.

"Being able to introduce new applications without the need to increase or redesign the server infrastructure makes a direct contribution to reducing the total costs of ownership," says Emiliano Lutteri. "Recently the company started providing remote heating services, which required their own customer management and accounting processes. With the i550 we were able to manage the work within the same system, which is very convenient and eliminates the need for additional expenditure. The biggest advantage offered by the i550 has been the fact that we can run all our solutions on a single System i server while keeping pace with the growth and change of our business."

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Emiliano Lutteri
Chief Information Officer
Gruppo AE-EW

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

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SAP AG
Dietmar-Hopp-Allee 16
D-69190 Walldorf

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Western Power Distribution accelerates data recovery with IBM and Tectrade

Overview

- ***The Challenge***
  Western Power Distribution wanted to accelerate the recovery of data from backups for operational and disaster recovery purposes. The existing tape-based backup was sufficiently reliable, but with multiple servers backed up on each tape there were significant media contention issues.

- ***The Solution***
  Western Power Distribution worked with Tectrade to refresh its IBM Tivoli Storage Manager infrastructure, introducing an IBM System Storage DS4800 array in a remote site for daily backups, copied back to an IBM tape library in the primary site for added resilience.

- ***The Benefits***
  The move from tape to disk enabled much faster recovery of individual files; it also eliminates the previous contention issues, enabling multiple servers to be restored in parallel. Virtual servers can be restored from disk in as little as seven minutes, and the critical application server environment can be recovered in as little as two days, compared with up to ten previously.

Western Power Distribution (WPD) delivers electricity to 1.4 million customers in South West England, and to 1.1 million customers in South and West Wales. The company employs approximately 2,300 people and maintains a transmission and distribution cable network stretching more than 82,000 km.

WPD's tape-based backup solution was working well, and the organisation was confident in its ability to recover individual files during normal operations, or even the entire server infrastructure in the event of a disaster. However, speed of recovery was a major issue. Al Kellaway, Computer Manager at Western Power Distribution, explains: "To minimise the manual effort involved in handling tapes, we tended to store data from multiple servers on each tape. This created problems with media wait-times when we attempted to recover servers in a disaster-recovery test scenario. Essentially, a server would secure a tape for recovery, and the other servers needing that tape would have to wait their turn."

The issue of tape contention meant that WPD could only recover three or four servers in parallel – pushing the full recovery time in a disaster out to as much as ten days. In addition to representing a business risk, the existing backup solution tied up valuable IT staff resources in tape management.

Cost-effective solution

Aiming to introduce a new backup solution that would be faster and easier to manage, WPD created a framework of requirements and invited

"Your view of a company is always based on the people you work with, and the Tectrade consultant was excellent. Indeed, we will continue to work with him as we plan our future capacity requirements."

Al Kellaway
Computer Manager
Western Power

a number of companies to bid for the work. "We had a natural preference for a solution incorporating IBM Tivoli Storage Manager, since we had used it successfully for around ten years – but it was by no means a foregone conclusion," recalls Al Kellaway. "We wanted a cost-effective solution that would not require us to mirror the entire infrastructure to a second full data centre."

The proposal from Tectrade, an IBM Premier Business Partner, met all of WPD's criteria. Using its own WAN infrastructure, WPD dedicated 1GB/s of fibre-optic bandwidth to connect its main data centre in Plymouth to a new Tivoli Storage Manager environment at a remote site in Exeter. The new Tivoli environment, designed and implemented with the assistance of Tectrade, runs on an IBM System p5 570 server connected to an IBM System Storage DS4800 with 1TB of Fibre Channel and 20TB of SATA disks. Data is initially backed up to the high-performance Fibre Channel disks on the DS4800, then steadily migrated to the lower-cost SATA disks throughout the course of the day.

"We now back up all data from the primary computer suite in our Plymouth site – across the network to the remote site," says Al Kellaway. "As a layer of insurance, we then take a reverse copy of the backup data to an IBM System Storage TS3310 tape library in our main site."

He adds: "Tectrade managed the entire solution implementation, from technical consultancy and design through to the delivery and installation of the IBM hardware. Your view of a company is always based on the people you work with, and the Tectrade consultant was excellent. Indeed, we will continue to work with him as we plan our future capacity requirements."

Tectrade was supported in the project by Triangle, another IBM Premier Business Partner. Triangle's expertise with IBM System p complemented Tectrade's IBM Tivoli and System Storage expertise. Triangle prides itself on an ability to see the bigger picture, employing proven innovators to help customers achieve measurable improvements through faster, simpler and more cost-efficient business processes.

Tiered backup solution

WPD previously had a single server/single application approach to its System p environment. Following a major consolidation and virtualization effort, the company now has around 20 logical partitions (LPARs) on a dozen System p servers, linked in a SAN to an IBM System Storage DS4800.

The System p environment runs the company's line-of-business applications, including asset management for poles, pylons

and transformers. It also runs the distribution billing system – not for retail customers, but rather for suppliers who use the WPD infrastructure to transmit power. Other line-of-business applications include the payroll system and streetworks management, and WPD also runs infrastructure tools such as IBM Tivoli Enterprise Console on the System p platform.

"We have placed our services into tiers, which determines their priority for recovery," says Al Kellaway. "As part of our disaster planning, some services change priority depending on the time of the month. Payroll is a good example – if salaries are not due to be paid for a couple of weeks, then other services can be restored as priority cases. By moving to disk-based backups, we have accelerated the recovery of servers significantly, and enabled more systems to be recovered in parallel."

For mission-critical systems such as power distribution, WPD has a separate high-availability environment replicated across six sites, each capable of completely independent operation.

Efficiency through virtualization

WPD's use of virtualization now extends to the Intel-based environment: the company is using VMware to run around 80 virtual servers on 12 physical machines.

Following the move to disk-based backup, individual virtual servers can be recovered within just seven minutes in a DR scenario, and WPD can recover individual files almost instantly.

Says Al Kellaway: "For the full recovery of critical systems, we've gone from as much as ten days to as little as two days, thanks to the move to disk-based backup with Tivoli Storage Manager on the DS4800."

He concludes: "The decision for IBM hardware was certainly influenced in part by our use of IBM System p as a strategic platform. It makes sense to do as much as possible with a single vendor, to keep training and support costs low. Our 220 servers are managed by a team of just 12 people; by standardising on a small set of technologies, we can keep training and support costs very low."

"For the full recovery of critical systems, we've gone from as much as ten days to as little as two days, thanks to the move to disk-based backup with Tivoli Storage Manager on the DS4800."

Al Kellaway
Computer Manager
Western Power

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire
PO6 3AU

The IBM home page can be found at **ibm.com**

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Distribution

Agrium finds the formula for growth with IBM System p and DB2

Overview

■ ***The Challenge***

Anticipating rapid growth, Agrium realized that its existing hardware infrastructure was reaching end-of-life and lacked the capacity to store and process increasing data volumes.

■ ***The Solution***

Working with IBM Global Technology Services and REALTECH, an IBM Business Partner, Agrium migrated its SAP software environment from a number of ageing Alpha servers to just five IBM System p5 570s. The company also migrated from Oracle to IBM DB2, and extended its SAN infrastructure, adding an IBM System Storage DS4800 and using IBM SAN Volume Controller (SVC) to virtualize the entire storage environment.

■ ***The Benefits***

New virtualized server and storage infrastructure increases flexibility, boosts performance and provides scalability for future growth; migration to DB2 reduced database maintenance costs by 50 per cent; SVC protects existing storage investment and provides simpler storage management; IBM's 'development advocate' program provides highly responsive technical support for DB2 environment.

■ ***Key Solution Components***

Industry: Manufacturing, Wholesale Distribution
Applications: SAP® R/3® with financial accounting, human capital management and production planning, SAP Customer Relationship Management, SAP Supplier Relationship Management, SAP Solution Manager, SAP Supply Chain Management, SAP NetWeaver® Exchange Infrastructure, SAP NetWeaver Business Intelligence
Hardware: IBM System p5™ 570, IBM System Storage™ DS4800, IBM System Storage SAN Volume Controller 3.1
Software: IBM AIX® 5L™, IBM DB2®, IBM HACMP™
Services: IBM Global Technology Services, IBM Business Partner REALTECH

Agrium, based in Calgary, Alberta, Canada, is a leading global manufacturer and wholesaler of agricultural nutrients, industrial products and specialty fertilizers, with major agricultural retail interests in North and South America. The company achieved total sales of more than US$4 billion in 2006, and employs over 6,500 people.

Agrium is planning to grow significantly over the next three years through expansion into new markets and the acquisition of new businesses – for example, the company is currently building a new production facility in Egypt. Agrium's IT team realized its existing infrastructure would not be capable of scaling to support the resulting increase.

"We were running our SAP software environment on 21 Alpha and Intel-based Windows servers, which were reaching end-of-life," explains Luke Lau, Director of IT Technology Planning at Agrium. "We needed a new hardware platform, so we asked several of the major vendors to propose a new architecture."

"The IBM System p5 platform offers us reliability, high performance and the ability to take advantage of leading-edge IBM virtualization technologies – making a significant contribution to the power and price-performance of our IT environment."

Luke Lau
Director of IT Planning
Agrium

Choosing a technology partner

After analyzing each of the proposals, Agrium decided to work with IBM, and invest in the System p5 platform.

"IBM had a much better roadmap than any of the other vendors – both in terms of the POWER processor architecture and the strong relationship with SAP," says Luke Lau. "In addition, we were keen to move to a virtualized infrastructure, and the IBM virtualization technologies are much more mature than offerings from other vendors."

Agrium worked with IBM Global Technology Services to implement five IBM System p5 570 servers to run its SAP application landscape. Three of these servers handle the production environment, and have been clustered using IBM High Availability Cluster Multi-Processing (HACMP) to ensure high availability. The remaining two p5-570s are currently used for testing, training and special projects.

Luke Lau comments: "The IBM System p5 platform offers us reliability, high performance and the ability to take advantage of leading-edge IBM virtualization technologies – making a significant contribution to the power and price-performance of our IT environment."

Virtualized storage environment

With the servers in place, Agrium's next task was to update its storage area network (SAN) to increase its capacity and improve scalability for the future. IBM Global Technology Services added a new IBM System Storage DS4800 disk system to complement the existing storage hardware, and deployed IBM System Storage SAN Volume Controller (SVC) to manage the entire infrastructure.

The IBM DS4800 provides superb data throughput with 2Gbps Fiber Channel connectivity and the ability to mix Fiber Channel and SATA disk drives for cost-effective performance. The configured storage system has seven shelves, for a total of 18TB storage. Agrium's production and business intelligence databases currently total around 2TB, so the SAP software environment will be able to grow without significant additional investment in storage hardware.

"SVC has made a big difference to the scalability and cost-effectiveness of our storage environment," says Luke Lau. "By treating all our storage devices as a single pool, it has become much easier to manage the infrastructure. If we need more space, we simply plug in more hardware and SVC treats it as part of the SAN – with minimal need to change settings or reconfigure."

He adds: "IBM Global Technology Services did an excellent job with the

hardware implementation. The quality of documentation they created was outstanding as well, and really helps our in-house team handle the hardware by themselves. "

Moving to DB2

As part of the migration, Agrium decided to move from its existing Oracle database platform to IBM DB2.

"Both IBM and SAP are committed to DB2 as a database platform for SAP applications, so we can be confident in its future as part of our environment," says Luke Lau. "DB2 is very well-integrated with the SAP software environment, so it is easy for administrators to manage their databases. In particular, the SAP DBA cockpit for DB2 enables most database administration to be handled from within the SAP software environment.

"One of the main reasons for migrating to DB2 was the excellent and cost-effective support provided by IBM. As part of our support contract, IBM assigned us a 'development advocate', who is always available to help us resolve any issues as quickly as possible. In addition, we are saving about 50 percent on maintenance costs with DB2, compared with our previous platform."

Rapid SAP software migration

Once the new infrastructure was ready, Agrium began the migration of its SAP landscape, working with IBM Business Partner REALTECH. Agrium uses a wide range of SAP applications, including SAP ERP, SAP Customer Relationship Management, SAP Supplier Relationship Management, SAP Solution Manager, SAP Supply Chain Management, SAP NetWeaver Exchange Infrastructure and SAP NetWeaver Business Intelligence.

"I really can't praise REALTECH enough," says Luke Lau. "They were extremely professional and knowledgeable, and helped us deal effectively with all the challenges of the migration. Their project management was excellent – ensuring we could go live with the new systems on time and on budget."

Advantages of virtualization

Agrium's SAP software environment, which supports 2,700 users, now runs in ten logical partitions (LPARs) spread across the three production p5-570s. The three servers have 29 active processors between them, and Agrium uses IBM System p Advanced POWER Virtualization (APV) technologies to share these processors between the different LPARs.

"Virtualization enables us to treat each of the System p5 servers as a single pool of processing resources, so we can allocate as much or as little power to each LPAR as it requires to handle its current workload," says Luke Lau. "And if we want to introduce a new application or development environment, we don't have to buy a new physical machine, as we can set up a new LPAR within a matter of minutes.

"As the SAP software environment grows, we are also planning to use IBM On/Off Capacity on Demand, which will allow us to temporarily switch on inactive processors within the p5-570s in order to deal with periods of peak workload – for example, month-end financial reporting. This will give us a performance boost without the

"The SAP DBA cockpit for DB2 enables most database administration to be handled from within the ERP environment. In addition, we are saving about 50 percent on maintenance costs with DB2, compared with our previous platform."

Luke Lau
Director of IT Planning
Agrium

expense, effort and disruption of buying new hardware."

In addition to virtualising their server environment, Agrium is using IBM SVC to virtualize the entire storage environment as well – including both the state-of-the-art IBM DS4800 and older storage servers from HP – enabling Agrium to maximise the utilization of its SAN hardware and keep costs low while promoting scalability.

Supporting future growth

In the near future, Agrium also plans to upgrade to DB2 9, which will offer a number of features – such as deep compression and improved integration – that will help the company as its SAP software environment grows.

"IBM Global Technology Services and REALTECH have helped us create an architecture that will support our SAP software environment as usage and data volumes increase, and will help us meet our strategic growth targets," concludes Luke Lau. "With System p5 and DB2, we have been able to improve SAP application availability and transaction response times for end-users, giving us an infrastructure that is more than equal to today's business challenges."

"IBM Global Technology Services and REALTECH have helped us create an architecture that will support our SAP ERP environment as data volumes increase, and will help us meet our strategic growth targets."

Luke Lau
Director of IT Planning
Agrium

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

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Circuit City boosts IT infrastructure effectiveness with storage virtualization

Overview

- ***Challenge***
  Build a scalable storage infrastructure that can keep pace with business growth; improve administrator productivity as well as application and server availability
- ***Solution***
  A virtualized storage environment based on IBM System Storage™ SAN Volume Controller, IBM TotalStorage® Productivity Center software and IBM System Storage DS4500 and DS8100 disk storage systems
- ***Key Benefits***
  - *The use of tiered storage architecture helps to reduce the overall cost of storage*
  - *Non-disruptive data migrations enabled by SVC reduce maintenance windows from hours to minutes, which helps improve application availability*
  - *IBM TotalStorage Productivity Center software—a centralized storage management and reporting tool—helps identify ways to improve application performance*
  - *The IBM FlashCopy® function helps reduce recovery times and improve data protection during configuration changes*
  - *The multi-tier storage environment helps enable excellent application performance while deferring Tier 1 storage purchases*

As a leading worldwide retailer of brand-name consumer electronics, PCs and entertainment software, almost every aspect of Circuit City relies on IT. In the U.S., the IT infrastructure supporting the company's 652 Superstores and CircuitCity.com Web site is located in two data centers on the corporate campus in Richmond, Virginia.

Circuit City outgrows traditional storage infrastructure

The storage architecture was typical of many large enterprises. Most of the storage was already SAN-attached; however, no single management or virtualization tools were in place. This created multiple SAN islands. After years of rapid growth, the IT team was struggling with storage management issues such as poor storage utilization and the need to interrupt application availability just to make changes to the server and storage infrastructure. Almost all of the storage administration work was performed by the various IT teams using manual procedures.

The amount of labor needed to simply keep everything running made it difficult for the storage administrators to plan ahead. Far too little of their time was spent on storage planning, optimization and strategy.

In June 2005, business requirements drove the doubling of storage in the two data centers. It was clear to Nick Otto, director of IT infrastructure services, that the time to move to a more flexible storage architecture had arrived.

Virtualized storage infrastructure helps address the demands of growth

Otto's team asked their incumbent storage vendor as well as IBM to recommend a comprehensive storage management initiative that would include storage virtualization, tiered storage and new tools to manage, monitor and deploy storage. After reviewing a number of technologies and architectural approaches, Circuit City selected IBM as its solutions provider.

IBM delivers virtualization management in an appliance-like device, called the IBM System Storage SAN Volume Controller (SVC). SVC is designed to combine storage capacity from multiple vendors into a single reservoir of capacity that can be managed from a central point of control. From the server's view, storage looks like a common LUN served by SVC—the actual storage characteristics are irrelevant to the servers. In fact, any type of physical storage can be deployed in the IBM virtual environment.

Compared to the other vendor, the IBM storage virtualization architecture provides greater flexibility and more control. For example, says Otto, "SVC is standards-based, so I can incorporate any servers and disk systems into the IBM environment."

In fact, Otto viewed the manageability benefits of virtualization as essential to the team's ability to serve users. "If I could not afford everything I wanted, I would have given up spare capacity before giving up virtualization. Fortunately, with IBM, I accomplished all my objectives within the budget."

Circuit City migrates nearly 400 TB to a virtualized environment with little downtime

The order was placed with IBM in June 2005. All system changes had to be completed before the company's peak season began, which gave the IT team less than four months to migrate most of their 400 TB of data to the new IBM virtualized storage infrastructure.

The flexibility of virtualized storage made it possible to complete the migration in the timeframe allowed. The Circuit City team first moved all the servers and the legacy storage devices behind the SVC and then loaded the drivers onto the servers. Then the new disk arrays were added to the environment. Because the storage was now virtualized, the data was easily migrated from the legacy disk arrays to the new IBM disk arrays without any interruption to service.

Adoption of tiered storage helps to reduce storage costs

The Circuit City IT team implemented three storage tiers. Today, the majority of storage growth at Circuit City is in Tier 2 and Tier 3:

Tier 1—Highly available, mission-critical enterprise-class applications such as large financial systems and e-commerce tools (IBM System Storage DS8100 series)

Tier 2—Important internal applications that serve corporate needs, such as procurement systems (IBM System Storage DS4500 arrays)

Tier 3—Less critical applications, such as workstation home directories and e-mail archives (IBM System Storage DS4100 arrays)

The tiered approach enables the IT team to match the price/performance of the disk drives to the needs of the applications, lowering the overall cost of storage without impacting application performance. Otto's team reduced its forecast for storage capital equipment spending by US$1 million over 18 months by moving applications from Tier 1 to Tier 2 storage. And growth has continued in Tiers 2 and 3 instead of expensive Tier-1 devices. Otto says, "Since 2005, our Tier 1 storage has stayed relatively flat while Tier 2 and Tier 3 have experienced significant growth."

Virtualization helps reduce the disruption of a SAN fabric upgrade

After the storage infrastructure was virtualized, the IT team upgraded the entire SAN fabric. In a traditional storage environment, such an extensive refresh would require large maintenance windows for deployment and provisioning. At Circuit City, says Otto, "With virtualization, the upgrade was simple and smooth. The disruptions were minimal."

IBM TotalStorage Productivity Center helps optimize storage planning

The Circuit City IT team deployed IBM TotalStorage Productivity Center software to help tune the storage environment. IBM TotalStorage Productivity Center software simplifies and automates the management of storage infrastructure through a centralized, common suite of tools for the management of storage devices, storage networks and data. The software is designed to help optimize resource utilization, improve application availability and enhance the productivity of storage administrators.

Says Otto, "TotalStorage Productivity Center uncovered bottlenecks in places that we had not expected. We took that information back to the application teams and suggested changes that made a big difference."

Another capacity upgrade was scheduled for Spring 2006. Says Otto, "TotalStorage Productivity Center forms the basis for our planning, giving us a clear view into storage needs and trends. Because of its monitoring and management capabilities, we invested more in Tier 2 and Tier 3 and bought less Tier 1 storage in 2006 than we had forecasted in 2005. That represented significant cost savings for the company."

FlashCopy helps boost productivity

According to Otto, IBM tools like FlashCopy helped the IT team get through the busy season without having to add staff. FlashCopy helps the IT team protect critical data when they change disk array configurations. The administrator can create a quick copy of volumes, make whatever system changes are needed and then restore the system from the copy. By completely eliminating the need to resort to backup tapes, administrators can work more quickly.

Virtualized servers and storage helps speed maintenance and provisioning

Today, the combination of server and storage virtualization enables the IT department to respond quickly to user needs. Two-thirds of the Microsoft® Windows® environment is virtualized using VMware ESX Server. As Otto explains, "Server virtualization tools like VMware VMotion help us easily move virtual machines. But without virtualized storage, maintenance on a physical server can still involve downtime. If the storage is virtualized, in a window of only a minute or two, the entire physical host server can be moved."

Virtualization is a storage administrator's dream come true

Most storage infrastructure upgrades no longer require outage windows. For example, since virtualization was installed, Circuit City has replaced 90 percent of the disks in the data center—all with minimal to zero disruption to users.

Looking back, Otto says, "IBM storage virtualization has transformed our IT storage infrastructure so we can respond quickly to user needs. And the IT team has the tools to work productively. Today, our team spends much more of their time thinking strategically, which helps us stay on the right course. IBM has helped us create a great environment for storage administration."

For more information

For more information, contact your IBM sales representative, IBM Business Partner or visit us on the Web at:

ibm.com/servers/storage/

IBM Systems and Technology Group
Route 100
Somers, NY 10589
U.S.A.

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Coca-Cola Bottling Company United cuts operational costs with SAP and IBM

Overview

■ ***The Challenge***

Growing success combined with ever-present demands for increased efficiencies led Coca-Cola Bottling Company United to migrate to the latest version of the SAP ERP application and the SAP NetWeaver Business Intelligence component. To exploit the advanced functionality, existing server infrastructure would have to be enhanced – yet the company also wanted to reduce total cost of operation and lay the foundations for disaster recovery and business expansion.

■ ***The Solution***

Upgraded existing IBM System i servers to model i570 servers. Deployed logical partitioning technology to support all the SAP applications in a single production machine, and implemented a high availability solution on the second server in readiness for a full disaster recovery program in a remote location.

■ ***The Benefits***

Reduced number of physical servers contributes to reduced administration and maintenance costs. Logical partitioning allows greater exploitation of existing compute capacity, which reduces the need for outlay on new servers and delivers a faster, more flexible response to business demands.

■ ***Key Solution Components***

Industry: Consumer Packaged Goods, Beverages, Distribution
Applications: SAP® ERP 6.0, including financials, controlling, materials management, production planning, human resources, sales and distribution; SAP NetWeaver® Business Intelligence (SAP NetWeaver BI)
Hardware: IBM System i™ models 570, 825
Software: Lotus® Notes®, Lotus Domino®, IBM DB2®, IBM BRMS (Backup, Recovery and Media Services)

Founded in 1902, Coca-Cola Bottling Company United is the third-largest Coca-Cola bottler in the US, serving customers in six south-eastern states from 18 sales offices. The company employs around 2,700 people and ships some 65 million cases of soft drinks every year.

The company has a longstanding program around IT efficiency, which includes both reducing the total costs of operations and implementing advanced business functionality such as information warehousing. Legacy systems are being migrated to SAP software, offering greater control over manufacturing processes, as well as making integrated reporting easier and faster.

Mike Neighbors, Vice President of Information Technology, comments, “For Coca-Cola Bottling Company United, SAP software was the natural choice, and there was no question of deploying it on anything other than IBM System i. Just as real estate is all about location, location, location, for us it’s all about reliability, reliability,

"System i ... offers probably the lowest total cost of ownership of any enterprise-class system."

Mike Neighbors
Vice President of Information Technology
Coca-Cola Bottling Company United

reliability. We deliver product every day, and our red trucks must roll out the gate every morning on time: reliability is the buzzword, and IBM System i servers are the way to achieve it.

"The second key reason for selecting System i is that it offers probably the lowest total cost of ownership of any enterprise-class system. The initial price tag can appear high, but you need to remember that the DB2 database comes fully integrated as part of the package. You also achieve cost savings because System i is more easily manageable with a small IT team."

Choosing SAP software

Following a highly successful implementation of SAP software, Mike Neighbors turned his attention to meeting new business demands and increased workload. Key business drivers were cost reduction, business risk management, and the development of new reporting tools.

The first step was to migrate to the latest version of the SAP ERP software, which offers a range of integrated business functionalities ideally suited to meet the company's business ambitions.

"Coca-Cola Bottling Company United has a long-running strategic focus on warehousing and distribution systems, reducing inventory and increasing cost-efficiency. The company will be able to exploit the integrated data capabilities of SAP ERP 6.0 and the reporting facilities of SAP NetWeaver BI to gain greater business control and help reach these objectives," says Mike Neighbors.

"With SAP software in day-to-day operation, information now only has to be entered once in one place for it to become available everywhere. Our people doing business analytical work can find everything they need quickly and easily. On the manufacturing side, by improving production scheduling and forecasting we have seen our inventory levels drop considerably, which in turn has reduced our need for working capital. This alone has helped to offset the cost of the solution.

Reducing costs, increasing capabilities

To prepare for the SAP software implementation, Coca-Cola Bottling Company United upgraded its production i830 server to an IBM System i570, enabling it to support more than 500 users and 1TB of production data. With growing workload, key technology issues such as logical partitions (LPARs) influenced the platform choice.

Coca-Cola Bottling Company United has reduced its physical server footprint by consolidating all the SAP applications to a single i570 server. The system supports a total of six LPARs, including production and development for both the SAP ERP application and the SAP NetWeaver Business Intelligence component, plus LPARs for Lotus Domino and SAP Solution Manager.

"With logical partitions replacing separate processors, licensing costs

have been reduced, and the reduction in physical servers has helped to reduce maintenance costs. The processing capacity of the i570 is available to all the applications, and we can use dynamic tools to allocate resources exactly as required. The i570 contains additional processors that can be activated when the workload rises, which offers the business a flexible growth path on a single totally reliable system," says Mike Neighbors.

"The biggest saving is in management time. In the past, adding a new SAP application involved a new physical server and configuration, whereas with the i570 we are able to meet the business demand by creating new virtual servers for the SAP software within the same system."

Better management of business risk

The objective is to control the growing data volumes, which present a significant business challenge for Coca Cola Bottling Company United. Being able to manage data from the single, central i570 server greatly improves Coca Cola Bottling Company United's ability to manage business risk at lower administrative and operational cost.

The company has also upgraded a second i830 to an IBM System i model 570 server. This backup i570 server runs a total of ten LPARs, mirroring the six production LPARs on the primary i570 server and a further four LPARs on an i825 server running a legacy application. The SAP and legacy applications are mirrored using Echo2 software from iTera, while Lotus Domino clustering handles Lotus Notes and related data. The backup i570 server will be moved to a remote location at a later date, to provide full disaster protection and recovery.

Reliability, scalability and lower costs

Mike Neighbors concludes, "We are strong believers in the IBM System i as the ideal strategic platform for mission-critical applications. With the LPAR technology, Coca Cola Bottling Company United no longer needs rooms full of servers to meet growing business demands. SAP software on System i servers offers huge reliability and scalability advantages, at greatly reduced operational costs."

"SAP software on System i servers offers huge reliability and scalability advantages, at greatly reduced operational costs."

Mike Neighbors
Vice President of Information Technology
Coca-Cola Bottling Company United

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

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SAP AG
Dietmar-Hopp-Allee 16
D-69190 Walldorf

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Japan Airlines: Raising the bar in the airline industry

Overview

- ***Business Challenge***
  To solidify its market leadership in the face of increasing passenger traffic and competition, Japan Airlines (JAL) needed a way to reduce the potential for costly service interruptions caused by IT system outages.
- ***Solution***
  Japan Airlines, working with IBM, implemented an enterprise-wide IT issue tracking, change and configuration management solution – an industry first in Japan – that gives JAL management greater visibility into, and control over, the company's mission-critical IT operations and a better understanding of how they impact the business as a whole.
- ***Key Benefits***
  Improved quality of service in the first year:
  - *System outages down 58 percent*
  - *IT service interruptions down 39 percent*
  - *Time to recover from outages down 80 percent*

An industry that depends on IT

Information technology is, in a way, as important to Japan Airlines as the safe and timely transportation of its passengers. Every aspect of the airline's business operations, from reservations to ticketing to scheduling to maintenance to business operations and more, relies on its IT systems to support its business. JAL's IT systems are – in every sense of the phrase – mission-critical.

Increasing passenger volume, along with heavier use of the Internet, is putting greater demands on these systems than ever before: Today, half of JAL's tickets are sold via the Web, and its reservation and ticketing systems are entirely electronic.

"Thanks to this new information, never before available, we were able to dramatically demonstrate the importance of improved monitoring and management of the airline's IT systems to the business side of the enterprise."

– Masayuki Kurosawa,
Vice President, IT Service and Planning

Business Benefits

- Reduces the number of system failures and interruptions, and overall downtime, dramatically: In the first year, system failures were down 58 percent, IT service interruptions were down 39 percent and downtime was reduced by 80 percent; in addition, the rate of outages continues to improve
- Improves overall quality of service by reducing IT outage-related operational delays
- Gives JAL management unprecedented visibility into the current state of its IT systems, fostering a greater understanding of how IT affects the business
- Provides issue tracking, configuration and change management that reduces the overall risk of IT outages and the resulting negative impact on airline flight operations
- Helps to achieve better business resiliency through more efficient, streamlined business processes that help to recover from outages more quickly and prevent IT issues from recurring
- New policies and procedures leverage industry best practices for IT management

"…these actions ultimately benefit not only the airlines individually, but also the industry as a whole"

– Masayuki Kurosawa,

In the airline industry, the cost of an IT outage can be millions of dollars per hour, according to JAL. There is not only the direct cost of lost sales while the systems are down, but the highly interdependent nature of the business means that an IT outage has a ripple effect that is felt throughout the enterprise. The resulting delays cause not only inconvenience for passengers and other customers, but higher costs for the airline as well.

Beyond the direct financial impact, the potential for damage to the airline's reputation is just as great. An outage of as little as 15 minutes will be picked up by the media and reported. A loss of prestige like this can hurt revenues long after the actual problem is cleared up.

Being proactive

Japan Airlines management saw an opportunity, provided by evolving technology, to improve its operations, cut risk and raise the standard of service quality for the entire industry. JAL took a leadership position, pioneering aggressive efforts to improve the availability of its IT systems.

JAL had long been working to maintain the highest possible standards of IT reliability, but these efforts faced a fundamental challenge. JAL had limited visibility into the state of its IT systems at any given time, in terms of configuration, operational status, asset location or the potential impact of changes. Obtaining this information would enhance the company's existing quality initiatives, giving JAL the ability to not only respond more quickly to IT system problems, but provide a basis for continuous improvement so that future problems could be avoided entirely. This improvement in capability had the potential to affect the entire business, enabling JAL to achieve unprecedented levels of service and thus solidifying JAL's market-leading position as a premier air carrier.

With some 1,500 servers supporting multiple business units, the scale of the project was considerable. The project, undertaken by IBM Global Technology Services, addressed the challenge of crossing boundaries within the enterprise. Each division within JAL had its own processes and procedures for change and systems management, and information was not shared between divisions.

In some cases, procedures were inefficient. For example, recovering from an outage might require the presence of a key systems administrator. Since most system changes are conducted in the middle of the night when the load is the lightest, that's when outages are most likely to occur. Understandably, it was often difficult to reach an administrator promptly to authorize corrective action.

JAL Information Technology Co., Ltd. (an IT joint venture company founded by JAL and IBM/JAL's IT arm) and IBM Global Technology Services implemented new procedures and policies based on the industry-standard Information Technology Infrastructure Library (ITIL). This supplier-independent, open framework of best practice approaches facilitates the delivery of high-quality IT services, including an extensive set of management procedures and process design guidance.

The solution monitors system status continuously. Mobile phone electronic message alerts are sent, when needed, to some 200 critical employees (including the CIO) to update the latest IT outage situation so that appropriate action can be taken promptly. Incidents are ranked by severity, from Level 1 to Level 4, with Level 1 incidents being those that can have the most severe impact on flight operations.

To speed recovery and increase system resiliency, the team defined new policies that govern how each kind of incident is to be dealt with. For example, before the most severe incidents can be closed, specific remediation steps must be defined and acted upon. In this way, the same problem is much less likely to recur.

New information focuses the business on the importance of IT

The new information provided by the solution helps not only the IT side of the company, but the business side as well. Thanks to an unprecedented level of knowledge about system status, company management has gained a better appreciation of the mission-critical nature of JAL's computing systems.

Key Components

Hardware

- IBM System p™

Software

- Tivoli Monitoring®
- Tivoli Enterprise Console®

Services

- IBM Global Technology Services – Outsourcing Services

Why it matters

Leading the industry, Japan Airlines implemented an enterprisewide IT monitoring and management solution based on the Information Technology Information Library of industry-standard best practices that has dramatically reduced both the number and severity of IT outages. This saves the airline millions of dollars, reducing risk and maintaining its reputation as a reliable, premium air carrier. The new information that the solution provides gives unprecedented visibility into JAL's IT systems, enabling company management to better focus its attention on mission-critical availability.

At the first board meeting after the system was installed, JAL's CIO was able to show that some 1,000 system changes were being made every month–12,000 per year, each one carrying with it the potential for IT service interruption. "Thanks to this new information, never before available," says Mr. Masayuki Kurosawa, Vice President, IT Service and Planning, "we were able to dramatically demonstrate the importance of improved monitoring and management of the airline's IT systems to the business side of the enterprise. This, combined with our demonstrated results, has helped management to place the appropriate focus and priority on our efforts to improve system availability."

JAL has realized impressive gains in system reliability, resilience and availability. In the first year of operation, Level 1 incidents fell by 58 percent, and Level 2 incidents fell by 39 percent. The time needed for recovery has also been drastically reduced, with systems being brought back online 80 percent faster. Now that JAL has met its initial objectives, it is setting higher standards.

What JAL's leadership means

While JAL's airline industry-first initiatives in boosting IT availability have helped it to maintain its competitive advantage among its peers, these efforts have broader implications. Other airlines have been influenced by JAL's improved performance to make changes of their own. "Taken together, these actions ultimately benefit not only the airlines individually, but also the industry as a whole and the traveling public as well, through improved on-time performance and an air transport system that runs more smoothly," concludes Mr. Kurosawa.

Establishing transparency and best practices-based management of its IT systems is a critical first step to further improvements to come. JAL is investigating server consolidation and a service-oriented architecture approach to its IT systems, two initiatives that promise to reduce the number of potential points of failure while increasing cost-effectiveness and system performance.

For more information

To learn more about how IBM can help transform your business and help you innovate, please contact your IBM representative or visit us at:

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SPAR saves a "six-figure sum" using a virtualized environment for SAP ERP with IBM System p

Overview

■ ***The Challenge***

Existing systems at SPAR Switzerland were not capable of handling the workload that would result from rapid business expansion and new SAP application functionality. Managers wished to implement new IT infrastructure that could scale as demand grew, and would offer greater system performance while reducing operational costs.

■ ***The Solution***

Working with IBM, TDS Multivision and IBM Business Partners Osys, SPAR selected an all-new IT infrastructure based on the advanced virtualization capabilities of IBM System p and IBM System Storage technologies.

■ ***The Benefits***

SAP application response times have been cut by around 40 per cent; administration and maintenance effort has been greatly reduced; IBM Capacity on Demand allows immediate and flexible increase in system capacity should the need arise; total costs of operation are lower than the previous infrastructure.

■ ***Key Solution Components***

Industry: Retail
Applications: SAP® ERP 6.0, SAP ERP Human Capital Management, SAP NetWeaver® Business Intelligence
Hardware: IBM System p5™ 570, IBM System p5 505, IBM System Storage™ DS8100
Software: IBM AIX® 5L™, IBM Tivoli® Storage Manager, IBM HACMP™, IBM Partition Load Manager, Oracle® 10g, Libelle BusinessShadow
Services: IBM Global Financing, TDS Multivision, IBM Premier Business Partner Osys

SPAR Handels AG in Switzerland is growing at around 15 per cent a year, expanding into new markets as well as increasing its existing market share. Based in St Gallen, SPAR generates sales of around CHF 855 million (€525 million) and employs 1,000 full-time staff.

To support operations, the company runs an extensive portfolio of SAP applications on IBM System p servers. With the planned introduction of new SAP applications and extended functionality, the existing IT infrastructure was not capable of delivering the performance, scalability and flexibility that SPAR needed. Senior IT managers, knowing that the technology leases were due for renewal, took the opportunity to review the company's IT systems, looking for the best way to satisfy performance demands from the business, offer a flexible environment capable of dealing with changing market conditions, and reduce operational costs.

Wolfgang Maehr, IT Director, comments, "There were basically two choices: upgrade existing systems or

"IBM Partition Load Manager ensures that application performance is fully optimized, exploiting available resources to the maximum extent – and we have the flexibility to add new application workload as SPAR continues to expand."

Wolfgang Maehr
IT Director
SPAR Handels AG, Switzerland

implement a totally new solution. For the long-term perspective, an upgrade would have simply delayed the decision and have left us with old hardware that was relatively expensive to operate. We selected new IBM System p servers that would enable us to take advantage of features such as virtualization, which would both reduce costs and introduce the kind of flexible environment that was needed to meet SPAR's business requirements."

SAP ERP –a core solution

SPAR has been using SAP applications for many years, starting with retail applications and subsequently migrating to SAP ERP 6.0 software, including core solutions such as finance and controlling, materials management, sales and distribution, warehouse management, SAP ERP Human Capital Management and SAP NetWeaver Business Intelligence (SAP NetWeaver BI).

Wolfgang Maehr explains, "Application performance and availability are crucial since SAP applications are 'the' system at SPAR, used in the stores as well as at headquarters. Our existing SAP application environment was running on IBM System p servers, with response times of around 500-600ms. The reliability of these servers gave us confidence, so we decided to consider moving to the latest IBM systems. We reviewed several benchmarks and IBM was the clear winner."

Working closely with partner TDS Multivision on system specification, SPAR selected two IBM System p5 570 servers, configured using the IBM High Availability Cluster Multi-Processing (HACMP) environment. Should one of the servers fail or suffer a disaster, workload is automatically transferred to the other server without interruption.

The two p5-570 servers support a total of eleven logical partitions (LPARs), each providing what amounts to an entirely separate server for different purposes. The SAP and other applications are distributed between the LPARs on the two systems so that each physical machine has approximately the same workload. The eleven LPARs include production, integration and test environments for the SAP applications, for SAP NetWeaver BI and for IBM Tivoli Storage Manager.

Policy-based flexibility with Partition Load Manager

SPAR is using IBM Partition Load Manager (PLM), a tool that extends the basic Advanced POWER Virtualization features of IBM System p5 servers, by providing additional policy-based balancing of workload. Partition Load Manager provides processor and memory resource management and monitoring across logical partitions within a single managed system. According to customer-defined PLM policies CPU and memory resources can be requested and donated by

LPARs as their workloads change over time.

"Partition Load Manager gives SPAR excellent flexibility," says Wolfgang Maehr. "When we are faced with very high workload demands from a particular application, the system automatically re-balances the resources to ensure the best possible performance and response. In practice, we are only using around 75 per cent of the total system capacity at present, and using IBM Capacity on Demand we can enable more compute power exactly as we need it. Partition Load Manager can then take advantage of the additional resources. IBM virtualization technologies give SPAR perfect scalability – on demand."

SPAR is also making use of the Virtual I/O Server (VIO) feature of IBM Advanced POWER Virtualization for System p, a special-purpose partition that enables the other LPARs to share physical network adapters. VIO helps maximize efficiency of physical I/O resources and reduces the requirement for – and expense of – numerous I/O adapters and their related peripherals, by distributing physical I/O bandwidth across application partitions on POWER processor-based systems. Using the integrated Web interface, VIO allows LPARs to be provisioned with suitable network connections in a matter of minutes. With VIO techniques, it is possible to create more application partitions than there are I/O slots or physical Ethernet, Fiber Channel or SCSI devices. Running two independent VIO partitions per server guarantees full data path redundancy as with dedicated physical adapters.

Safe data storage from IBM

SPAR's SAP application landscape has around 500 named and 300 concurrent users, who access upwards of 1.6TB of data. To manage and secure this precious operational information, SPAR has implemented a storage area network (SAN) based on an IBM System Storage DS8100 for its SAP applications.

"The DS8100 provides enterprise-class data storage at a very effective price point for SPAR," says Wolfgang Maehr, "offering excellent performance and very high levels of data integrity."

IBM Tivoli Storage Manager, running on an IBM System p5 505 server, provides system administration services, which include data backup to an IBM System Storage LTO 3584 Automated Tape Library. The two principal p570 servers are situated at separate offices, and the DS8100 storage server is kept at a third location for maximum physical protection.

"We use Tivoli Storage Manager to control backup processes, with Libelle BusinessShadow, a third-party data mirroring solution, for continuous database shadow copy," says Wolfgang Maehr. "The combination of the hugely reliable IBM hardware, Tivoli Storage Manager and Libelle software offers SPAR excellent data protection."

IBM Global Finance offers a great deal

SPAR and IBM have shared a long-lasting commercial partnership for IT infrastructure. Wolfgang Maehr comments: "The IBM solution provided the best price-performance ratio for SPAR, offering very attractive cost savings.

"IBM Global Finance created a package tailored to SPAR's financial needs, enabling us to take advantage

> *"The DS8100 provides enterprise-class data storage at a very effective price point for SPAR."*
>
> Wolfgang Maehr
> IT Director
> SPAR Handels AG, Switzerland

of the higher performance, greater scalability and lower total costs of operation that could be immediately offset against the purchase price. It was a compelling business case. With this arrangement, SPAR has already negotiated a maintenance contract for the next four years, helping us fix and stabilize IT costs."

Looking to the future

SPAR has seen immediate performance gains from the new IBM System p570 server environment, with response times cut to around 300-400ms. SPAR estimates this has saved a high six-digit sum in boosted productivity.

Wolfgang Maehr comments, "In some ways the performance gain is relatively modest, at 40 percent, because the older IBM servers were so good. However, the new landscape is much easier to maintain, which reduces our administration, maintenance and operational costs. The virtualized IBM environment is ideal for SPAR, because we gain very high availability, higher SAP application performance, greater flexibility and lower operational costs, and yet we only have to maintain a single physical system.

"We have a very constructive, collaborative approach with IBM, which encourages us to consider new projects and new technologies to help us run a more efficient business. IBM Partition Load Manager ensures that application performance is fully optimized, exploiting available resources to the maximum extent – and we have the flexibility to add new application workload as SPAR continues to expand.

"The new IBM solution has the scalability to meet SPAR Switzerland's needs until 2010, maximizing the return on our investment," concludes Wolfgang Maehr.

"The virtualized IBM environment is ideal for SPAR, because we gain very high availability, higher SAP application performance, greater flexibility and lower operational costs, and yet we only have to maintain a single physical system."

Wolfgang Maehr
IT Director
SPAR Handels AG, Switzerland

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

SPC03020-CHEN-00 (03/08)

Usha integrates payroll and ERP with SAP on IBM System i

Overview

- ***Challenge***
  Enhance power and capacity of hardware infrastructure, to enable upgrade to latest version of ERP software and to allow integration of payroll systems with ERP environment
- ***Solution***
  Selected a new infrastructure based on IBM System i™ Solution Edition servers for SAP software, replacing four existing servers with two i550 servers running SAP ERP 6.0, SAP ERP Human Capital Management and IBM Lotus® Domino®; installed an additional i550 for SAP NetWeaver® Business Intelligence
- ***Key Benefits***
  Integration of payroll and accounting systems, reducing manual processing; high-performance System i hardware cuts response times by over 95 percent; reduced management, power and cooling costs for servers

Usha International is the marketing and distribution organization for the Siddharth Shriram Group, selling a wide range of products manufactured by other companies in the group—everything from sewing machines and sandwich toasters through to air conditioning and automotive parts. Its distribution channels include 60 company showrooms and a network of almost 5,000 dealers. Usha products are available at more than 30,000 retail outlets across India, helping to generate annual revenues of over Rs. 5.5 billion (US$138 million). The company employs 1,200 people and has a large network of offices interconnected using a VPN network.

Usha has been using ERP software from SAP since 2000, helping the company to handle processes from procurement to sales and accounting.

“SAP software is at the core of our business,” says Mr. Sukanta Kumar Nayak, Senior General Manager for IT at Usha International. “Around 80 percent of our employees access SAP applications on a daily basis for creating and billing orders to various customers and to check stock. We have a Web portal that allows our suppliers to interact with these systems too.”

Usha wanted to expand its SAP software landscape by deploying additional modules, including the SAP ERP Human Capital Management (SAP ERP HCM) solution, Indian payroll and business intelligence tools for all locations. In addition, changes to key business processes and the opportunity to take advantage of new functionalities made an upgrade to SAP ERP 6.0 an attractive option.

"When we originally implemented our SAP software, we chose IBM System i as the hardware platform," comments Mr. Sukanta Kumar Nayak. "These servers were an excellent investment, and supported 24x7 operations for more than five years. However, we knew that the proposed upgrade to SAP ERP 6.0 would require additional processing power, so we decided to rethink our hardware infrastructure."

Consolidation through virtualization

Usha selected a new infrastructure based on IBM System i Solution Edition servers for SAP software, consolidating its four existing servers to just two IBM System i 550s, taking advantage of IBM Advanced POWER™ Virtualization technologies. The IBM System i Solution Edition for SAP software is a packaged solution combining hardware, operating system, database and application software, giving mid-sized companies a powerful yet cost-effective ERP solution that is also fast and easy to deploy.

The first i550 has four IBM POWER5+™ processors. The second machine has two processors and three logical partitions (LPARs), which support development and quality assurance systems for the SAP software as well as the company's IBM Lotus Domino server. Usha added a third i550 for its new SAP NetWeaver Business Intelligence component, with two processors and two LPARs—one for the production environment and one for development.

"Using IBM Advanced POWER Virtualization gives us a very flexible hardware landscape, enabling us to allocate processing resources in an optimal manner," says Mr. Sukanta Kumar Nayak. "For example, when we reach the end of the month, we have the option to allot more processor capacity to reporting systems, helping them to handle the increased workload.

> *"Using IBM Advanced POWER Virtualization gives us a very flexible hardware landscape, enabling us to allocate processing resources in an optimal manner… As a result, we have the option to run our month-end reports without blocking up the entire system, which used to be a problem with our old infrastructure."*
>
> — Mr. Sukanta Kumar Nayak, Senior General Manager for IT, Usha International

As a result, we can run our month-end reports without blocking up the entire system, which used to be a problem with our old infrastructure."

Thanks to their high-performance POWER5+ processors, the new System i servers have given a considerable boost to order processing speeds. Response times have been reduced from over two minutes to a matter of seconds—an improvement of more than 95 percent in many cases.

Leveraging DB2 for i5/OS

Usha's SAP software environment currently encompasses around 3 TB of data, which is held in IBM DB2® databases.

"DB2 is embedded in the i5/OS® operating system, so it is a highly robust and reliable platform for our ERP environment," says Mr. Sukanta Kumar Nayak. "The built-in database administration tools are excellent, helping to optimize performance and delivering excellent response times. Moreover, we are now able to back up the database without taking it offline—enabling true 24x7 operations, which is a huge advantage."

DB2 also has specific advantages as a database platform for SAP ERP. An integrated DBA cockpit allows the database to be managed from within the SAP software, making administration simple. By upgrading to the latest DB2 9 software, Usha has benefited from features such as deep compression and XML support.

The data is stored using on the internal disk drives of the i550s, and backed up to an IBM 3581 Tape Library, with Ultrium 3 Tape Drives.

"The i550 internal storage should provide enough capacity to match business growth for the next three years, avoiding further capital expenditure on hardware," says Mr. Sukanta Kumar Nayak. "The IBM Tape Library provides a highly effective centralized backup infrastructure, helping to keep our data safe and providing a simple recovery process in case of disaster."

Scalability and low TCO

"As our SAP software landscape grows, we can simply activate extra CPUs in the i550 servers—there is no need to buy an additional box," explains Mr. Sukanta Kumar Nayak. "With multiple virtualized environments running on just two physical servers, we keep electricity and air conditioning costs to a minimum, and free up valuable space in the data center. This all adds up to a low total cost of operation, and should lead to a rapid return on investment."

> *"By consolidating our SAP ERP and Lotus environments to the IBM System i 550 platform, we have built an infrastructure that offers excellent performance and scalability, without compromising on business resilience."*
>
> — Mr. Sukanta Kumar Nayak, Senior General Manager for IT, Usha International

He concludes: "By consolidating our SAP ERP and Lotus environments to the IBM System i 550 platform, we have built an infrastructure that offers excellent performance and scalability, without compromising on business resilience."

For more information

Contact your IBM sales representative or IBM Business Partner. Visit us at:

ibm.com/systems/i

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Route 100
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Produced in the United States
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BBC03001-USEN-00

Finance

Norwich Union transforms its mainframe auditing and monitoring capabilities with IBM Tivoli zSecure software.

Overview

Norwich Union
Norwich, United Kingdom
www.norwichunion.com

Industry
- Insurance

Products
- IBM Tivoli zSecure Admin
- IBM Tivoli zSecure Alert for RACF
- IBM Tivoli zSecure Audit for ACF2
- IBM Tivoli zSecure Audit for RACF

IBM Business Partner
- Logicalis

"IBM Tivoli zSecure software gives us a simple, powerful way to comply with identity and access management initiatives, and to assure auditors that preventative, detective and corrective controls are installed."

—Phil Secker, Security Support Manager, Norwich Union

Norwich Union is part of the Aviva group, a leading provider of life and pension products in Europe and one of the largest insurance groups in the world.

Challenge

Norwich Union needed to facilitate compliance with identity and access management initiatives by implementing preventative, detective and corrective controls within its IT environment. Norwich Union had been leveraging homegrown utilities and code, but these methods were limiting. With several Resource Access Control Facility (RACF®) tools to maintain various RACF databases, the company needed a strategic, robust solution to keep up with high demand for security and audit reports, and with often-complex security requests.

Solution

IBM Business Partner Logicalis helped Norwich Union consolidate some of its RACF databases into a single database, with IBM Tivoli® zSecure software playing a key role. The consolidated database was an enabler for various business initiatives, including a central repository for security administration, analysis and reporting. This is managed by IBM Tivoli zSecure software, which is a collection of mainframe security administration, compliance and auditing solutions.

The solution includes IBM Tivoli zSecure Admin software, which enables efficient RACF administration with fewer resources and IBM Tivoli zSecure Audit for RACF and ACF2 software, which automatically analyzes and reports on security events and exposures. Norwich Union also invested in IBM Tivoli zSecure Alert for RACF software to enable quick response to RACF and z/OS events through real-time alerting. These solutions have helped the client address the demands of its growing, hetrogeneous mainframe environment, including compliance with tighter security policies, procedures and regulations.

Benefits

- Simplifies mainframe security administration tasks, improving efficiency and reducing errors
- Enables quick, proactive response to security events
- Supports robust audit and compliance reporting

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Software Group
Route 100
Somers, NY 10589
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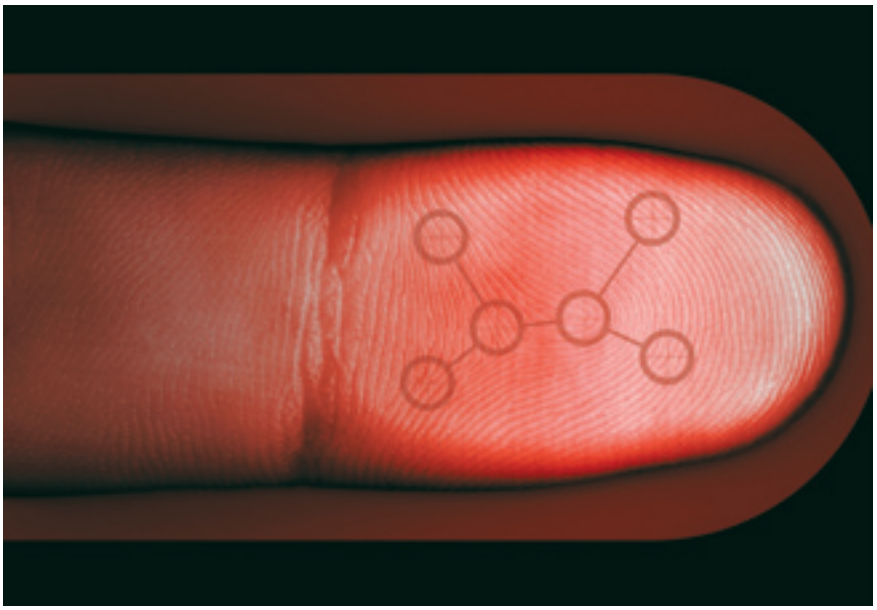
IBM and Valid Technologies implement fingerprint recognition to improve security at The International Bank of Miami, N.A.



IBM Business Partner: Valid Technologies LLC

Valid Technologies is the developer of an advanced fingerprint biometric solution that enables strong user authentication processes within a secure, reliable service oriented architecture framework. The company is headquartered in Boca Raton, Florida.

The password-based authentication method used at The International Bank of Miami, N.A. needed to be replaced because it was complicated and difficult to manage. Employees needed to have different passwords for each system, and forgetting one or more passwords was a common occurrence.

Over 30 percent of the work orders coming to the bank information technology help desk were requests for password resets, each of which took several minutes of staff time to resolve. There were hundreds of such requests each month.

The goal was a stronger authentication system, but if the bank stuck with a password approach, it was faced with having to require and enforce more elaborate passwords — for example, mixing upper and lower case letters combined with numbers — and with requiring them not only for general access to restricted areas but also for discrete transactions, such as wire transfers.

SOA enters picture

The bank turned to a solution provided by IBM and Valid Technologies LLC, an IBM Business Partner that has carved out a specialty in biometric authentication, using fingerprint recognition devices. The solution includes Valid's flagship product, Valid Secure System Authentication (VSSA), plus IBM DB2® for i5/OS®, IBM WebSphere® Application Server, IBM System i™ and IBM eServer™ BladeCenter®.

After testing and training, the IBM and Valid solution was running within three months.

Improvements came early and dramatically, including a 25 percent reduction in work orders for password resets, said Ray Guzman, vice president of information technology at the bank.

> ***"The VSSA and IBM solution is one, strong, and irrefutable form of verification of identity that can be used to authenticate users to operating systems and applications, including at the transactional level."***
>
> Ray Guzman,
> vice president,
> information technology,
> The International Bank
> of Miami, N.A.

"But there's another benefit that is even more important than the efficiencies gained by the use of the IBM and VSSA solution," Guzman said. "And that is our users no longer have to remember multiple passwords or go through password reset routines or risk reprimands for writing down passwords on their desk blotters. All they do is use the fingerprint reader attached to their PCs, and that's it," he explained.

VSSA can enable every logon and transaction throughout an enterprise with touch-of-a-finger biometric convenience, accountability and security. It is designed to run on the IBM System i, which communicates easily with mainframe, UNIX®, Linux® and Windows™ applications.

"The VSSA and IBM solution is one, strong, and irrefutable form of verification of identity that can be used to authenticate users to operating systems and applications, including at the transactional level," Guzman said.

It also is compliant with a service oriented architecture (SOA) framework. SOA stresses modularity and reusability of code in the building of applications, resulting in more adaptable and less costly applications.

Multiple passwords bypassed

Greg Faust, chief executive officer of Valid Technologies, said he and his colleagues knew when they founded the company that the System i was the ideal platform to host their technology.

"We were convinced that existing approaches were weak and wrong-headed, based as they were on the Windows operating system, with each application designed for a specific purpose," Faust recalled. "We wanted to go with the i5 because of its openness and rock-solid reliability and the robustness of the database" — IBM DB2 for i5/OS."

He continued: "DB2 is just enormously efficient, enormously fast and enormously securable. And we needed to have it very securable."

The networks advantage

Valid Technologies participates in IBM PartnerWorld® Industry Networks, which offers a rich set of benefits to all IBM PartnerWorld members who want to team with IBM to build their vertical market capabilities, expand their partner network and attract customers in the markets they serve. Valid is "optimized" in the banking industry, which means it has developed further specialization by optimizing its applications with IBM technologies, achieving success with its own solutions and other criteria.

Faust said, "Participation by Valid in IBM PartnerWorld Industry Networks means a lot because it is providing us with a great many avenues and contacts that we would not have otherwise. The objectives of IBM and our own are very closely parallel. So it just makes sense."

For more information

Please contact your IBM sales representative or IBM Business Partner. Or you can visit us at: **ibm.com**

For more information about ISV resources from IBM PartnerWorld, visit: **ibm.com**/partnerworld/industrynetworks

To learn more about Valid Technologies, visit: validtech.com

To learn more about The International Bank of Miami, N.A., visit: tibom.com

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Banca March gains flexibility, boosts system performance and prepares to expand its business with IBM software.

Overview

Banca March
Palma de Mallorca, Spain
www.bancamarch.es

Industry

- Banking

Software

- IBM DB2® Administration Tool for z/OS®
- IBM DB2 Automation Tool for z/ OS
- IBM DB2 Object Comparison Tool for z/OS
- IBM DB2 SQL Performance Analyzer for z/OS
- IBM DB2 for z/OS
- IBM DB2 Utilities Suite for OS/390® and z/OS
- IBM Rational® Functional Tester
- IBM Rational Functional Tester Extension for Terminal-based Applications
- IBM Tivoli® OMEGAMON® XE for DB2 Performance Expert on z/OS
- IBM Tivoli OMEGAMON XE for CICS® on z/OS
- IBM Tivoli Workload Scheduler

Servers

- IBM System z™

Headquartered in Palma de Mallorca, Spain, Banca March offers banking, securities, property investment and insurance services in Spain as well as London, the Canary Islands, the Balearic Islands, the Mediterranean coast and Andalusia.

Challenge

For several years, Banca March had been using a small IBM mainframe, maintained by IBM, to manage its customer transaction data. To compete with larger banks that offer more advanced services, Banca March had decided to introduce innovative new products and expand with 30 new branches, but its database system could not accommodate the expansion.

Solution

Banca March renegotiated its contract with IBM Global Technology Services – Worldwide Strategic Outsourcing to revamp its infrastructure and expand the capability of its database system. The bank chose the powerful IBM DB2 for z/OS data server running on an IBM System z mainframe to host its production and development environments.

To optimize the performance and stability of the DB2 data server, IBM implemented a suite of IBM DB2 tools and IBM Tivoli and IBM Rational software. The client leverages the Tivoli software to effectively manage the database performance workload. For example, Tivoli Workload Scheduler is integrated with the bank's mainframe-based planning tool to simplify the monitoring and control of workflow spanning its mainframe and distributed environments. The DB2 software tools enable the client to manage and administer the database and to automate internal processes. The company uses Rational Functional Tester tools to validate processes in its development environment.

The solution is being hosted at an IBM data center in Torrejón, outside of Madrid, Spain. The client retains management of its systems while IBM continues to manage the hardware infrastructure.

BANCA MARCH

Benefits

- Increases the capacity and performance of the bank's database system
- Boosts IT efficiency with database management tools
- Enables the client to compete effectively with larger banks

"IBM products and services are the key to our business success and enable us to compete head-to-head with companies much larger than our own."

— Juan Mairata, IT Operations Manager, Banca March

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Bank of Montreal enables rapid recovery with high availability technology from IBM

"Bank of Montreal Photo by Matthew Plexman"

Overview

- ***Challenge***
  To increase the Bank's operational resiliency by extending the distance between data center sites
- ***Solution***
  Implementing a high availability solution that includes IBM Geographically Dispersed Parallel Sysplex™ (GDPS®) and Server Time Protocol (STP)
- ***Key Benefits***
  Enables disaster recovery in less than two hours, enables a recovery point objective of zero over a distance of 100 km, and helps the Bank meet regulatory requirements

One of the five largest banks in Canada, Bank of Montreal (BMO) is a highly diversified financial services organization with assets that totaled over US$366 billion in 2007. BMO utilizes a wide array of technologies to support the processing of financial data, including a significant investment in IBM systems and software. Bank of Montreal serves the U.S. market through Chicago-based Harris N.A., which has the third largest number of branches in the Chicago area and over $42 billion in assets.

For financial institutions like BMO, the ability to recover from major system failures is critical. When the events of September 11, 2001, highlighted significant deficiencies in the disaster preparedness of many companies, the U.S. government issued a series of new regulations and industry-specific guidelines designed to address this problem. The "Interagency White Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System" and other guidelines provide numerous recommendations for improving the recovery capabilities of financial institutions, including locating the disaster recovery center beyond the immediate region of a primary facility, and delivering zero percent data loss up to the point of disaster.

"That white paper definitely had a strong influence on our plans," explains Malcolm Sanderson, a senior technical architect at BMO. BMO responded to the challenge by implementing an ambitious program of improvements to its disaster recovery strategy, beginning with the development of a new data center location.

BMO's Operational Resiliency Program

The original backup and disaster recovery (DR) site was located less than 10 km from the primary data center, an inadequate distance to be considered "out-of-region." To solve this problem, BMO set up a new site—one that was

100 km away. This effort, part of BMO's Operational Resiliency Program (ORP), had several important goals: to increase the distance between the primary and backup sites, to achieve a recovery point objective of zero, to establish two control points for operations, and to enable system and workload restoration within a two-hour timeframe.

IBM helped supply BMO with the technologies necessary to achieve these resiliency goals and supported the project throughout the implementation. Says Sanderson, "We have a very strong IBM team locally that's been involved in the project. We've had them engaged all the way through."

Early adopters of STP

Critical to the success of the new data center was the ability to synchronize transactions between the Bank's primary and backup servers—10 IBM System z™ mainframes in all. Peer-to-peer remote copy (PPRC) was used to achieve data mirroring between sites, effectively synchronizing transactional data between the servers. Geographically Dispersed Parallel Sysplex (GDPS), a multi-site end-to-end application availability solution, was used to automate the recovery process and manage the PPRC environment.

But the primary challenge of the BMO implementation was the increased distance between the two sites. GDPS has typically relied on Sysplex Timer® technology, which could only support distances of up to 40 km without intermediate sites. The Bank's two sites are linked through nearly 100 km of fiber optic cable, a length that far exceeds that limit. To meet this challenge, BMO became an early adopter of a newly developed IBM timing technology known as Server Time Protocol (STP).

STP, which keeps multiple processor clocks at different locations in sync with each other, was designed to enhance the capabilities of GDPS/PPRC. STP supports a multi-site Coordinated Timing Network (CTN) that allows clock synchronization between System z mainframe servers up to 100 km apart. BMO was the first IBM customer to implement GDPS/PPRC via STP at this distance.

In order to implement the solution, BMO had to expand capacity of their storage subsystem, which consists of an IBM System Storage™ DS8300 at the primary data center and an IBM Enterprise Storage Server® 2105 at the backup site. They also had to upgrade their IBM z/OS® version on an accelerated timeline.

As an early adopter through the IBM Implementation Assistance Program (IAP), BMO gained advance access to cutting-edge STP technology, and they had the opportunity to give specific feedback about their needs early in the development process, ensuring a more timely and personalized response.

Measurable successes

The IBM solution has fulfilled BMO's requirement for longer-distance recovery, and it has enabled a recovery point objective of zero. "Prior to this implementation, if we had a disaster we would lose an entire day's transactions for some applications," says Sanderson. "We wanted to get to the point where we could recover all transactions up to the point of disaster."

Reaching that goal was a team effort, and one that required aggressive testing before, during and after the implementation. "We did an enormous amount of testing on all of this technology prior to implementation," says Sanderson, "And IBM was at the table throughout this process." Even before testing began at the new site, a variety of tests were conducted in a lab environment, including tests on a 100-km spool of fiber cabling so GDPS and STP could be tested thoroughly at the full distance.

> *"IBM was at the table throughout this process."*
>
> – *Malcolm Sanderson, Bank of Montreal*

Now that the solution is in production, BMO continues to conduct recovery tests several times a year, a process that also measures how long the recovery process takes. "Our goal is to recover services within two hours from the time we initiate the recovery process," says Sanderson. A recent BMO test showed a recovery time of just one hour and 54 minutes, surpassing the goal by six minutes.

"What GDPS brings to the table is the automation necessary to allow us to recover within a two-hour timeframe," Sanderson explains. "It automates a lot of manual processes, and with automation you get speed. It also detects conditions that might cause the recovery to fail. With our new GDPS system, once we make the decision to do a site takeover, we simply tell the system, and the system completes the recovery automatically."

Reducing operational risk

BMO and Harris N.A. have benefited from this implementation in other ways as well. By bringing their disaster recovery strategy into compliance with federal guidance, they have significantly reduced their risk of data loss when recovering from a system failure. And although this improvement in operational resiliency is largely invisible to the Bank's customers, it helps to ensure that institutional trust will be maintained in the event of a catastrophe. As Sanderson says, "The real benefit to the business is a reduction in risk. We have a better insurance policy now than we had before."

> *"The real benefit to the business is a reduction in risk. We have a better insurance policy now than we had before."*
>
> – *Malcolm Sanderson, Bank of Montreal*

"Data protection and reputational risk are our critical success factors," says Lee Dunn, vice president of BMO's Operational Resiliency Program. "Businesses have evolved from paper-based transactions to electronic transactions through a number of channels and are heavily reliant on technology. The implementation of PPRC, GDPS and STP technologies has enabled BMO to provide the right level of resiliency to our internal lines of business."

"Part of the team"

Sanderson says that the IBM GDPS High Availability Team provided excellent service and support to the BMO staff throughout the project. "IBM has been an integral part of the team," reports Sanderson. "They've been living side-by-side with our system programmers—attending meetings, helping with planning, coming in at midnight when we're testing."

"They've also done a lot of the integration prep work," he continues. "For example, IBM has a partnership with Nortel, so they were able to test the GDPS solution with Nortel to make sure everything was going to work properly."

Extending the solution

With the BMO implementation, GDPS has been proven to operate at greater distances than previously possible, helping BMO achieve its disaster recovery objectives for Harris N.A. The Bank's Operational Resiliency Program has since moved into its next phase, which includes applying these same technologies to applications for Bank of Montreal.

For more information

Contact your IBM sales representative or IBM Business Partner. Visit us at: **ibm.com**/systems/z

For more information about Bank of Montreal and Harris N.A. of Chicago, visit: www.bmo.com

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OIC03005-USEN-00

Deutscher Ring goes virtual with IBM System p for cost savings and increased performance

Overview

■ ***The Challenge***

With SAP software divided between various platforms and servers, Deutscher Ring's infrastructure was complex, inefficient and costly to run. There was limited flexibility in allocating resources to changing business requirements, and performance was deteriorating as workload grew.

■ ***The Solution***

Deutscher Ring worked with IBM Global Technology Services to migrate its entire SAP software landscape, both databases and applications, onto two IBM System p5 570 servers running IBM AIX 5L and IBM DB2. The company also implemented IBM Tivoli Storage Manager and IBM DB2 Content Manager with DB2 CommonStore for SAP software, and plans to introduce IBM Tivoli System Automation.

■ ***The Benefits***

Reduced costs by around 33 per cent, while cutting some batch runs from 90 minutes to just 30 minutes and delivering a 40 per cent improvement in general SAP software response times; gained significant flexibility with IBM Virtual I/O Server, a component of IBM Advanced POWER Virtualization for System p; improved operational efficiency with SAP Insurance Collections and Disbursements (SAP FS-CD) and strengthened strategic management by delivering Balanced Scorecards using SAP Business Information Warehouse (SAP BW) and SAP Strategic Enterprise Management (SAP SEM).

■ ***Key Solution Components***

Industry: Insurance
Applications: SAP® R/3® with financial accounting and controlling, materials management, SAP Insurance Collections and Disbursements, SAP Business Information Warehouse, SAP Strategic Enterprise Management
Hardware: IBM System p5™ 570
Software: IBM AIX® 5L™, IBM DB2® optimized for SAP software, IBM Tivoli® Storage Manager, IBM DB2 Content Manager, IBM DB2 CommonStore for SAP software, IBM Tivoli System Automation
Services: IBM Global Technology Services

Deutscher Ring AG is a major private insurance firm, headquartered in Hamburg and with branch offices throughout Germany. The company employs more than 1,700 people to manage around 2.8 million contracts, with total annual booked gross fees and deposits of approximately €1.5 billion.

With an SAP software environment divided between a number of IBM and HP Intel® processor-based servers Deutscher Ring had a relatively complex infrastructure that required multiple different skill sets to manage.

Aiming to standardize on a single platform that would offer a high degree of flexibility, excellent performance for both batch and interactive workload, and low management costs, Deutscher Ring selected the IBM System p5 platform running IBM AIX 5L for its entire SAP software landscape.

Werner Rave, Manager of IT Architecture Department at Deutscher Ring, comments: "The IBM System p5

"Our costs relating to hardware are now about 33 per cent lower with the System p5 solution, and at the same time we have seen dramatic improvements in both batch performance and system response times."

Werner Rave
Manager of IT Architecture Department
Deutscher Ring AG

platform provides a high-performance environment for our SAP software, with excellent flexibility. We use advanced virtualization features to run multiple independent systems on each p5 server, and we can automatically increase or reduce the computing power as business demands fluctuate."

Flexible choice

Deutscher Ring worked with IBM Global Technology Services to migrate its SAP databases and applications to two IBM System p5 570 servers running AIX 5L V5.3. Each p5-570 has a total of eight IBM POWER5 processors, of which four are permanently active on each server. The remaining four processors on each p5-570 can be activated on a temporary basis using IBM On/Off Capacity on Demand, giving Deutscher Ring ample headroom for both unexpected spikes in demand and ongoing business growth, without requiring the company to permanently invest in the additional capacity. Similarly, each p5-570 has 64GB of main memory, of which 40GB on each is permanently active, with the remainder available on demand.

Deutscher Ring has two separate data centers – one in-house and one operated by a service provider several kilometers away. The new System p5 architecture is split between the two, with workload balanced across both servers. Deutscher Ring supports 1,800 named users of SAP applications on the two p5-570s, with typically 400 concurrent users. All production, quality assurance, test and development systems run in LPARs on these two systems. In the unlikely event of a failure at one data centre, the remaining p5-570 can run the entire workload of the productive system, ensuring business continuity.

"We aimed to divide batch-intensive workload between the two System p5 servers to provide high performance with built-in protection against unplanned downtime," says Werner Rave. "The sophisticated Dynamic LPAR and Micro-Partitioning capabilities of the System p5 platform were a major factor in our choice of solution, making it easy to run multiple SAP software environments side-by-side in a single footprint. They also allow us to re-allocate resources on the fly, so that we can prioritize batch workload overnight, then switch the power back to live users during the working day."

Virtualization for efficiency

Dynamic Logical Partitioning (DLPAR) and Micro-Partitioning are both features of IBM Advanced POWER Virtualization for System p. Deutscher Ring also takes advantage of another feature: Virtual I/O Server. Each p5-570 uses a combination of

redundant Virtual I/O Servers and physical I/O adapters connecting to both enterprise LAN and SAN. While the Virtual I/O Servers provide access for multiple SAP LPARs across shared I/O adapters, the physical adapters are dedicated to those partitions which constantly require a high volume of I/O. Each time a new LPAR is created, it can simply be connected to a Virtual I/O Server rather than a physical adapter, saving time and reducing complexity.

Says Werner Rave, "With Virtual I/O Server, we no longer need to install, connect and configure physical adapters when building a new partition. This saves a great deal of time and money, and reduces the downtime by avoiding the need for a physical installation with cabling. Additionally, we can pool the total bandwidth and share it between virtual systems, automatically providing more capacity for systems that need it."

Without Virtual I/O Server technology, Deutscher Ring would require a large number of physical adapters, some of which would be underused while others would occasionally lack bandwidth – making for a costly and inefficient solution.

Performance gains

By consolidating from multiple systems on different hardware platforms to just two p5-570s, Deutscher Ring simplified its infrastructure and reduced hardware administration and maintenance costs.

"Our costs relating to hardware are now about 33 per cent lower with the System p5 solution, and at the same time we have seen clear improvements in both batch performance and system response times," says Werner Rave. "The POWER5 processors in the p5-570s offer very good price-performance. Some queries in SAP BW and SAP Strategic Enterprise Management that previously took 90 minutes now take just 30 minutes, and users are experiencing a 40 per cent improvement in general SAP R/3 response times."

Deutscher Ring made a strategic decision to adopt IBM DB2 optimized for SAP software on AIX, partly for its innate scalability and partly for its close adaptation to the demands of SAP software. The company uses DB2 to manage around 3.8TB of data for 1,800 users. Werner Rave comments, "DB2 optimized for SAP software is now the main development database at SAP, and the close cooperation between IBM and SAP makes it an excellent choice for us."

Standardized functionality from SAP

In addition to its core ERP functionality from SAP, Deutscher Ring runs its SAP Insurance Collections and Disbursements (SAP FS-CD) application on the p5-570s – a special integrated environment for managing inbound and outbound insurance payments. Previously, the company had a third-party mainframe-based solution written in COBOL to handle these payments.

"The previous payments management solution was becoming increasingly difficult to manage," says Werner Rave. "We saw SAP FS-CD as the best-of-breed solution, and we certainly value having a standard solution that integrates easily with our ERP systems. With better control over our policies and payments through SAP Insurance Collections and

"By virtualizing our SAP software environment and running it on the highly flexible IBM System p5 servers, we have seen impressive reductions in our total cost of ownership while simultaneously boosting performance and availability for the business."

Werner Rave
Manager of IT Architecture Department
Deutscher Ring AG

Disbursements, our business risk is lower, and the SAP application helps internal users work more efficiently.

Balanced Scorecards

Deutscher Ring uses SAP BW as the basis for its SAP SEM application, which it uses to run Balanced Scorecards. The Balanced Scorecard is a technique that aims to translate business strategy into terms that can be easily understood, communicated and acted upon, by clearly defining the meaning of concepts such as quality, customer satisfaction and growth.

Says Werner Rave, "In the past, management information was rather technical and poorly presented in visual terms. Our senior management wanted to deploy a new strategic steering system that would enable at-a-glance views of performance across the whole enterprise. Once a month, managers receive a range of scores based on predefined measures, enabling them to identify potential issues and react to them in a timely and informed manner."

The Balanced Scorecard has 200 named users, and is built using complex queries on around 50GB of data. The POWER5 processors in the p5-570 ensure that the multidimensional queries on highly interdependent data sets run quickly so that reports are delivered to users on time.

Automatic management

Deutscher Ring uses IBM Tivoli Storage Manager to automate the backup of the DB2 databases that support its SAP software, and has deployed IBM DB2 Content Manager with DB2 CommonStore for SAP software to handle the archival and retrieval of SAP documents. The full IBM DB2 Content Manager environment stores 3.8TB, of which approximately 11 GB are SAP documents.

In the near future, Deutscher Ring plans to extend its deployment of IBM Tivoli System Automation (Tivoli SA) – currently implemented in its mainframe environment – to cover its AIX environment also. Based on a "desired state" and goals defined by an administrator, Tivoli SA monitors system operations and automatically corrects deviations from the predefined state, helping to ensure high system availability.

Says Werner Rave, "There are still significant links between our SAP software systems and systems running on our mainframes, and managing the interfaces is very important. We plan to deploy Tivoli SA to manage all business-critical systems with a single set of tools, which will enable us to offer better service with the same IT administration team.

Building long-term benefits on System p5

By migrating its SAP software landscape entirely to the IBM System p5 platform with DB2 database, Deutscher Ring has successfully reduced the number of servers in the data centre, bringing down total cost of ownership while improving performance, availability and flexibility. The addition of Tivoli and DB2 tools for automating backup, document management and systems management will help the company to keep long-term support costs low and keep skilled staff available for high-value work.

Werner Rave concludes, "By virtualizing our SAP software environment and running it on the highly flexible IBM System p5 servers, we have seen impressive reductions in our total cost of ownership while simultaneously boosting performance and availability for the business."

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> Werner Rave
> Manager of IT Architecture Department
> Deutscher Ring AG

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

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Mn Services relies on IBM Consul InSight to meet SAS-70 IT control requirements.

Overview

- ***Challenge***
  Meet stringent auditors' requirements to satisfy Statements on Auditing Standards (SAS)-70
- ***Why IBM?***
  Expert and innovative advice, flexible solution and services, and proven track record with other financial institutions
- ***Solution***
  Company-wide monitoring of critical IT control processes
- ***Key Benefits***
  Acquired SAS-70 certification; improved quality of IT infrastructure; completed implementation of system in 3 months

Mn Services found in the IBM Consul InSight Security Manager solution an optimal tool to manage the most important IT controls and meet the most stringent auditors' requirements.

Dutch Mn Services manages pensions and insurance and supports companies in the management of their institutional capital. With 650 employees, the organization looks after the pension administration of more than 1.1 million Dutch citizens and manages 55 billion USD (July 2007) for an increasing number of clients.

Flexible, insightful and involved. Those are key words that characterize the company's services. Mn Services offers a wide range of services encompassing pension management,

"We tested our decision to choose IBM Consul with our internal IT auditor. He was impressed with its forensic investigation capabilities. Other important aspects are the enormous ease of use and the transparency of the data."

– Jurgen Batteram, Security Manager, Mn Services

"The nice thing about the IBM Consul solution is that it is a tool with many adjustment possibilities and many options. It takes on average half an hour to get an overview and I can easily determine if and which security breaches have taken place."

– Piet Osefius, Security Coordinator, Mn Services

insurance, employee benefits, management support and asset management. Clients can rely on Mn Services for a complete package of integrated services, as well as for individual service offerings.

Mn Services considers innovation to be important and directs much attention to the development of both staff and processes. For example, advanced administrative systems enable the organization to keep the most recent information at its disposal. This clearly benefits business performance and the value delivered to customers. At Mn Services, the client's interests always come first and the organization aims to achieve the very best results.

Meeting the most stringent IT control requirements

Last year Mn Services, located in Rijswijk, near The Hague, Netherlands, decided to introduce SAS-70. The company found in the IBM Consul InSight Security Manager solution an optimal tool to manage the most important IT controls and meet the most stringent auditors' requirements. SAS-70 stands for '"Statements on Auditing Standards number 70." These regulations pertain to the critical processes within the organization, including IT controls. Depending on the type of process or system being monitored, certification does not take place automatically. Qualification, therefore, must be proven to independent auditors each year.

Thorough preparation

For some time, Mn Services had been looking for a control and monitoring tool for the security of the IT infrastructure. "When in the past year the decision was made to work in conformity with SAS-70 guidelines, we already had a point of departure. Our extensive preliminary inquiries from past years were a good starting point for the approach we desired," explains Jurgen Batteram, security manager, Mn Services.

Leon Verschoor, responsible for purchasing information and communications technology (ICT), explains that external consultants had advised the firm on potential suppliers, products and support. "In that preparatory stage we also wanted to check the quality and professionalism of the future supplier's local sales and support organization. The professionalism of advice, flexibility of the solution and services, and a proven track record with other financial institutions were what made us choose IBM Consul."

Auditor-proof and suitable for forensic investigation

"In addition to that, we tested our decision to choose IBM Consul with our internal IT auditor," says Batteram. "He was impressed with its forensic investigation capabilities. Other important aspects are the ease of use and the transparency of the data."

Mn Services takes care of the collection and the monthly payments to the retirees of various Dutch pension funds. "The latter encompasses over 100,000 clients and many millions of Euros a month. It goes without saying that it is of the greatest importance to us and to our clients that this is done according to the service level agreements we have," says Verschoor. "Our customers, in particular the larger pension funds and investment companies whose capital we manage, expect us to show proof that our systems are set up in the safest and best possible way to conduct 'E-tail Business' (retail via the Internet). To qualify for certification according to SAS-70 requires defining and setting up a demonstrable process approach of main and sub-processes."

Trust requires control; control offers certainty

"Using the most advanced IT and security management program enables us to offer demonstrable services of the very highest quality level," concludes Verschoor. Piet Osefius, security coordinator at Mn Services, adds, "Within this framework it is essential that not only the general users of our IT systems—both internal and external—but also the managers and administrators—deal with our systems as carefully as possible. Of the 50 people involved in this process, some 20 have a very high degree of authorization. To them it is important that they are trusted and that they operate according to their competencies and assignments. IBM Consul InSight Security Manager offers the kind of protection that allows us in case of catastrophes to determine afterwards what has happened. This can be monitored accurately and is observed daily in the program."

Easy to use with direct access to any event

"With respect to the separation of functions, the administrators in Mn Services' front office check the activities of the administrators in the back office. If we determine, via the handy dashboard of IBM Consul InSight Security Manager, that undesired activities have taken place in the system, the problem is automatically escalated to ICT and security management," explains Batteram.

Key Components

Software

- IBM Consul InSight Security Manager

"Thanks to the insights gained through IBM Consul InSight, the quality of our infrastructure has increased. We continuously measure the operation of our servers; with the information we obtain we can optimize the settings."

–Piet Osefius

"Once the decision was made to work with IBM Consul, we decided to have IBM Consul specialists support us in the implementation phase. In part thanks to this decision we had the entire system up and running in three months, including an adequate monitoring level."

– Piet Osefius

"The nice thing about the IBM Consul solution is that it is a tool with many adjustment possibilities and many options. By means of signal colors we can determine right away where and when remarkable events have taken place," according to Osefius. "This gives us the opportunity to determine via a few simple clicks whether we are dealing with a human mistake or a behavioral pattern. The system is very user-friendly and therefore very suitable to be used on a daily basis. It takes on average half an hour to get an overview and I can easily determine if and which security breaches have taken place."

Double infrastructure — double security

Mn Services has a disaster-tolerant IT structure, with a mirrored infrastructure in two places. In case of a disaster on one site, business activities will continue uninterruptedly from the other site. The IT infrastructure consists of Microsoft® Windows® 2000 and 2003 Network Servers, IBM AIX® 5.3, Oracle 10*g* databases and IBM System i™ systems. Currently the company monitors some 100 servers and the main corporate databases, including a large number of applications developed in-house. "IBM Consul offers the advantage of insight at a high aggregation level into what is going on within our system," says Osefius. "In addition we can, if something occurs, get into the finest details on a log-in level to determine the cause. This information enables us to conduct forensic investigations and gather proof of evidence. The good thing with IBM Consul is that we can gain the permanent ability to see how the system has been set up, including all baseline and audit settings and other security measures. Thanks to the insights gained through IBM Consul InSight, the quality of our infrastructure has increased. We continuously measure the operation of our servers; with the information we obtain we can optimize the settings."

Good support, quick implementation

"Once the decision was made to work with IBM Consul, we decided to have IBM Consul specialists support us in the implementation phase," says Osefius. "In part thanks to this decision we had the entire system up and running in three months, including an adequate monitoring level. Finding the balance fast requires a lot of expertise and experience. Consider all that's involved, for instance, in the security baseline settings of the server setup and adjusting the audit settings. In addition, you have to consider that, if company policy forces you to switch to a too-detailed information provision, there is a risk that you will drown in the sheer amount of information that is generated. Thanks to the possibilities of IBM Consul InSight Security Manager it didn't take us very long to come to a surprisingly good result. Following the initial phase we are now fine-tuning the system to meet our specific needs."

IBM Consul makes IT security easily manageable

"What better thing than to step into the office in the morning and see right away on your screen what security incidents have taken place on the servers in the past 24 hours," says Osefius enthusiastically. "Our maintenance experts who have 24x7 access to the system can see immediately what has happened both within and outside working hours," according to Batteram.

The entire Mn Services organization, including the business units, was involved in setting up the policy for IT security. Within every business unit there is a contact person who is involved. In addition, the introduction of the new system was communicated extensively throughout the entire organization. Initially, this was cause for some suspicion, but eventually the realization has sunk in that all of this contributes to the protection of the integrity of all employees.

Mn Services is very satisfied with the system load that resulted from the implementation of the IBM Consul InSight security management product. Initially there was fear that the systems would slow down considerably following the activation of auditing. In reality this did not happen and there were no delays. For that matter, when IBM Consul was introduced, the firm also decided to upgrade the IT infrastructure to state-of-the-art.

IT infrastructure is 100% safe

"With IBM Consul we can see how well we are secured," says Osefius. "Thanks to our decision to introduce SAS-70, we can now count on the security of our IT infrastructure." Now that IBM Consul InSight Security Manager has been used for a number of months, other effects become obvious. "In particular the advantages in configuring systems are obvious," states Batteram. "Working has become a lot easier now that we know what exactly happens within our IT infrastructure. Moreover, it is also an advantage that our privileged users (power users, system managers, administrators) know that we guard each other from mistakes."

"Thanks to the fast introduction of the new system we have withstood our audit with success and SAS-70 certification is now a fact," says a satisfied Verschoor. "This goes for both our business units and for the corporate organization. IBM Consul InSight helps us in achieving our type 2 certification for SAS 70."

"Thanks to the fast introduction of the new system we have withstood our audit with success and SAS-70 certification is now a fact."

– Leon Verschoor, ICT Purchasing, Mn Services

Batteram makes a few additional points:

- *Thanks to IBM Consul, Mn Services gets a lot of extra information, which assures a better control over "working according to the rules"*
- *IT security at Mn Services is not a one-person issue, but a vital theme dependent upon many people within the organization*
- *Thanks to this approach, Mn Services was able to set up a self-learning process organization equipped with good controls and documentation*
- *When the dashboard is used regularly, security staff members become very handy and gain insight into the possibilities of this control tool*

"We would not have known how to set up our log collection and log management functions in the short term if we had not had at our disposal IBM Consul InSight Security Manager," concludes Osefius. "In part thanks to the strongly increased manageability we hope to further develop Mn Services into an exemplary organization in our branch. The uniformity in reports is very easy and, for non-technical people, easy to interpret. The reports are consistent regardless of the platform they are generated from. With that we hope to gain the praise of the auditors."

For more information

Please contact your IBM sales representative or IBM Business Partner.

Visit our Web site at:
ibm.com/tivoli

You can get even more out of Tivoli® software by participating in independently run Tivoli User Groups around the world. Learn about opportunities near you at **www.tivoli-ug.org**

For more information on Mn Services, visit:
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IBM Corporation
Software Group
Route 100
Somers, New York 10589
U.S.A.

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Metavante Technologies Ltd. boosts performance and increases resilience with IBM System p

Overview

■ ***The Challenge***

To sustain high service levels for a growing customer base, Metavante Technologies Ltd. wanted to increase transaction processing performance and boost the resilience of its IT infrastructure. The company also aimed to create a more flexible and responsive platform for delivering IT services.

■ ***The Solution***

Metavante implemented two IBM System p5 570s, clustered using IBM HACMP, to run its central IBM Informix database. Working with Bell Micro (www.bellmicro.eu), an IBM Premier Business Partner, the company also upgraded to IBM Informix Dynamic Server 10 and WebSphere Application Server 6.1. The solution is hosted by IBM e-business Hosting Services in Warwick, with a disaster recovery site in Portsmouth.

■ ***The Benefits***

The combination of new IBM hardware and software delivered a five-fold increase in transactional performance, and the scalable architecture is designed to help support business growth. IBM PowerVM technology is intended to enable the new servers to adapt dynamically to changing business conditions.

Metavante Technologies Ltd. (Metavante) specialises in the management and processing of open-loop prepaid and debit cards – a growing market in the European region. Formerly known as Nomad Payments, the organisation was acquired by the global Metavante International Group in January 2008. Nomad had developed a powerful, versatile card payments system called Nomad CORTEX, which leverages open systems technologies and is designed to be customised to meet the unique needs of almost any card issuer.

The company has run CORTEX on the IBM Informix database platform for a number of years, on the IBM System p platform with IBM WebSphere Application Server providing Web services.

With rapid business growth, the existing hardware was reaching the limits of its capacity. Metavante wanted to refresh its servers and create a new storage environment, and approached IBM for a solution.

"IBM has been our infrastructure partner for a long time now," says Clive Taylor, Head of Operations at Metavante Technologies Ltd. "In our experience, the reliability of IBM hardware and software can provide an ideal foundation for businesses that require 24x7 availability from their IT environment."

Building a new infrastructure

Following a detailed set of capacity planning and modelling exercises to ensure that the new infrastructure would be sufficiently scalable – and able to grow in a cost-effective manner – Metavante worked with IBM e-business Hosting Services to deploy two IBM System p5 570 servers at an IBM data centre in Warwick.

The System p servers are clustered using IBM HACMP (High Availability Cluster Multi-Processing) to provide load-balancing and a high level of resilience, and run the company's Informix database under IBM AIX 5L. Each p5-570 is equipped with 16 64-bit IBM POWER5+ processors, of which half are currently active. The additional processors can be activated on a temporary or permanent basis to help Metavante handle peak workload or respond to business growth.

The p5-570s offer IBM PowerVM features including Dynamic Logical Partitioning – whereby virtual servers can be resized automatically and on-the-fly as business priorities or application loads change. Micro-Partitioning technology allows logical partitions to occupy as little as one-tenth of a processor, enabling multiple virtual servers to be packed onto each physical p5-570.

Says Clive Taylor, "In our opinion, the System p platform offers exceptionally high performance and availability in a very flexible package. We can quickly adapt to changing business conditions by activating additional processors or moving system resources from one partition to another – all without the delay and complexity of installing new hardware."

A further three Intel-based servers have been deployed to run WebSphere Application Server 6.0 under Linux, and IBM e-business Hosting Services offers storage via an on-demand model, intended to provide a flexible and highly scalable infrastructure. Finally, a similar hardware setup was implemented at a second IBM data centre in Portsmouth, designed to provide a comprehensive disaster recovery solution.

Leveraging IBM Informix

With the hardware in place, Metavante worked with Bell Micro to upgrade its core software to IBM Informix Dynamic Server 10 and WebSphere 6.1. Bell Micro also helped to negotiate the licensing agreement with IBM. Going forward, Bell Micro aims to play a key role in the ongoing support of the IBM software landscape, helping to maintain high availability levels and minimising disruption to the service for Metavante's customers.

"Our main driver for the software refresh was to keep up to date and ensure that our new landscape would be supported for the next three years," says Clive Taylor. "But there are also a number of new features in Informix Dynamic Server 10 that could potentially make a big difference to our business."

High-performance System p architecture

With Informix Dynamic Server running on the new IBM System p5 570 hardware, Metavante has seen a dramatic improvement in its transaction processing capability.

"Our tests show that this new solution from IBM e-business Hosting Services and Bell Micro can handle up to 53 transactions per second, making it nearly five times faster than our previous infrastructure," says Clive Taylor. "This increased performance, combined with the scalability of Informix and the highly expandable System p architecture should help us meet the needs of our customers both now and in the future."

"In our opinion, the System p platform offers exceptionally high performance and availability in a very flexible package."

Clive Taylor
Head of Operations
Metavante Technologies Ltd.

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire
PO6 3AU

The IBM home page can be found at **ibm.com**

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Rabobank accelerates provisioning and boosts flexibility with an IBM virtualization solution

Overview

- ***Challenge***
  Achieve faster time-to-market for new products and services; enable more flexible response to changing customer requirements; adjust service provision up or down to match changing patterns of demand; reduce costs by centralizing and standardizing server infrastructure, to enable more competitive pricing to customers; create a building-block approach to infrastructure
- ***Solution***
  Rabobank worked with IBM Global Services to design a new architecture based around the IBM System p™ platform running IBM AIX 5L™ V5.3. The architecture replaces the previous "one application per physical server" model with virtualized servers running on standard physical "building-blocks": IBM System p5™ 570 and 560Q servers, each with 16 IBM POWER5+™ processors
- ***Key Benefits***
  Fast and flexible server provisioning; Rabobank estimates average utilization of physical server resources up from 20 percent to around 40 percent, representing more efficient use of investment in computing capacity; average server provisioning time cut from as much as two months to as little as two days, enabling near real-time response to new business requirements; reduction in power consumption and cooling requirements

Rabobank Group (www.rabobank.com) is a full-range financial services provider founded on cooperative principles, and is a global leader in sustainability-oriented banking. The Group is comprised of 180 independent local Dutch Rabobanks, a central organization (Rabobank Nederland), and a large number of specialized international offices. The Rabobank Group holds the highest credit rating (AAA) from Moody's and Standard & Poor's, and is among the world's fifteen largest financial institutions in terms of Tier 1 Capital.

As Rabobank's business grew, and as new internal systems were added and external services launched, so the number of servers in the data center grew. As is the case in most large companies, much of the hardware was underutilized, and the bank was beginning to run out of space, power and cooling capacity in its two data centers. Equally, the time taken to provision new physical servers was unacceptably long from the point of view of business users.

To support the bank's aim of delivering better value new products to its customers at greater speed, the IT function at Rabobank needed to create a more

compact and efficient server infrastructure that would offer very rapid delivery of new computing power to business users.

"Our UNIVERSE project, designed with assistance from IBM Global Services, has created a new "building-block" approach to infrastructure, where we have a smaller number of standardized servers that each run multiple virtualized environments," says Jan Ebbes, Manager UNIX® Systems, Rabobank. "We have reduced the total number of physical machines, improved the utilization by virtualizing up to ten servers on each one, and enabled a two-day delivery cycle for new servers."

Growing pains

Rabobank had standardized on IBM AIX® running on the IBM System p platform for business applications, typically with Oracle databases also on System p. The major applications used by the bank are: Siebel CRM for front-office functions, SAP ERP for back-office functions, and IBM WebSphere® Application Server for Java™-based applications. Rabobank also has a large CICS environment running on the IBM System z™ mainframe platform with IBM DB2® databases. For reasons of scalability, the Siebel CRM system relies on DB2 on the mainframe rather than Oracle—the application has 30,000 named users of whom 18,000 are concurrent.

The bank operated a policy of procuring a new physical server for each new application in the AIX arena, and growth in server numbers was running at 50 percent every two years—double the expected rate. "We quickly grew from 200 to 300 physical servers, and the danger was that we would soon outgrow our data centers in terms of the space, power and cooling capacity that we required," says Abe Boersma, Product Manager System p/AIX, Rabobank.

He adds, "Although we require some 'white space' on every server to account for growth in workload over its three-year life, and also to account for daily peaks in workload, we had too much unutilized capacity across the infrastructure as a whole. The average daily utilization on each server was between 16 and 20 percent, meaning that on average up to 80 percent of our investment in hardware was effectively unused."

In the past, when a particular business unit needed a new application, it would ask the IT function to implement a new dedicated server with a certain number of processors and a certain amount of memory and disk. Following a lengthy procurement, installation and testing process, the new server would go live—usually around two months after the original request from the business.

"There was frustration from the business side that it took so long to deliver a new server," recalls Jan Ebbes. "From the IT point of view, we were frustrated that we might buy a four-way server and find that only one processor was really needed. There was then no way to share that idle capacity, and the net result was poor utilization and high power consumption compared with the amount of useful work the servers were doing."

Building the new architecture

Rabobank engaged IBM Global Business Services to help design a new architecture as part of its UNIVERSE server consolidation project. Rather than using single physical servers sized to specific applications, the new architecture is based around the idea of a standardized "building-block" approach to the physical infrastructure combined with virtualization to enable efficient allocation of the processing capacity to the applications.

Rabobank selected IBM System p5 570 servers with 16 processors each as the basic unit of the new infrastructure, and is using IBM Advanced POWER™ Virtualization for System p technologies to virtualize multiple servers and run them in logical partitions (LPARs). The bank subsequently switched to the IBM System p5 560Q as its basic unit, and now has a total of 64 p5-570 and p5-560Q servers split between its two data centers.

"This was a large and complex infrastructure project which ran very smoothly," says Jan Ebbes.
"IBM provided excellent technical input, and also helped us to sell the new approach to our internal clients—in some ways, that was the bigger challenge, since they were so accustomed to having their "own" physical servers."

"The business can now request the computing capacity that it needs for a new application, and we simply carve out a new virtual server in a partition on one of the System p5 servers ," says Abe Boersma. "The Micro-Partitioning™ feature enables us to

have virtual servers as small as one-tenth of a physical processor, so that we can size them to fit the business requirement with a greater degree of precision, and offer lower pricing to our internal clients. Equally, a single virtual server can span multiple processors—on any given System p5 server, we have between one and ten LPARs, each of which is a completely independent virtual server."

Dynamic server re-sizing

Rabobank has focused on delivering new services rather than on virtualizing existing physical servers, and currently has 284 LPARs across the 64 physical footprints. Nevertheless, the bank has successfully eliminated around 80 physical servers through virtualization, and avoided purchasing more than 200 new physical servers.

"Under our old provisioning model, the 284 LPARs would have been delivered as 284 physical servers—so it's very easy to see how virtualization has eased our data center capacity problems," says Jan Ebbes. "However, the most important benefit is the flexibility and speed this gives us in serving our internal clients. It takes just two days to deliver a new virtual server to the business, compared with two months for a physical one—a huge benefit in terms of accelerating time-to-market for the new services that the business is trying to deliver to our external customers."

The LPARs on each System p5 server can be dynamically re-sized as business priorities change—so that, for example, a server that has a heavy overnight batch load can "borrow" resources from other LPARs that are active only during the working day. The re-sizing can be controlled directly by an administrator, and can also be policy-based, with weightings assigned to each LPAR according to its level of importance to the business. This allows the System p5 to spot when a business-critical system is under particularly heavy load and automatically assign it processing power from a less important LPAR.

Supporting SOA

Rabobank plans to start using IBM Enterprise Workload Manager (EWLM) in the near future, to increase the sophistication and automation of resource allocation. EWLM provides goal-based, end-to-end performance monitoring of an application, and influences network traffic routing decisions for improved application performance and server effectiveness.

"EWLM will give us something like the flexibility we have in the System p environment across the whole Rabobank infrastructure," says Jan Ebbes. "When applied on top of the virtualization on System p5, EWLM will provide significant opportunities for our new Service Oriented Architecture (SOA), which aims to build new services by combining existing business processes in new ways. The standardization of the hardware and the server-oriented infrastructure have contributed in a major way to our SOA initiative."

Costs down, spare capacity up

Rabobank also uses the Virtual I/O element of IBM Advanced POWER Virtualization, which enables physical I/O channels to be virtualized and shared across different LPARs. "Virtual I/O is a key driver for our new flexibility," says Abe Boersma. "We direct virtualized I/O channels to LPARs depending on their requirements, and we can set up a new system or change the I/O allocation without moving existing network cables or patching in new ones—which also reduces risk and dramatically increases the speed of provisioning."

The average utilization of processor resources for the new environment is 40 percent, a significant improvement on the previous rates of between 16 and 20 percent. This means that Rabobank can do more useful work for less investment in hardware, and has reduced the frequency of purchasing new hardware. By combining virtual servers with different workload profiles—for example, ensuring that each physical server has some servers with peak usage during the working day, and some with peak usage overnight—Rabobank can reduce the total "white space" while providing more total peak capacity to handle spikes in demand. By contrast, its old "one-for-one" approach using physical servers meant that spare capacity on one server could not be reallocated to help another server cope with a spike in demand.

> *"The business can now request the computing capacity that it needs for a new application, and we simply carve out a new virtual server in a partition on one of the System p5 server."*
>
> – *Abe Boersma, Product Manager System p/AIX, Rabobank.*

"It is difficult to put a precise figure on cost savings, because the new environment is not a one-for-one replacement of the old one," says Jan Ebbes. "We estimate that the cost savings could be as high as 40 percent, partly because of the improved utilization and reduced costs of power and cooling, and partly through the improved ease and speed of setting up new systems for the business. Managing the virtual servers is much faster and easier, and the availability is also better—reducing the workload for the IT team while enabling us to offer a better service to the business."

Total flexibility

The provisioning process for new servers is much quicker, since Rabobank effectively already has them "in stock": 95 percent of all new projects are now delivered as virtual servers. Says Abe Boersma, "We can look at anticipated demand, and buy in new physical servers ahead of time to make sure we are prepared—this approach was made possible by the building-block and virtualization approaches to infrastructure."

Within the Rabobank business, the IT function now makes a very visible contribution to improved speed-to-market for new products and services, by providing new systems in days rather than months. The flexibility it can offer is also appreciated by the business, as Jan Ebbes explains: "We can be far more flexible in terms of allocating computing power as business requirements change, and we can offer our internal clients flexible pricing based on usage—so that infrastructure becomes much more like a utility rather than a capital cost."

He concludes, "The UNIVERSE project enabled by IBM System p virtualization has cut capital and operational costs, improved flexibility and the speed of provisioning, and enabled us to make far more efficient use of our computing resources."

> *"It takes just two days to deliver a new virtual server to the business, compared with two months for a physical one—a huge benefit in terms of accelerating time-to-market for new services."*
>
> – *Jan Ebbes, Manager UNIX Systems, Rabobank.*

For more information

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IBM Systems and Technology Group
Route 100
Somers, NY 10589
U.S.A.

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Tivoli software

IBM integrated mainframe management solution delivers uninterrupted business intelligence at Swiss Re.

Overview

- ***Challenge***
  Provide insurance agents with uninterrupted access to critical information while managing a growing volume of transactions and increasingly complex business services
- ***Why IBM?***
  IBM provides the integrated, automated and open technology to help achieve end-to-end management of business services across distributed and mainframe environments
- ***Solution***
  Performance and availability platform that accelerates problem identification and resolution and helps staff optimize resources
- ***Key Benefits***
  Achieved 99.99 percent availability of its IBM DB2® mainframe environment while reducing operating costs; reduced problem resolution time from several days to less than one day; increased staff productivity; reduced number of unsolved problems to virtually zero; helped IT staff better align its resources to business needs

IBM technology helps Swiss Re staff deliver high levels of service with less than one minute of downtime a week.

Swiss Re is one of the world's leading reinsurers and the world's largest life and health reinsurer. The company operates through more than 70 offices in over 30 countries. Swiss Re has been in the reinsurance business since its foundation in Zurich, Switzerland, in 1863. Swiss Re offers a wide variety of products to manage capital and risk. Traditional reinsurance products, including a broad range of property and casualty as well as life and health covers and related services, are complemented by insurance-based corporate finance solutions and supplementary services for comprehensive risk management. Swiss Re is rated "AA" by Standard & Poor's, "Aa2" by Moody's and "A+" by A.M. Best.

"With IBM Tivoli OMEGAMON software we have increased the quality of our DB2 mainframe service to a remarkable extent and can manage our DB2 environment to its highest level."

–Erwin Schaefer, Systems Engineer, Swiss Re

Key Components

Software

- IBM DB2 Universal Database™
- IBM Tivoli® Configuration Manager
- IBM Tivoli Enterprise Console®
- IBM Tivoli Monitoring
- IBM Tivoli OMEGAMON XE for CICS®
- IBM Tivoli OMEGAMON® XE for DB2plex
- IBM Tivoli OMEGAMON XE for WebSphere® Application Server
- IBM Tivoli OMEGAMON XE for WebSphere MQ on z/OS®

Hardware

- IBM @server® zSeries® system
- IBM TotalStorage® Virtual Tape Server systems

Services

- IBM Customer Support Organization

"More and more we must handle business growth with our existing resources. IBM technology helps us achieve greater levels of efficiency at a lower cost."

–Erwin Schaefer

For Swiss Re, information is the lifeblood of its business. The ability to gain insight from information and deliver that insight to the people who need it most is critical in maximizing customer satisfaction, minimizing risk and increasing revenue. At the same time, to deliver attractive returns to shareholders and maintain its top financial strength and rating, executives must maximize efficiencies and optimize the company's investments.

Given these factors, Swiss Re Systems Engineer Erwin Schaefer says that continuous uptime and excellent performance of its information management applications are musts in enabling agents to quickly and efficiently respond to customer needs and industry shifts.

Creating a solid foundation for delivering business insight

IT staff must deliver 99.99 percent availability for its critical mainframe-based database services, permitting less than one minute of downtime per week. Yet, as Swiss Re launched new Web-based services for its customers, agents and adjusters — including risk calculation, customer service and claims applications — the volume and complexity of database transactions increased.

In fact, today Swiss Re engineers must manage a growing information enterprise that supports more than 100 applications and spans 50 IBM DB2 Universal Database subsystems running across 2 IBM @server zSeries systems, with eight partitions on each server.

To successfully meet the needs of the business, Swiss Re IT staff needed the ability to pinpoint problems quickly, proactively identify potential issues, and provide the business with necessary information to support the planning and delivery of new services across this environment. Doing so required an integrated, automated and open approach to IT management that would:

- *Consolidate and correlate information from multiple sources, ultimately across both mainframe and distributed environments, enabling administrators to predict potential problems before the business is impacted.*
- *Automate notification and recovery processes according to business policies to speed problem resolution.*
- *Provide in-depth operational data to fine-tune performance and optimize resource allocation for existing and planned services.*

Says Schaefer, "The more we can simplify, streamline and automate processes, the better we can manage the growing complexity of service delivery while maintaining existing staffing levels."

IBM technologies help build an on demand operating environment

For more than 20 years, IBM DB2 software and mainframe systems have been the engine for Swiss Re's information enterprise, providing a high-performance, reliable infrastructure for delivering information to employees worldwide. Almost all of the company's reinsurance and financial data — from customer information to contracts to its knowledge warehouse — is managed on this platform. More than 7.6 million database transactions are performed daily.

Data is saved by four IBM TotalStorage Virtual Tape Server systems with 23 terabytes of storage. IBM DB2 content management solutions help integrate and deliver critical business information on demand.

Over 10 terabytes of data is stored in IBM DB2 Universal Database software and this number is rapidly increasing. Explains Schaefer, "Running IBM DB2 software in a mainframe environment provides us with the flexibility to grow capacity when we need it and the ability to reliably deliver data to our insurance staff. The result is a highly stable, available platform on which to run our business."

To help meet service-level requirements efficiently, Swiss Re uses IBM Tivoli OMEGAMON technology. Tivoli OMEGAMON software was selected due to the solution's automated problem-solving capabilities and ability to integrate information from a variety of sources into a single console.

An OMEGAMON customer for more than a decade, Swiss Re today uses Tivoli OMEGAMON technology to proactively manage and tune its DB2plex and CICS environments, helping administrators sense, pinpoint, analyze and resolve bottlenecks, conflicts and other issues which delay critical transactions. Programmers can see how new services are performing and adjust applications as needed to enhance service delivery. Business managers can better understand how business services are actually being delivered.

This year, Swiss Re staff will expand its use of Tivoli OMEGAMON XE technology to optimize performance and availability of the company's WebSphere Application Server and WebSphere MQ environments. Because the Tivoli OMEGAMON family provides a consistent user interface for end-to-end monitoring and reporting of critical systems and applications, Swiss Re will realize lower training and deployment costs and greater efficiencies as it implements new Tivoli OMEGAMON XE monitors.

Data from the Tivoli OMEGAMON XE software is consolidated into a Tivoli OMEGAMON console, enabling staff to review operational data and assess service delivery through a single view. The console monitors the company's main systems and backup systems so staff can continuously monitor performance and availability of transactions in the event that operations are switched to an alternate site.

According to Schaefer, the company will soon upgrade the Tivoli OMEGAMON console to IBM Tivoli OMEGAMON DE software. Doing so will enable administrators to map process flows to comprehensive business views for a better understanding of the effect that system problems have on specific business operations.

Schaefer stresses that implementation of the latest versions of Tivoli OMEGAMON technology and use of Tivoli OMEGAMON DE represent important advancements in helping Swiss Re IT staff better communicate with line-of-business and divisional managers. "With Tivoli OMEGAMON DE, we can aggregate information into business views and customize workspaces for executives," explains Schaefer.

Critical events from monitors across the company's distributed and mainframe environment — including IBM Tivoli OMEGAMON software, IBM Tivoli Monitoring software, IBM Tivoli Configuration Manager software and third-party network management tools — are fed into Tivoli Enterprise Console. Using predefined business policies, Tivoli Enterprise Console then automatically takes action — either initiating specified recovery processes or sending an alert to the necessary administrators.

Realizing 99.99 percent availability with ease

Leveraging IBM technology, Swiss Re has reached its goal of delivering 99.99 percent data availability, while reducing operating costs. For example, the IBM Self-Managing Autonomic Capabilities built into IBM zSeries systems have helped the company increase the resiliency and flexibility of its environment. These capabilities enable the servers to automatically allocate resources for multiple jobs and manage workloads according to demand so administrators can focus on other business priorities.

Likewise, the IBM Self-Managing Autonomic Capabilities incorporated in IBM TotalStorage Virtual Tape Server systems help improve Swiss Re's data protection in case of disaster while helping to optimize resource utilization.

Additionally, with Tivoli OMEGAMON software, production problems that once took several days to resolve now take less than a day. Staff productivity has increased significantly as administrators can more quickly resolve problems. Where once staff faced challenges that they simply could not solve—such as locating the source of a transaction slowdown—now these types of situations no longer occur. IT staff also can now better align resources to business needs and improve communication with lines-of-business managers. "Certain problems simply cannot be solved without this technology," says Schaefer. "With IBM Tivoli OMEGAMON software we have increased the quality of our DB2 mainframe service to a remarkable extent and can manage our DB2 environment to its highest level."

Schaefer emphasizes that the IBM Customer Support Organization has provided critical expertise in helping Swiss Re achieve these results. "IBM provides the commitment, expertise and high level of service to help us effectively leverage the technology for business value."

Ultimately, Schaefer stresses that Tivoli OMEGAMON technology will help Swiss Re gain an integrated view of its distributed and mainframe environments from a single dashboard and enable staff to build business views for critical services, regardless of the platforms they run on. In fact, with the success of Tivoli OMEGAMON XE software, Swiss Re is working closely with IBM to pilot the next evolution of the Tivoli end-to-end zSeries Infrastructure Management software, which combines many Tivoli availability solutions into a single integrated management center. "More and more we must handle business growth with our existing resources," says Schaefer. "IBM technology helps us achieve greater levels of efficiency at a lower cost."

For more information

Please contact your IBM sales representative or IBM Business Partner.

Visit us at:
ibm.com/tivoli

For more information on Swiss Re, visit:
www.swissre.com

IBM Corporation
One New Orchard Road
Armonk, NY 10504
U.S.A.

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Industrial

Ideal Stelrad Group gets proactive with Tivoli Monitoring from IBM

Overview

■ ***The Challenge***

Ideal Stelrad Group uses SAP software to manage production at its five manufacturing sites, which operate 24x7. With a mixture of different monitoring applications used to maintain its multiplatform IT environment, daily maintenance was time-consuming and high availability difficult to guarantee – increasing the risk of production downtime.

■ ***The Solution***

Ideal Stelrad Group worked with Celerity (www.celerity-uk.com), an IBM Premier Business Partner, to replace multiple tools with integrated IBM Tivoli Monitoring 6 to monitor the complete IT landscape. The software is fully integrated with the company's SAP applications, and provides advanced warning of most potential failures.

■ ***The Benefits***

Out-of-hours email alerts enable fast response to emerging situations; better visibility of system performance helps identify bottlenecks and improves capacity planning; ability to deal with problems proactively before they arise helps increase system availability and reduce business risk.

IBM Premier Business Partner

CELERITY solutions for business

"We've been working with Celerity for three years now. They helped us with the upgrade to the IBM System p architecture, and we were really impressed with the way they quickly gained an understanding of our business."

Andy Hayes
IT Services Manager
Ideal Stelrad Group

Ideal Stelrad Group is a leading pan-European heating business headquartered in Newcastle upon Tyne. The company manufactures and markets an extensive range of domestic, commercial and industrial gas boilers in the UK, and steel panel radiators, towel warmers and decorative radiators across Europe. Leading brands include Ideal Boilers, Stelrad Radiators and Henrad Radiators. Ideal Stelrad has five manufacturing sites across Europe, with a boiler facility in the UK and radiator facilities in the UK, the Netherlands, Belgium and Turkey. Ideal Stelrad currently employs over 2000 people.

Ideal Stelrad Group's production processes run 24 hours a day, 7 days a week – a schedule that is only possible with the support of advanced enterprise resource planning (ERP) software from SAP. All five sites are managed from a central SAP system based at the company's data centre in Hull. The SAP software runs under IBM AIX on the IBM System p 520 platform, and is supported by a number of large Oracle databases.

"Our SAP systems are absolutely crucial to the business," explains Andy Hayes, IT Services Manager at Ideal Stelrad Group. "If they go down, we have about four hours until the production line is affected. Maintaining availability is vital."

Ideal Stelrad Group also has a number of other important systems – email, file servers and design applications among them – running under various environments including Microsoft Windows. Because of this mixed environment, it had been difficult to find a monitoring solution which could cover the whole infrastructure, and Ideal Stelrad Group had deployed a number of small point solutions.

"Without a single centralized monitoring system, we were spending a lot of time on daily maintenance tasks," says Andy Hayes. "It was hard to work out what needed most attention, so we had to check everything, and we found ourselves reacting to situations rather than taking preventative measures."

Turning to Tivoli

Ideal Stelrad Group realised that a new generation of IBM Tivoli products could offer the functionalities it was looking for, and asked IBM Premier Business Partner Celerity to look into the best options.

We've been working with Celerity for three years now," explains Andy Hayes. "They helped us with the upgrade to the IBM System p architecture, and we were really impressed with the way they quickly gained an understanding of our business. They convinced us that IBM Tivoli Monitoring was the best-of-breed solution, and would be able to meet our requirements."

Ideal Stelrad Group next approached IBM, which demonstrated the software and delivered a successful proof-of-concept. Celerity then performed the implementation and customized the software for Ideal Stelrad Group's unique environment.

Tivoli Monitoring provides a single customizable workspace portal through which Ideal Stelrad Group can manage its entire hardware and software environment – AIX and Windows systems alike. Most importantly, the solution is fully integrated with Ideal Stelrad Group's SAP and Oracle environment.

"We only have a small SAP Basis team to look after a number of large and important systems, so it was crucial that our new solution should help them spend more time on important issues and less on simple daily maintenance," says Andy Hayes. "The level of SAP integration offered by Tivoli Monitoring was the best we'd seen, and helps us deal with problems before they happen. In fact, we have set up predictive scripts which solve nine out of ten SAP-related problems without human intervention."

Reaping the benefits

If the system detects a potential or actual system failure – an underperforming disk drive or a database server running out of memory – it immediately alerts the relevant member of Ideal Stelrad Group's IT team, ensuring that prompt action is taken to prevent or minimise downtime. As a result, Andy Hayes expects to see an improvement in the availability figures:

"We're looking forward to seeing the first results of this new system," he comments. "I'm sure we'll see a noticeable difference in our quarterly report. Even without statistics, our IT staff are definitely spending more time on improving the infrastructure and less on daily maintenance and fire-fighting."

By providing a more accurate picture of the operations and capabilities of Ideal Stelrad Group's various systems, Tivoli Monitoring is integral to the company's efforts to improve performance and reliability. The IT team can easily identify bottlenecks and undertake accurate capacity planning.

"When a system is running out of room, we know about it early on," says Andy Hayes. "We can plan our upgrade path ahead of time, so we have plenty of opportunities to research the best options and we don't have to rush into it. This could potentially save us a lot of time and money in the long term by avoiding bad investments and misguided projects."

He concludes: "We've been very happy with the performance and reliability of our IBM System p servers, especially as a platform for SAP. But as a large enterprise, we can't afford to run the risk of failure. The Tivoli Monitoring solution gives us peace of mind because we know that most problems can be dealt with before they start to affect the business.

"IBM and Celerity have delivered an ideal solution for our environment. Tivoli Monitoring gives us a single point of control with all the tools we need to repair, protect and optimise our systems."

"We've been very happy with the performance and reliability of our IBM System p servers, especially as a platform for SAP. But as a large enterprise, we can't afford to run the risk of failure. The Tivoli Monitoring solution gives us peace of mind because we know that most problems can be dealt with before they start to affect the business."

Andy Hayes
IT Services Manager
Ideal Stelrad Group

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire
PO6 3AU

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Lamson & Sessions cuts hardware costs for its SAP software environment by 20 per cent with IBM

Overview

■ ***The Challenge***

Manufacturer Lamson & Sessions wished to hone its business profitability by learning more about its customers, costs, and processes. To achieve this goal, the company desired a more flexible infrastructure to allow for future deployments of SAP applications, but its many legacy servers were proving costly to operate and lacked the capacity for the proposed new software.

■ ***The Solution***

Working with Meridian IT, the company consolidated its server inventory from 18 machines down to just four clustered machines – two IBM System p5 570s and two p5-550Qs – using IBM Advanced POWER Virtualization technology. To provide sufficient data storage and management capacity, the company had previously introduced a SAN using IBM System Storage DS8100 hardware and IBM Tivoli software.

■ ***The Benefits***

Hardware operational costs were reduced by 20 percent and fewer physical servers mean less maintenance and management workload. New processing capacity and virtualization technologies allowed for the introduction of new SAP software and functionality, offering faster business analysis to help the company refine business processes and enhance profitability.

■ ***Key Solution Components***

Industry: Fabrication and assembly
Applications: SAP® R/3® 4.7, SAP Solution Manager, SAP NetWeaver® Portal
Hardware: IBM System p5™ servers, models 570 and 550Q, IBM System Storage™ DS8100, IBM Total Storage 3584 Tape Library
Software: IBM AIX®, IBM HACMP™, IBM Tivoli® Storage Manager, Oracle® database
Services: IBM Premier Business Partner Meridian IT

Lamson & Sessions, headquartered in Cleveland, OH, is a leading manufacturer of thermoplastic enclosures, fittings, conduits, pipes, and wiring devices for electrical, telecommunications, waste water, and consumer markets. The company employs about 1,300 people and generates revenues of around US$500 to $550 million per year.

To manage its supply chain and assets and provide a Web portal for employees, Lamson & Sessions invested some years ago in a suite of enterprise resource planning (ERP) software from SAP. As the business grew, the company wished to learn more about its customers, costs and business processes. To achieve this improved visibility, the company planned to introduce new SAP functionality – for example, deploying content management and management of internal controls applications, as well as various components of SAP NetWeaver that can analyze the data captured by other SAP applications. However, the existing inventory of 18 legacy servers

"The IBM System p5 platform provides an ideal infrastructure for SAP applications, delivering excellent performance to end users. The Advanced POWER Virtualization features have reduced the physical footprint in our data center by almost 80 per cent – keeping maintenance workload and hardware costs low."

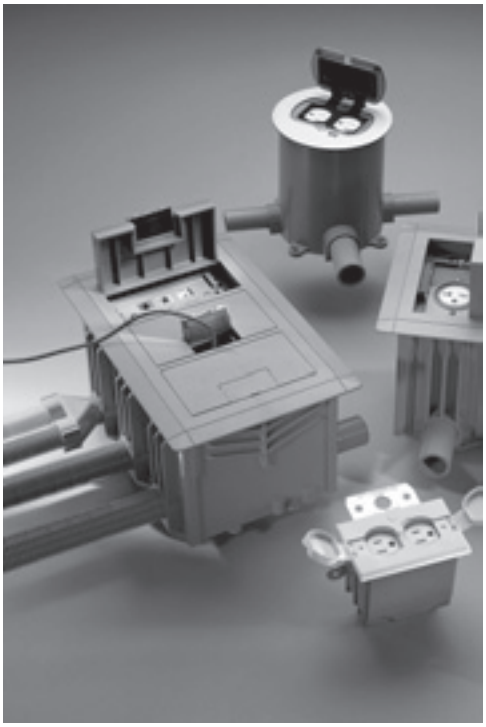
Jerry Theus
Manager Technology Services
Lamson & Sessions

lacked the capacity to handle these new applications.

"We needed more space and better performance, not only for a newer version of our SAP ERP software, but also to provide a proper sandbox environment for test and development," says Jerry Theus, Manager of Technology Services at Lamson & Sessions. "Moving forward, because the business depends on SAP software, we wanted a way to explore new applications and functionalities safely before introducing them into the production environment – which would significantly mitigate business risk."

Wide-ranging technical expertise

Lamson & Sessions had recently engaged an IBM Premier Business Partner, Meridian IT, to consolidate Intel-based systems to IBM BladeCenter hardware, and had been impressed by Meridian IT's depth of experience with both IBM hardware and SAP software.



For the SAP application upgrade project, Meridian IT made a compelling proposal: to virtualize the entire SAP software environment, which would enable the company to reduce its inventory of physical servers from 18 machines down to just four. Two IBM System p5 550Qs would act as SAP application servers, while two p5-570s would handle the database and other applications.

Douglas Carey of Meridian IT explains: "We support 40 or 50 customers' SAP software environments, across a wide variety of platforms, and it is relatively rare to find a hardware partner with as much expertise in SAP software. There are probably only around ten IBM Business Partners in the US with a range of skills comparable to ours, and who can deliver a true value-add to SAP software projects."

A smooth implementation

Meridian IT performed a proof-of-concept briefing to showcase the capabilities of the System p5 hardware as a platform for SAP software, and gave a first-hand demonstration of how the new solution would meet Lamson & Sessions' specific functionality needs.

Meridian IT assisted throughout the project, coordinating IBM service technicians with the Lamson technical team. Meridian IT validated Lamson's desire to use HACMP for a high-availability solution and installed IBM Tivoli Storage Manager for Enterprise Resource Planning to manage backups, providing complete data protection.

Lamson & Sessions' SAP software environment, which handles more than 600 users, was migrated to this new

hardware platform within 12 hours – thanks to exhaustive testing and planning by the Lamson team – so there was very little production downtime. As a result of the migration, response times have improved, and the company has the capacity to run full test and development systems alongside its production SAP applications.

The advantages of System p5

The p5-550 servers each have four active processors to power the SAP application tier, while the p5-570s contain eight processors for production and 12 for development and testing. Advanced POWER Virtualization enables Lamson & Sessions to run a wide range of SAP software environments on 21 logical partitions (LPARs) within the System p5 servers. Each LPAR has resources allotted to it according to pre-defined policies, which allow spare processing capacity to be allocated on-the-fly to systems with heavier workload. This ensures that the utilization of processor capacity is, on average, far higher than with a traditional physical server infrastructure.

"The IBM System p5 platform provides an ideal infrastructure for SAP applications, delivering excellent performance to end users," says Jerry Theus. "The Advanced POWER Virtualization features have reduced the physical footprint in our data center by almost 80 per cent – keeping maintenance workload and hardware costs low."

The System p5 servers provide a highly reliable and available platform for Lamson & Sessions' SAP software environment, helping to minimize downtime and support lean manufacturing processes. In the unlikely event of a failure, IBM offers a 24x7 break-fix service to get systems back online quickly.

"We have confidence in IBM as a partner for the long-term," says Jerry Theus. "There is a clear road-map for the System p platform and POWER architecture, and IBM's leadership in the technology sector means that we can rely on them to deliver innovative, leading-edge solutions. We have a great relationship with our IBM account team too."

Enterprise-class storage infrastructure

Prior to the success of the server consolidation project, Lamson & Sessions worked with another IBM business partner, Berbee, to implement a storage area network (SAN), based on an IBM System Storage DS8100 with 7TB of fibre-channel connected disk. The SAP software environment currently uses around 50 per cent of this capacity.

"The DS8100 data storage environment is an enterprise-class solution and can scale to meet the needs of our SAP software environment in a cost-effective manner," says Jerry Theus. "Combining the new hardware and software with our existing Tivoli Storage Manager solution makes it easy to ensure that our SAP data and applications are safe and can be backed up and restored quickly."

With Tivoli Storage Manager for Enterprise Resource Planning, Lamson & Sessions gains a backup solution that is optimized for SAP software environments and Oracle databases. The highly-automated Tivoli solution provides a browser-

"With IBM System p servers and DS8100 storage, supported by Tivoli software, Lamson & Sessions has gained a reliable, high-performance environment with enough capacity to help us extend our SAP software environment effectively."

Jerry Theus
Manager Technology Services
Lamson & Sessions

based central control point that provides information about data transfer performance and system backup status, eliminating much repetitive administrative workload for IT staff.

Building for the future

With the new System p5 infrastructure underpinning its SAP software environment, Lamson & Sessions is in a good position to develop its systems further and introduce new functionalities as its business needs grow.

Lamson and Meridian IT are already working on a further project to deploy several SAP NetWeaver components in an IBM System p5 environment – all of which will be fully tested in the company's sandbox environment before being put into production.

"IBM System p technologies are providing Lamson & Sessions with the visionary infrastructure tools we need in order to treat IT as a strategic business tool rather than just another computer hosting environment," says Jerry Theus. "Meridian IT has helped us build a System p infrastructure for the SAP software solution that gives us a strategic and competitive advantage in today's ever-changing world market."

He concludes: "With IBM System p servers and DS8100 storage, supported by Tivoli software, Lamson & Sessions has gained a reliable, high-performance environment with enough capacity to help us extend our SAP software environment effectively. Meanwhile, the deployment of IBM virtualization technologies is helping us cut hardware costs by 20 per cent, free up space in the data center, and save time on server management."

"Meridian IT has helped us build a System p and SAP software solution that gives us a strategic and competitive advantage in today's ever-changing world market."

Jerry Theus
Manager Technology Services
Lamson & Sessions

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

GK12-4293-00 (09/07)

Tarmac consolidates its SAP software environment with IBM System p

Overview

■ ***The Challenge***

Meet increasing business demands from existing and new activities; find a way to move from an end-of-life hardware platform and implement a long-term strategy for growth; continue to reduce total operational costs

■ ***The Solution***

Tarmac chose to move away from having one server per application to a consolidated solution based on a smaller number of IBM System p5 servers, using server virtualization and Capacity on Demand technologies. The company migrated its SAP software to two p5-595 servers and two p5-570 servers, running IBM AIX

■ ***The Benefits***

With a smaller number of physical servers, Tarmac has dramatically reduced operational costs while improving its ability to respond to business needs with new services. Virtualization and Capacity on Demand technologies have enabled the implementation of a disaster recovery plan, helping to reduce business risk – and as icing on the cake, system response times have halved, offering a better user experience

■ ***Key Solution Components***

Industry: Construction
Applications: SAP® R/3® 4.6C with human capital management and financial accounting applications, SAP NetWeaver® Business Intelligence
Hardware: IBM System p5™ 595 and 570 servers

Tarmac Limited is the leading supplier of road-surfacing and heavy building materials in the UK. The company employs some 12,500 people worldwide in more than 500 locations, with total sales of £2.1 billion (approximately €3.1 billion).

Construction companies work to tight schedules to reduce costs, and know that offering a dependable service is an essential competitive advantage. To meet the needs of demanding customers, Tarmac needs to maintain highly efficient internal operations and keep tight control of its supply chain and logistics. In its suppliers, therefore, it values the ability to deliver the precise specification and quantity of materials reliably and on time.

The Tarmac IT division provides services for the UK business, with logistics, human resources, finance and general business management applications. The company has grown both organically and through acquisition, which often presented a significant challenge for the IT department: systems were frequently

"The IBM offer was more cost-effective than competing proposals, and we were more confident that the IBM virtualization technologies available on the System p platform would be reliable and robust."

Dave Humphreys,
IT Manager,
Tarmac

not scalable, were approaching end-of-life, or were not suitable for integration with Tarmac's SAP software environment.

Dave Humphreys, IT Manager at Tarmac, comments "Given our growth, a key question was whether the systems we acquired were capable of responding to the increasing demands made on IT by our business users. In many cases the answer was 'no.' We were looking for a scalable, cost-effective way to handle IT infrastructure for new acquisitions and realize the benefits of expansion.

"To provide the required scalability for our central SAP software environment, we needed a high-performance hardware architecture – with a full disaster recovery strategy to ensure protection against any failure. We also wanted to reduce total operational costs: every penny we save is a direct contribution to the bottom line, as the building materials business is intensively competitive."

End of the road

Tarmac was running a complete suite of SAP software, including human capital management and financial accounting applications, as well as the SAP NetWeaver Business Intelligence component. The company's HP servers running the Tru64 operating system had reached capacity and had been declared as an end-of-line product, with the result that it was no longer possible to upgrade or extend the hardware environment. The alternative offerings would require a complete server and operating system change, particularly to implement a high availability solution, and both factors led Tarmac to consider migration to a new server platform.

Rather than simply replicate the existing architecture, the company took the opportunity to ask IBM and other vendors to propose clean-sheet landscapes based on Tarmac's business needs. Understanding Tarmac's strategic business requirements was a key part in creating a successful solution.

"Business risk, the ability to grow and the total operational costs were key factors for Tarmac," says Dave Humphreys. "We were keen to reduce the total number of servers in order to cut floorspace costs – using virtualization to increase our utilization and flexibility, and taking advantage of IBM System p On/Off Capacity on Demand to help us handle peak workloads more effectively.

"Finally, the solution needed to include disaster recovery capabilities, which are essential to reduce the business risks of running a consolidated operation."

Tarmac chose to replace more than 20 existing servers with four IBM System p servers, models p5-595 and p5-570. With two servers in each of the company's two data centers, Tarmac is using IBM System p Advanced POWER Virtualization and Capacity on Demand to create a highly robust, flexible solution that not only meets strategic growth and disaster recovery requirements, but also offers lower operational costs.

"The IBM offer was more cost-effective than competing proposals, and we were more confident that the IBM virtualization technologies available on the System p platform would be reliable and robust," says Dave Humphreys. "The combination of virtualization and Capacity on Demand meant that we could achieve our business aims easily and at low operational costs."

Reduced physical footprint

In the former one-server, one-application landscape, each physical server was designed to provide acceptable user performance during the peak workload period – a few days at the end of each month. Much of the existing server capacity was left idle for the majority of the time, inflating hardware costs.

With the new solution, each p5-595 server is able to support multiple SAP applications by using logical partitions (LPARs). As workload on each application changes, the system dynamically allocates sufficient processor and memory resources in order to maintain acceptable response times. Each LPAR is, in effect, ideally defined, so there is no need to over-provision for just a few days' peak workload.

"The two p5-595 servers run all the SAP ERP and business intelligence production systems supporting some 3,000 SAP software users accessing 30TB of data. The two p5-570 servers run development and test systems. Each LPAR has a certain predefined CPU and memory capacity, and behind that, so to speak, is a pool that can be used at times of peak workload, enabling us to keep performance levels constant across the month," says Dave Humphreys.

"The reduced physical footprint, the ability to dynamically allocate resources as required, and the ability to deliver on our service level agreements with just four IBM System p servers are considerable achievements, and have reduced our costs.

"When we had twenty servers, a great deal of our time was taken up with monitoring and managing the system. We now operate just ten LPARs, which in itself makes operations easier to control.

"The IBM solution automatically handles much of the management workload, freeing up time and energy for more productive IT tasks," he adds.

Full disaster recovery

Part of the solution requirement was to design a robust environment with full disaster recovery capabilities. Tarmac is using virtualization to distribute the production applications between the two data centers.

"Should a physical server fail for any reason, workload can be transferred to the remaining server in the second data center. We can then use IBM Capacity on Demand to activate

"IBM Advanced POWER Virtualization and Capacity on Demand technologies enable Tarmac to manage risk, reduce costs and serve customers from a single centralized hardware platform."

Dave Humphreys,
IT Manager,
Tarmac

additional processors in the second p5-595 server, helping us continue to meet business needs until we are able to restart the failed system," remarks Dave Humphreys.

"This arrangement enables us to provide comprehensive disaster recovery capabilities without additional investment, which fits exactly with our corporate objectives."

Serving the business in new ways

With the IBM System p5 solution in place, Tarmac is now positioned to take full advantage of its acquisitions. It is easier to add and enable SAP applications by creating new virtual servers, with no need to wait for new physical servers to be delivered, configured and commissioned. As total transaction workload grows, Tarmac can enable additional processors in the p5-595 servers, and allocate the new resources to the existing virtual servers as the need arises.

Dave Humphreys concludes, "Response times for users have been halved, and we have the capability to add new services without any impact on performance. With IBM, Tarmac now has a platform that allows us to meet our business requirements in a way that we were unable to match before. If we want to update our SAP applications we can do it easily, partly because the System p architecture is highly scalable, and partly because we can re-allocate existing capacity according to workload."

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

GK12-4294-00 (09/07)

Adolf Würth GmbH deploys a flexible, low-cost, high-performance SAP landscape with IBM POWER6

Overview

■ ***The Challenge***

The existing system infrastructure supporting SAP applications at Würth, a global fixings and fastenings company, had reached the limits of its capacity. A planned upgrade to new SAP software would entail new processors and main storage, which was economically disadvantageous. The company looked for a high-performance, flexible solution to its IT infrastructure needs.

■ ***The Solution***

Würth implemented six POWER6 processor-based IBM System p 570 servers, each with 16 CPUs and 300GB memory, supporting a complete range of SAP ERP 6.0 applications. System resilience is provided by IBM High Availability Cluster Multi-Processing (HACMP), and processors and I/O are fully virtualized using IBM PowerVM.

■ ***The Benefits***

By using IBM virtualization technologies to share workload across the high-performance POWER6 processors, fewer CPUs are required, contributing to considerable energy savings. Response times in the SAP application environment have improved by up to 30 per cent, due to the increased performance of the POWER6 processors. Virtualization of processors and I/O adapters reduces the time taken to provision a new server by 85 per cent – significantly increasing business flexibility.

■ ***Key Solution Components***

Industry: Distribution
Applications: SAP® ERP 6.0, including financials, controlling, human resources, materials management, quality management, sales & distribution and warehouse management functionalities; SAP NetWeaver® Business Intelligence; SAP NetWeaver Portal
Hardware: IBM System p™ 570
Software: IBM AIX® 5.3
Services: IBM Global Services

The Würth Gruppe (Würth) was once a two-person family business. The company now employs almost 5,000 people in 390 operations in 86 countries, with annual turnover of €7.7 billion. Building up and developing Würth is the life's work of Professor Dr h. c. mult. Reinhold Würth, and the company is one of Germany's outstanding business success stories.

Würth is a worldwide leader in the distribution of fastening, fixing and assembly materials, including screws, screw accessories, dowels and plugs, chemical products, furniture and construction fittings, tools, and stock keeping and picking systems. More than 100,000 products are sold to trade customers through some 30,000 sales representatives worldwide, and the company has an outstanding reputation for quality and on-time delivery.

Picking the right way forwards

To support its continued success, Würth operates a wide range of SAP applications. The ERP environment has been extended continuously to meet customer demands, and transaction workloads have risen steadily.

"The interaction between the SAP applications and IBM servers has been excellent, and implementation on the POWER6 technology was straightforward and fast."

Harald Holl
Head of Systems Technology
Adolf Würth GmbH & Co. KG

Harald Holl, Head of Systems Technology of Adolf Würth GmbH & Co. KG, explains the challenges: "The existing server technology was reaching its limits in terms of performance, and could only be extended by adding processors and main storage – which was not economically viable. Moreover, we were planning to take advantage of an upgrade to SAP ERP 6.0 by introducing a number of new functionalities, which would require increased compute capacity. The search commenced for a server platform that would provide a combination of excellent performance, flexibility and value for money."

Constructing a solution

Würth has now upgraded to the SAP ERP 6.0 application, which includes financial accounting, controlling, human resources, materials management, quality management, sales & distribution and warehouse management functionalities. The company also runs the SAP NetWeaver Business Intelligence component, as well as SAP NetWeaver Portal.

The high degree of automation in Würth's business processes makes it vital for the company's SAP applications to remain online throughout business operations – 24 hours per day, five days a week. A highly reliable hardware infrastructure was therefore essential, so the company decided to consult IBM for a solution.

Working directly with IBM, the Würth team reviewed the benefits of deploying POWER6 processor-based IBM System p 570 servers as a platform for its SAP applications and other business software. The new POWER6 processors offered a combination of very high processor performance, excellent system flexibility through use of virtualization technologies, and low operational costs – making a compelling business case for the new technology platform.

POWER6 offers a range of new functionalities that can optimize the performance of SAP applications. For example, decimal floating point datatypes are increasingly becoming part of the standard SAP application coding (starting with SAP NetWeaver 7.1). The POWER6 decimal floating point feature will significantly improve SAP processing times whenever SAP applications use this new datatype for calculations.

In some SAP benchmarks, System p servers that use the new POWER6 processors have demonstrated nearly twice the performance of competing x86 systems with the same number of cores, and a 50 per cent increase in performance over POWER5+ systems.

"Our positive experience with POWER5 and the clear roadmap that IBM has put in place for the POWER architecture convinced us that POWER6 would be an ideal option for our business," says Harald Holl.

Würth is the first SAP customer to have migrated from POWER5 to POWER6 processor-based hardware. The company has deployed six POWER6 processor-based p570 servers, all with the same system configuration of 16 CPUs and 300GB memory.

"Our early impressions of the new server infrastructure have been very positive," says Harald Holl. "We estimate that the new POWER6 processor-based solution is around 30% more efficient in terms of SAP application performance."

The company's SAP applications and the databases that support them are distributed across the servers in

logical partitions (LPARs). By using IBM PowerVM technologies to increase utilization across the high-performance POWER6 processors, peak load performance is improved considerably and CPU resources can be allocated dynamically, helping to gain optimal performance in complex workload situations. Equally, fewer CPUs are required and energy efficiency is improved, reducing hardware and energy costs.

A smooth implementation

Harald Holl is full of praise for the engagement with IBM – from pre-sales right through to go-live and ongoing support:

"IBM did a lot of work with us initially to ensure that we chose the right solution for our business needs, and to demonstrate the advantages of the new POWER6 processors. The IBM consultants were highly knowledgable, and quickly made all of us – both the IT department and the senior management team – feel confident that we were making the right decision."

Würth designed, sized and installed the new solution in direct cooperation with IBM consultants, as the first implementation of SAP applications on POWER6 processor-based servers in Europe. The solution was commissioned to production on schedule, within just three months.

Harald Holl describes the cooperation as "absolutely perfect, exemplary. Considering the project scale, this was excellent work. The interaction between the SAP applications and IBM servers has been excellent, and implementation on the POWER6 technology was straightforward and fast."

Securing the benefits of HACMP

Würth uses IBM High Availability Cluster Multiprocessing (HACMP) to protect its business-critical SAP software environment from failures by monitoring, detecting and responding to conditions and maintaining service availability.

Würth has created four two-node HACMP clusters – one for each of its main database instances – distributed across the six new POWER6 servers. If any of the primary database nodes fails, the SAP applications will fail over to the standby node, so the continuity of Würth's business will be well-protected even if one of the servers experiences a major outage.

IBM PowerVM virtualization technologies optimize efficiency by allocating minimal processor resources to the standby LPARs during normal operations, freeing up resources for the other LPARs running on the same machine. When a failover occurs, the uncapped standby LPARs dynamically expand (using resources from the shared processor pool) to provide the required level of performance for the databases and SAP applications.

HACMP can also minimize the need for Würth to take systems offline for planned maintenance, by transferring users and applications to the standby nodes during scheduled maintenance. The HACMP clusters can also be configured to meet complex and varied application availability and recovery needs.

The HACMP solution plays a critical role for Würth, since its business needs to be able to operate 24 hours a day. Many of the more than 250 sales offices are staffed by fewer than six employees, who rely totally on the SAP applications to provide product information, stock reporting and sales functionality – so any downtime could have a serious effect on productivity.

> *"The very high compute capacity of the POWER6 processors, the advanced server virtualization capabilities, and the low TCO provide a highly cost-effective environment for Würth's SAP landscape."*
>
> Harald Holl
> Head of Systems Technology
> Adolf Würth GmbH & Co. KG

Assembling a virtualized environment

The previous SAP software landscape, running on non-IBM hardware, had only limited virtualization capabilities. When the company moved to IBM System p servers with POWER5 processors, it became possible to take advantage of CPU virtualization with micropartioning – and with the introduction of the new POWER6 processors, Würth is able to leverage the latest and most advanced IBM PowerVM virtualization technologies, extended to I/O components as well as processors and memory.

Würth has implemented two Virtual I/O (VIO) servers in separate LPARs, which provide network and SAN connections and bandwidth to all the SAP applications from a fixed number of physical adapters. Each application can be allocated the I/O resources needed to maintain system performance, adjusted automatically using system policies set in the VIO server console.

Harald Holl comments, "The new POWER6 solution offers much improved flexibility to Würth. With the former servers, creating an LPAR for a new SAP application took up to a day. The POWER6 processor-based IBM System p landscape enables new production LPARs to be ready within one hour – an improvement of more than 85 per cent. The ability to implement change rapidly and reliably is important to Würth as the company continues to grow into new markets."

To support the new systems, Würth retains IBM Comfort Line enhanced technical support, Account Advocate remote technical support services and Total Microcode Support.

Focus on Partition Mobility

Harald Holl says that when IBM PowerVM Live Partition Mobility is implemented, Würth will be able to conduct planned downtime without interruption for end users.

"With PowerVM Live Partition Mobility, we should be able to maintain the servers without taking them offline at all – which means that planned downtime could be reduced considerably," says Harald Holl.

IBM PowerVM Live Partition Mobility makes it possible to move active partitions from one physical server to another without disrupting SAP applications. This provides considerable systems management flexibility and improved availability.

Planned application outages for hardware and firmware maintenance and upgrades can be avoided by moving the partitions to an alternative server during the maintenance or upgrade. Workloads running on servers that require maintenance can be moved elsewhere while repairs are completed. Applications on several underutilized servers can be consolidated to a single large server without business interruption, and applications can be moved between servers in order to optimize utilization, workload performance and energy cost within a data center – all while the applications are running.

Harald Holl concludes, "The introduction of POWER6 virtualization technologies, HACMP, PowerVM Live Partition Mobility and Virtual I/O server will contribute to increased resilience, improved reliability and enhanced SAP application response. The very high compute capacity of the POWER6 processors, the advanced server virtualization capabilities, and the low TCO provide a highly cost-effective environment for Würth's SAP landscape."

> *"With the former servers, creating an LPAR for a new SAP application took up to a day. The POWER6 processor-based IBM System p landscape enables new production LPARs to be ready within one hour."*
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IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

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Public

IBM helps Honolulu fast-track a technology overhaul

Gordon Bruce, CIO, City and County of Honolulu

Overview

- ***Challenge***
  To bring the city's IT infrastructure up to date after years of underfunding, including replacing critical systems that were up to 35 years old
- ***Solution***
  To build a state-of-the-art IT infrastructure for Honolulu that included deploying new IBM hardware, upgrading to the latest technologies, and implementing a business continuity strategy
- ***Key Benefits***
  Achieved new levels of systems scalability and performance, increased flexibility through virtualization and partitioning, and enabled business continuity capabilities that help deliver more reliable services to the citizens of Honolulu

When Mufi Hannemann took office as mayor of the City and County of Honolulu on January 2, 2005, he brought with him a deep appreciation for information technology—and a keen understanding of what technology could do for the citizens of Honolulu. Hannemann convened an independent panel of private-sector volunteers to review Honolulu's agencies, including the struggling Department of Information Technology (DIT). The panel found that the department had historically been woefully under-funded—by $100 million in the last five years alone.

And the evidence was all around. The driver's licensing and motor vehicle systems were 35 years old—the oldest such systems in the country. The financial systems and core business applications were 26 years old. Other crucial systems were running on hardware and operating systems that were no longer supported. Disaster recovery was inconsistent. These factors were jeopardizing the department's ability to provide reliable services to the citizens of Honolulu.

Toward a state-of-the-art IT infrastructure

Determined to make up for years of neglect, Mayor Hannemann put forth an aggressive plan to build a state-of-the-art IT infrastructure for Honolulu—a directive that included deploying new hardware, upgrading legacy systems to the latest technologies, and implementing a business continuity strategy. He envisioned that this new infrastructure would not only help mitigate the department's operational risk, it would support new e-government initiatives, enable interoperability and improve agency workflows across the City and County.

To spearhead this massive effort, Mayor Hannemann appointed a new CIO and director of the DIT, Gordon Bruce, who brought with him 30 years of experience in IT. Bruce was tasked with directing the mayor's technology initiative, which included upgrades not only in data center hardware and software but also in IT facilities, network infrastructure and telecommunications.

"Some of these systems hadn't been touched in decades," explains Bruce. "We were in dire need of a strategic plan and an investment in technologies that would help us deliver services as well as improve public safety."

Virtualizing ERP on System p5

Due to the urgency of the situation, the organization took a fast-track approach, in an effort to avoid what Bruce calls "analysis to paralysis." The first step was to implement a new ERP system, replacing the 26-year-old application—and a few manual typewriters—with a robust new software solution. The DIT selected a government-specific solution from IBM Premier Business Partner CGI (formerly CGI-AMS) and virtualized it on IBM System p5™ 570 servers running IBM AIX®. Winning the bid to provide hardware and implementation services was IBM Premier Business Partner Sirius Computer Solutions.

Bruce says the decision to go with IBM System p5 helped the agency set a firm foundation for the future. "CGI offered the same solution on a Microsoft® Windows®-based platform," Bruce notes, "but I had to keep an eye to scalability. We went with the IBM System p5 architecture not only because of reliability and availability but because of the flexibility it gives us for the future. After languishing for so many years, we had to think long-term."

The DIT saw massive growth in the usage of the new ERP system. While the agency was expecting the system to support 200 trained users, that number shot up to 900 in less than six months. Bruce reports that the exponential growth in users has had no impact on the system's performance. "That's partly because the equipment was sized and scaled properly," Bruce explains, "but it's also because we have the ability to manage performance through virtualization."

> *"We went with the IBM System p5 architecture not only because of reliability and availability but because of the flexibility it gives us for the future."*
>
> – *Gordon Bruce, CIO, City and County of Honolulu*

Standardized storage

In addition to the p5 570 servers, the DIT has deployed an IBM System Storage™ DS8100, two IBM 2145 SAN Volume Controllers (SVCs) and an IBM tape library. The entire infrastructure is duplicated at the agency's disaster center, which also functions as the development and test facility rather than sitting "dark."

"We're standardizing on the DS8100 for our storage solution set," says Bruce. "And with the SVC, we don't have to run five or six different storage platforms—we're migrating to one, along with one standard set of schedulers, one standard set of backup/recovery products and one standard set of management applications."

Forging a new mainframe migration path

The agency's next task was to replace its aging mainframe architecture, a challenge that involved migrating over 100 significant applications to a new platform, including driver's licensing, voter registration, and motor vehicle registration. Sirius recommended the IBM System z9® platform, which would not only give the DIT the reliability they were looking for, but would also provide

flexibility through both virtualization and the ability to create Linux® partitions. There was just one problem: "Our mainframes and applications were so old that there was no migration path for us to go to the System z9," Bruce recalls. "We didn't even know if our COBOL applications would run on it."

IBM, Sirius and the DIT set out to create a migration path for the mainframe applications, setting up a z9 test system in a Sirius data center facility in Denver and porting the applications over for testing in an IBM z/OS® environment. The team effort proved successful, says Bruce. "It's a great partnership when you can work together, test the waters and develop a migration path that didn't exist."

> *"It's a great partnership when you can work together, test the waters and develop a migration path that didn't exist."*
>
> – *Gordon Bruce, CIO, City and County of Honolulu*

Once again, business continuity was built into the solution, with a second z9 server installed at the disaster center as a test and development machine and positioned as the recovery machine should the need arise. The disaster center was a critical piece of the project, not only to ensure reliable service to citizens and employees but also to meet audit requirements.

"The backup facility is a smaller mirror image of what we have in production," Bruce explains. "But rather than dumping millions of dollars into a room that's just sitting dark, we use the disaster center as a testing and development site."

Agency-friendly financing

The DIT was able to secure competitive five-year leasing terms for these solutions through IBM Global Financing. "It made total sense to go the leasing route," says Bruce. "You're able to lock in your maintenance fees, and you know what the long-term costs will be. It makes government budgeting a lot easier and more stable."

The City and County of Honolulu was recently named the country's "Biggest Mover" by Inc. magazine, in part due to these technology investments.

Results in "technology time"

The City and County of Honolulu has achieved remarkable results in a very short time—in "technology time," as Bruce describes it. And Bruce gives credit to his team as well as to the third parties, particularly Sirius. "They were a key player from the very beginning," he notes. "They brought in experts to help us architect the systems—both the System p5 and the System z9. They educated my team on what it was we were acquiring, and they provided us with resources to help us with the work."

But Bruce says it was the vision of Mayor Hannemann that ultimately made these accomplishments possible: "We wouldn't be where we are today if it weren't for his continued support and involvement."

For more information

Contact your IBM sales representative or IBM Business Partner. Visit us at:

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For more information about the City and County of Honolulu, visit: www.honolulu.gov

For more information about CGI, visit: www.cgi.com

For more information about Sirius Computer Solutions, visit: www.siriuscom.com

IBM Systems and Technology Group
Route 100
Somers, New York 10589
U.S.A.

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Tectrade helps Dumfries and Galloway Council migrate its storage hardware with IBM SAN Volume Controller

Overview

■ ***The Challenge***

As part of a server consolidation exercise, Dumfries and Galloway Council needed greater storage capacity for its SAN. The Council wanted to find a simple, safe way to deploy a new infrastructure with minimal disruption, and to manage its storage systems more effectively.

■ ***The Solution***

Working with Tectrade (www.tectrade.co.uk), an IBM Premier Business Partner, the Council deployed a new SAN based on IBM System Storage DS4800 hardware. IBM System Storage SAN Volume Controller was used to migrate data from existing SAN hardware, and manages the new virtualized infrastructure.

■ ***The Benefits***

Centralised storage has simplified physical server management and backup processes, and will enable the development of a full disaster recovery solution. Storage virtualization has increased flexibility and scalability, supporting server consolidation and minimising the risk and disruption of migrating data.

Dumfries and Galloway Council is responsible for providing a wide range of services to 148,000 people in southern Scotland. The council employs 6,500 people at 150 sites across the region.

As communications infrastructure in the region has improved significantly in recent years, the Council decided to embark on a programme of server consolidation and centralisation, moving 150 servers from local sites onto just 70 machines in a central data centre.

"As a consequence of the server consolidation, we now have a lot more data stored centrally," explains Graeme McIlorum, Technology Services Manager at Dumfries and Galloway Council. "We were already using a SAN based on IBM FAStT500 hardware, so we decided to update this infrastructure in order to increase our storage capacity."

Migrating to new SAN hardware

The Council decided to refresh its storage hardware by introducing IBM System Storage DS4800 hardware to the SAN, and gradually phasing out the existing hardware platform. For guidance on how to perform this migration safely and manage the new infrastructure, the Council consulted Tectrade, an IBM Premier Business Partner specialising in centralised storage solutions.

Tectrade helped the Council deploy IBM System Storage SAN Volume Controller (SVC) to virtualize the existing storage environment, and installed the new DS4800 hardware. SVC enables IT administrators to treat an entire SAN as a single pool of storage, enabling storage devices to be added or removed with minimal need for manual configuration. In consequence, it was a simple task to integrate the new hardware into the Council's SAN, move 8TB of critical

data onto it, and gradually remove the older FAStT systems from the network.

"The DS4800 is an impressive platform, providing a very scalable architecture without compromising on reliability," says Graeme McIlorum. "IBM SAN Volume Controller enabled us to migrate to the new hardware quickly, safely, and without disruption to our systems. The combination of these two products is excellent, giving us the flexibility to make optimal use of an enterprise-class infrastructure."

The Council was so impressed by the solution that it decided to move its 4TB Microsoft Exchange environment – which provides email and calendaring for around 3,800 users – onto the SAN as well.

"Now that we have a more reliable, easily manageable storage infrastructure, it makes sense to move more of our core systems onto the SAN," explains Graeme McIlorum. "Having a single, centrally managed storage environment means considerable savings in administrative workload, as well as simplifying backup processes. SAN Volume Controller gives us the flexibility to allocate storage capacity wherever it is most needed, so it is easy to add new systems to the network."

Building a resilient infrastructure

Dumfries and Galloway is also planning to set up another SAN at a second data centre, as part of a comprehensive disaster recovery solution.

"The Tectrade team has really helped with the design of the second SAN," says Graeme McIlorum. "On topics like mirroring, for example, there are a lot of different technologies on the market and making the wrong choice could be an expensive mistake – so Tectrade's expert opinion is very valuable to us."

He concludes: "With IBM DS4800 hardware and SAN Volume Controller, Tectrade has helped us deploy an enterprise-class storage infrastructure. The centralisation of our storage infrastructure is a vital part of our consolidation strategy, helping to simplify management and reduce operational costs."

"With IBM DS4800 hardware and SAN Volume Controller, Tectrade has helped us deploy an enterprise-class storage infrastructure. The centralisation of our storage infrastructure is a vital part of our consolidation strategy, helping to simplify management and reduce operational costs."

Graeme McIlorum
Technology Services Manager
Dumfries and Galloway Council

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire
PO6 3AU

SDC03001-GBEN-00

Flintshire consolidates three operating systems to IBM System i

Overview

- ***Challenge***
  With numerous physical servers running around 350 business-critical systems, Flintshire's infrastructure was large and complex to manage. A planned migration to a new file server platform threatened to add yet more physical servers, creating a potentially unsustainable burden on already overstretched IT staff resources.
- ***Solution***
  Working with REAL Solutions, an IBM Premier Business Partner, Flintshire consolidated 18 physical servers to logical partitions on two IBM System i™ 570s, then added Linux® partitions to the same systems to handle the file serving workload.
- ***Key Benefits***
  System i technology supports three different operating systems in a single physical footprint, with the ability to dynamically reallocate system resources in response to changing patterns of demand; the introduction of Linux on System i platform enabled Flintshire to decommission 30 physical servers; stable and robust System i technology provides flexible, highly-available services to internal users and local citizens.

Flintshire County Council provides municipal services to 148,000 citizens, and has a combined annual revenue/capital budget of £287 million. In addition to maintaining local schools and roads, the council's 7,500 employees are responsible for collecting taxes, running social services, and maintaining the county's extensive leisure facilities. As a unitary authority, Flintshire offers around 750 distinct public services, and runs around 350 business-critical systems to support them.

With a large and growing number of physical servers to support, Flintshire's relatively small IT team was spending as much time on routine administration as on developing and delivering new services. New rapid development projects were already pushing the capabilities of its infrastructure to the limit, central government initiatives resulted in the replacement of older software, and the creation of new online services for citizens was set to increase the pressure.

"Our goal was to reduce complexity in the infrastructure and to eliminate our systems management issues," recalls John Thomas, Operational Services Manager at Flintshire County Council.

"Developing a more flexible, responsive and scalable infrastructure was a vital first step in realizing the Council's ambitious plans for more efficient and interactive services to citizens."

Compact and robust infrastructure

Aiming to gain more flexibility in service provision and reduce the number of physical servers it needed to manage, Flintshire consolidated a total of 18 older IBM iSeries® and pSeries® servers to two IBM System i platforms running both IBM i5/OS® and IBM AIX 5L™ V5.3. Since this initial migration, the council has upgraded its two IBM System i570s and increased from 18 partitions to nearly 30. Each i570 has 16 IBM POWER5+™ processors, four of which are held in reserve and can be activated when required using IBM On/Off Capacity on Demand.

"We migrated our entire AIX® workload to logical partitions on the i570s, and we've since added a number of new AIX partitions—each of which has saved us from having to buy another new physical server," says Thomas. "Beyond the direct cost-savings in terms of hardware acquisition and maintenance, we're also keeping the physical infrastructure more simple and manageable."

The i570s now handle around 80 percent of the total business workload at Flintshire, including IBM Domino® for 2,500 users, financial applications, human resources, payroll and numerous public administration systems.

"The business value of the IBM System i solution is its ability to simplify the infrastructure by acting as a platform for consolidation," says Thomas. "Most organizations need to run multiple operating systems, which typically results in a sprawling, costly infrastructure that is both difficult to maintain and unresponsive to new demands. By consolidating to System i, we have created a compact and robust infrastructure in which we can concentrate all our investment in redundancy and high availability, leaving our staff with more time to focus on service delivery."

The success of the virtualization concept on System i is now being extended to the Intel® environment, where Flintshire is introducing VMware virtualization software running on IBM System x3950 servers. The council currently has four x3950s running ten virtual Windows® servers each, and is steadily migrating business applications to them.

Linux on System i

When Flintshire made a strategic decision to migrate away from Novell NetWare as its file serving platform for Microsoft® Windows desktop users, the IT team considered the implications of moving directly to Windows on the server side. An evaluation determined that the 30 existing physical servers would need to be replaced by 50 new servers—an unacceptable increase in the size and complexity of the infrastructure.

> *"By consolidating to System i, we have created a compact and robust infrastructure in which we can concentrate all our investment in redundancy and high availability, leaving our staff with more time to focus on service delivery."*
>
> – *John Thomas, Operational Services Manager, Flintshire County Council*

"Instead of adding 50 stand-alone servers to the network, we successfully migrated our file servers to Samba running on SUSE Linux Enterprise Server in a partition on the i570," says Thomas. "We have a single server for 2,500 users, offering better availability, performance and scalability than the previous solution—and at a significantly lower cost than the stand-alone alternative."

The Linux partition on the first i570 is mirrored to the second for high availability, and uses less than one CPU, making it very cost-effective. Availability has also improved, since there is no longer any need to shut down the file server for the purpose of backing up data—this now takes place in the background.

"Linux on the i570 provides very high availability for our users, and there is quite simply no systems management overhead for my team," says Thomas. "If we add more users or need more storage capacity, we just dynamically adjust the resources available to the Linux partitions without even taking the system down."

If Flintshire had chosen to deploy its file servers on stand-alone servers, the management overhead would have been much higher, and any increase in the capacity of the servers would have required physical intervention and a lengthy period of downtime. Equally, the council would have needed to invest in spare capacity on each one of the 50 physical servers, to account for spikes in demand and general growth in data volumes over the expected life of the servers. By contrast, running the file servers on a virtualized Linux server on the i570 enables Flintshire to allocate precisely the right amount of resources, while enabling the Linux partition to re-size dynamically in response to changing demands.

Robust yet flexible infrastructure

With Linux, AIX and i5/OS running on the System i platform, Flintshire has a robust yet flexible infrastructure offering very high availability. "We quite simply have never experienced any unscheduled downtime on the i570s," comments Thomas, "and there's no such phrase in our organization as 'the e-mail's down'. The robustness of the System i platform—and System x™, for that matter—is a cornerstone of our approach to IT service provision. With System i, we have invested in systems that are designed not to go down, so that we can focus our staff resources on the business needs, rather than wasting their time and skills on the routine maintenance and troubleshooting common with other, less reliable platforms."

The two i570s are housed in separate data centers linked by dual redundant dedicated fibre-optic connections. All of the business-critical services are mirrored between the two sites, enabling Flintshire to fail over to the second site in the event of a disaster.

As Flintshire continues to introduce new administrative systems and Web services for citizens, the council draws on the skills and experience of IBM and REAL Solutions to ensure that its infrastructure develops accordingly.

"We have built an extremely successful business relationship with both REAL Solutions and IBM —they've been instrumental in helping us make our infrastructure more responsive," says Thomas. "Over the past two or three years, the workload on our System i platform has increased enormously—for instance, it hosts our Web site and most of the back-end databases, which have grown from 80,000 to 500,000 hits per month. To manage that growth, we have just dynamically re-allocated the system resources, enabling us to expand with minimal disruption and no need to 'rip and replace' the hardware. This makes the i570 the ideal platform for a fast-growing organization like ours."

For more information

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Route 100
Somers, NY 10589
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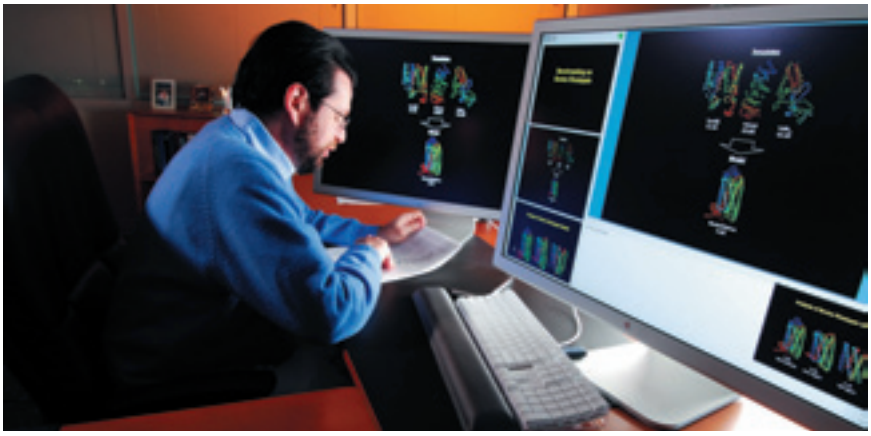
Georgia Tech implements a cool solution for green HPC with IBM



Overview

- ***Challenge***
  Achieve highest possible computational performance with limited budget and floor space; resolve issues related to concentration of heat output from ultra-dense blade servers.
- ***Solution***
  Georgia Tech designed a unique cooling solution incorporating both standard air conditioning and IBM Rear Door Heat eXchanger, enabling a compact solution that saved an estimated $780,000 in data center costs. The new supercomputer is based on an IBM System Cluster 1350 solution with more than 1,000 IBM BladeCenter® LS20 nodes, each with four AMD Opteron cores.
- ***Key Benefits***
  Maximal LINPACK performance of 8.5 TFlops, achieved 51st place in the June 2006 Top500.org list; water cooling and innovative data center design enabled 55 percent reduction in air conditioning requirements and 10 to 15 percent reduction in operational costs; compact and quiet showcase solution offering phenomenal computing power.

Founded in 1885, the Georgia Institute of Technology (Georgia Tech) is one of America's leading research universities. Its over 18,000 undergraduate and graduate students are taught by more than 900 full-time staff on a 400-acre campus in the heart of Atlanta, GA.

Georgia Tech's Center for the Study of Systems Biology requires supercomputing capabilities for protein structure simulations and other techniques supporting research into new drugs. By creating detailed computer models of new chemical compounds, researchers can potentially reduce by a factor of ten the number of physical compounds that need to be tested, which can help them to dramatically accelerate their research supporting the creation of new life-saving drugs.

Using advanced IBM BladeCenter and cooling technology, Georgia Tech built a compact supercomputer with low power consumption and heat output.

Says Bartosz Ilkowski, Georgia Tech senior research technologist, “Our own innovative data center design, allied with the IBM technologies, enabled us to pack a huge amount of computing power in a compact space. The new supercomputer is far more cost effective and environmentally friendly than a traditional design, while offering the same compute power.”

Revolutionary design

Georgia Tech upgrades its supercomputing assets on a three-year cycle, to ensure that it continues to attract world-class students, researchers and academics. For its most recent upgrade, Georgia Tech specified a high-density 4,000-core computational solution.

“We needed a compact solution to reduce data center floor space—and therefore hosting costs. IBM BladeCenter offered 25 to 40 percent more servers per rack for no additional power or cooling,” says Ilkowski. “The environmental factor was also important: blades would consume up to three times less power than the alternative offerings based on rack-mounted servers.”

Increasing the density of the solution would make better use of available floor space, but would also create “hotspots” in the data center requiring significant cooling. The university wanted the new supercomputer to act as a showcase for its ground-breaking research facilities, so it was vital to keep air conditioning noise and air displacement to a minimum.

The “traditional” solution design called for 85 tons of air conditioning (a total of just over 1 million BTU per hour) and very high airflow—which would have been expensive, noisy and impractical. Instead, Georgia Tech created a revolutionary cooling solution employing air conditioning with physically separate hot/cold aisles, and water cooling via an IBM Rear Door Heat eXchanger unit on each rack. A unique aspect of the cooling solution is Georgia Tech’s creation of “open floor” tiles on the cold aisle, with special directional baffles that project cool air to the top of the cabinets and minimize hotspots.

Fast, compact, cool

The supercomputer itself is an IBM System Cluster 1350 solution with more than 1,000 IBM BladeCenter nodes, each with four AMD Opteron cores running Linux®. With a maximal LINPACK performance of 8.5 TFlops (trillion floating-point operations per second), the solution was the 51st fastest supercomputer in the world as of June 2006.

Each of the 12 racks used in the solution is equipped with an IBM Rear Door Heat eXchanger unit and contains six BladeCenter chassis, each with 14 BladeCenter LS20 servers.

The use of IBM Rear Door Heat eXchanger technology reduced the air conditioning requirements by approximately 55 percent, and cut the operational cost of cooling the blades by between 10 and 15 percent. Georgia Tech estimates annual cost savings for air conditioning of approximately $160,000. In addition, the compactness of the solution design reduced the actual amount of floor space that Georgia Tech needed to lease by around one third.

Airflow requirements are also considerably lower. Says Ilkowski, "Using just air conditioning, the airflow required to cool the data center would have been approximately 52,500 cubic feet per minute (CFM). By achieving around 50 percent of the total cooling effect through water cooling combined with our innovative data center design, we reduced the amount of air conditioning needed and thereby also reduced the required airflow to around 30,000 CFM. Lower airflow means less disruption and less noise for visitors to this showcase facility."

He concludes, "The new supercomputer is the result of a highly successful collaboration by Georgia Tech, IBM, Minick Engineering and our hosting partner, BellSouth (now AT&T) in Atlanta. We are pleased that we now have a very compact, energy-efficient solution that is easy to install, manage and scale."

> *"We are pleased that we now have a very compact, energy-efficient solution that is easy to install, manage and scale."*
>
> – *Bartosz Ilkowski, Georgia Tech Senior Research Technologist*

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U.S.A.

Produced in the United States
October 2007

OIC03003-USEN-00

Storage virtualization heralds the end of planned downtime at Gwinnett County

Overview

- ***Challenge***
  Reduce application outages due to changes within the storage infrastructure while improving the ability of IT to respond to changing user storage needs
- ***Solution***
  A virtualized storage environment based on IBM® System Storage™ SAN Volume Controller, IBM TotalStorage® Productivity Center software and IBM System Storage DS4800 and System Storage DS4700 Express disk storage systems
- ***Key Benefits***
  - *Application availability is no longer affected by changes to the storage system, even during data migrations and maintenance*
  - *Storage utilization is increased due to enhanced flexibility to allocate storage to applications when and where it is needed*
  - *Advanced replication capability of the IBM FlashCopy® feature improves data protection and the accuracy of testing*

The environment being served by the Gwinnett County IT department has changed. Like almost every enterprise in the world, offering more online access to their systems has created the need to operate around the clock. "With our citizen self-service initiatives well under way, the ability for IT to get approval for planned downtime has virtually disappeared," says Barry Puckett, information technology services manager at Gwinnett County. "Our Web site is used extensively at all times of the day, and our employees use our internal systems over a much wider range of hours than ever before. As a result, we have had to rethink how we architect our systems, especially storage."

Growth and always-available computing drive the need for a new storage architecture

Both Intel® architecture-based servers and IBM System p™ 570 and System p 690 servers, which host the county's SAP applications, were attached to storage area networks (SANs).
The Intel-based servers accessed an IBM TotalStorage Enterprise Storage Server® (ESS) Model F20, and the System p servers accessed an ESS Model 800 storage system.

Both storage systems worked well, but the county's storage needs were growing rapidly. New applications drove the need to store more data. And the move from server-attached storage to centralized SAN-based storage also contributed to rising SAN storage requirements.

IBM storage system reliability makes for an easy choice

When the ESS Model F20 reached its end of life, the Gwinnet County IT group decided to move up to the IBM System Storage DS4000™ family, ultimately choosing System Storage DS4800 and System Storage DS4700 Express systems as the basis of its new storage infrastructure. The staff's long experience with the reliability of IBM storage systems made the decision easy. Says Puckett, "We have HP StorageWorks Modular Smart Arrays, but we are moving away from them because of the additional redundancy that the System Storage DS4000 family provides."

IBM SAN Volume Controller hides storage changes from application users

The Gwinnett County IT team needed to move to the new systems without disrupting ongoing operations. Changes to storage systems are notoriously disruptive, requiring the IT team to negotiate outage windows with internal users who must then plan for downtime. When storage is used 24 hours a day, as with Gwinnett County enterprise resource planning (ERP) and tax systems, these negotiations can be painful. Worse, with no visibility into scheduled downtime, users outside the organization—such as the citizens using the county's tax system—face even more frustration.

IBM had the answer. "We had received briefings by IBM about storage virtualization and the IBM System Storage SAN Volume Controller," says Gwinnett County Contract IT Architect Philip Wilson. "Incorporating virtualization into our storage infrastructure was exactly what we needed."

SAN Volume Controller is a modular appliance based on IBM System x™ servers that can be configured in high-availability pairs. By virtualizing the storage environment, physical storage changes are hidden from applications. Multiple storage devices, even non-IBM devices, are supported by SAN Volume Controller. By pooling capacity from multiple disk arrays, SAN Volume Controller helps increase storage utilization.

Compared to traditional storage management techniques, SAN Volume Controller boosts administrator productivity by providing a single point of control over all the storage it manages. Provisioning new storage devices and migrating data from one device to another are simple tasks enabled by a Web interface. Reconfigurations do not result in downtime.

Gwinnett County upgrades storage overnight with no disruption to applications

The IT group had two major data migrations to accomplish. Initially, the ESS Model F20 was being decommissioned along with several other storage systems from various vendors. But within a year, the ESS Model 800 would come off lease. First, during a planned maintenance outage, Wilson put SAN Volume Controller in front of the storage devices that were supporting the Intel-based servers and the System p servers. "We reconfigured the servers to point to SAN Volume Controller. We also attached the new System Storage DS4800 and System Storage DS4700 Express storage arrays behind SAN Volume Controller," explains Wilson. "We used 4 Gbps Fibre Channel connections between SAN Volume Controller and the System Storage DS4800 array in order to provide the greatest possible performance."

Once the servers came back up, according to Wilson, "the servers continued to access their storage devices as if nothing had changed." Next, he tested the data migration capability during the day. "I moved the data on one of our test servers from the ESS Model F20 to the System Storage DS4800 without even being noticed by the end users. That was impressive."

After that test, Wilson proceeded to migrate all the data from the ESS Model F20 and other storage systems onto the new System Storage DS4800 and System Storage DS4700. "On a Friday afternoon, I entered the migration commands and went home for the night. The next morning, I logged in to see that the migration had taken place with no errors whatsoever. We had accomplished a hot migration without incurring any application downtime," he says.

Wilson notes that one of the database administrators dropped by his office the next Monday to ask what happened. As Wilson explains, "It used to take him a little over three hours to run his Oracle database exports and he wanted to know why it just took 45 minutes. Our whole team was grinning from ear to ear."

SAN Volume Controller offers flexibility to keep up with changing user needs

With SAN Volume Controller enabling non-disruptive storage additions, the Gwinnett County IT group can now respond quickly to changing user needs. Both the Intel-based servers and the System p servers access the same physical storage devices, so reserve capacity can easily be assigned to either group of servers.

"If someone needs more storage, I simply open the SAN Volume Controller console and increase their storage allocation," says Wilson. "Storage management with the IBM SAN Volume Controller is a storage administrator's dream come true."

In the future, Wilson plans to use IBM TotalStorage Productivity Center software to analyze and optimize storage resource allocations. "Reorganizing storage allocations across the arrays can help us improve response times and postpone additional storage purchases," he says.

> *"Storage management with the IBM SAN Volume Controller is a storage administrator's dream come true."*
>
> – *Philip Wilson, Contract IT Architect, Gwinnett County*

Non-disruptive maintenance helps increase storage availability

Routine storage system maintenance can now be conducted without application downtime: The IT team simply moves the affected data to another storage device before taking the storage server offline. "We can quickly move all the data from one array to another so we can perform maintenance, including shutting the entire array down," says Wilson. "Having the ability to perform non-disruptive maintenance enables us to proactively fix problems before they might affect users. That just helps to increase overall storage availability."

Tiered storage helps lower overall costs

The Gwinnett County IT team selected the two models of IBM storage arrays in anticipation of implementing tiered storage architecture. The System Storage DS4700 has low-cost Serial ATA (SATA) drives and the System Storage DB4800 has faster, more expensive Fibre Channel-attached drives. "We assign only the applications that need high performance to the System Storage DS4800 array. All other applications use the System Storage DS4700. That has helped us lower the overall cost of storage for the county," explains Wilson.

SAN Volume Controller also reduces the minimum amount of storage that can be assigned, which has helped improve storage utilization. Better utilization of the storage hand can obviously postpone the time when additional capacity must be purchased.

FlashCopy improves testing and data protection

The ESS Model 800 houses all the data used by the SAP systems running on several large IBM System p servers. With SAN Volume Controller in front of the ESS Model 800, the county's SAP team can use the FlashCopy feature to

make quick backup copies of SAP data for data protection and testing purposes. “We wrote a script for SAN Volume Controller that our SAP administrator can use to create a point-in-time backup copy,” adds Wilson. “Because everything is automated, the outage window is very small and we in IT do not need to be involved. That makes everyone happy.”

Virtualized storage sets the stage for smooth operations

SAN Volume Controller figures into the county’s business continuity requirements as well. Once a second data center is established, Wilson plans to use the Metro Mirror feature to maintain a mirror image of production data at the remote data center. That way, if anything should happen to the primary data center, the data will be quickly accessible to resume operations.

Next year, when the ESS Model 800 goes off lease, the IT department envisions another smooth data migration to the new device—probably on another Friday night. “When the time comes, we can simply add another IBM storage array to SAN Volume Controller and migrate the data without any application downtime,” says Puckett. “If all goes according to plan, it might all happen again while we are home sleeping.”

> *“We wrote a script for SAN Volume Controller that our SAP administrator can use to create a point-in-time backup copy. Because everything is automated, the outage window is very small and we in IT do not need to be involved. That makes everyone happy.”*
>
> – *Philip Wilson, Contract IT Architect, Gwinnett County*

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TSC03036-USEN-00

Illinois State University works with IBM to equip students with 21st-century computing skills on the mainframe

Overview

- ***Challenge***
  Introducing a new Enterprise Computing Systems degree concentration at Illinois State University depended on access to real-world mainframe capacity. Existing systems were not capable of handling the extra workload, so students could not experiment in a real large-scale integrated programming environment.
- ***Solution***
  The IBM Academic Initiative for System z™ provided an IBM eServer™ zSeries® 890, software, faculty advanced educational opportunities and teaching materials in support of the new program on long-term loan to the Illinois State University's College of Applied Science and Technology.
- ***Key Benefits***
  Students are able to experience multiple operating system environments, advanced virtualization technologies and the integration capabilities of the mainframe platform in a way that offers excellent preparation in both programming and research for the commercial world of enterprise computing.

Just over 20,000 undergraduate and graduate students attend Illinois State University, one of the leading higher education centers in the USA. The university employs 3,500 staff, running courses from applied technology to fine arts on a 970-acre campus.

Leading US companies, such as State Farm, Caterpillar, John Deere, Country Financial, CitiGroup, Charles Schwab and others, support Illinois State University, and there is a strong connection between academic study and the practical value of these courses developed at Illinois State University. Dr. Chu Jong, Enterprise Computing System Coordinator and Assistant Professor at Illinois State University's School of Information Technology, College of Applied Science and Technology, identified the opportunity to create a series of courses focusing on enterprise computing systems, which would give students valuable skills for managing the IBM System z mainframe platform.

Dr. Jong comments, "In meetings with companies, they described how the market for programmers with IBM System z skills was tightening as baby-boomer generation professionals retired. Working with these companies, we created the plan for new courses in

Enterprise Computing Systems which would solve the skills bottleneck and ensure that graduates had valuable expertise that would help them secure employment in this field."

An essential part of the Enterprise Computing course would be hands-on programming and test and development experience on live mainframe servers. As part of the course design phase, Dr. Jong reviewed the available capacity on the installed mainframe systems used by Illinois State University for human resources, payroll and related administration.

Gaining real-world experience

To initiate the Enterprise Computing Systems education program at Illinois State University, virtual mainframe systems were provided for students to access remotely via the Internet. Each student was assigned a user ID on an IBM System z server, enabling them to gain hands-on experience on the mainframe platform. As the Enterprise Computing Systems program grew, the IBM Academic Initiative determined that it was time to provide an IBM eServer zSeries 890 mainframe server on campus—to enable Illinois State University to further expand its program and meet the growing expectations of the professors and students.

Dr. Jong comments, "Access to the z890 will provide students with an invaluable view into the demands of real-world business environments through the study of enterprise computing systems. Using the z890 will also offer students new opportunities to work in teams on virtual projects and lab assignments, and build skills on virtualization, enterprise-class Linux and the full mainframe architecture."

Dr. Jeffrey A. Wood, Dean, College of Applied Science and Technology, Illinois State University, adds: "IBM is a world class company that realizes how important an investment into educational infrastructure can be. The investment by IBM in this collaboration demonstrates its commitment to providing future generations with opportunities to learn. This project stands as a model for education and industry collaboration to create mutually beneficial teaching, research and learning experiences."

> *"This project stands as a model for education and industry collaboration to create mutually beneficial teaching, research and learning experiences."*
>
> – *Dr. Jeffrey A. Wood, Dean, College of Applied Science and Technology, Illinois State University*

Building a pool of skills

The university plans to use logical partitioning to run multiple distinct environments on the z890, including project production and development and test/quality assurance areas. These will provide the students with experience closely aligned to real-world operations on the mainframe platform. The University will include disaster planning and recovery scenarios in the course as well, ensuring that students are fully prepared for commercial environments.

"From my perspective, the loan by IBM offers many benefits," says Dr. Jong. "The IBM offer made the course financially viable for the School; for the companies involved the course will address a critical skills shortage; in addition students will gain hands-on experience of the capabilities of the IBM System z platform, such as simultaneous native support for multiple operating systems, dynamic load balancing and a host of advanced virtualization technologies available on the mainframe architecture."

"The immense total computing capacity of the z890 also means we will be able to introduce distance learning programs, where students outside Illinois State can register and participate in the course. Ultimately, students graduating with mainframe skills will be an

extremely valuable pool of talent for virtually every major enterprise around the world—the vast majority of which still run mission-critical workload on the mainframe platform."

Creating benefits for all

The z890 server is easily expandable, and will enable Illinois State to add new elements to its Enterprise Computing courses in the future. The z890 offers the specialized Integrated Facility for Linux® (IFL) processor designed to run Linux applications, and a specialized Java™ execution environment with zSeries Application Assist Processors (zAAPs) designed to run Java technology-based applications on z/OS® V1.6 and subsequent releases.

Jai Menon, IBM Fellow and Vice President Technical Strategy and University Relations, IBM, comments, "The new mainframe resources at Illinois State University will help students better understand how enterprise-scale data warehousing, e-commerce, and business intelligence technologies work together."

"IBM will supplement classroom lessons in operating environments, data communication and security with sponsored guest lectures and educational trips to local customer data centers. As businesses increase their reliance on technology, there is a greater demand for skilled employees to manage these complex processes and functions."

"Our work with Illinois State University showcases how we are helping to create a smarter pool of potential hires for ourselves, our customers, our business partners and, of course, other local and global businesses."

> *"Students will gain hands-on experience of the capabilities of the IBM System z platform, such as simultaneous native support for multiple operating systems, dynamic load balancing and a host of advanced virtualization technologies available on the mainframe architecture."*
>
> – *Chu Jong, ECS Coordinator, Assistant Professor at the School of Information Technology, College of Applied Science and Technology, Illinois State University*

Mainframe at the heart of the infrastructure

Illinois State has fixed its IT strategy on open systems, running Linux on a variety of server platforms. Dr. Jong plans to use the z890 to manage very large databases and storage volumes, allowing the diverse server types to connect to the mainframe as a central integration point.

"The advantage is that we can connect other servers to the z890 for transactional workload and return the results to the peripheral system," says Dr. Jong. "We can extend the useful working life of the remote server by reducing the workload, while the students learn how to program, integrate, test and deploy in preparation for the commercial world."

He concludes, "Although it has roots stretching back several decades, the mainframe has perhaps never been more relevant. The stability and security of the platform make it indispensable in most large enterprises, so it is vital for their future employment prospects that our students have some experience of the mainframe. With help from IBM, we're now able to give those students a firm grounding and commercially valuable skills on the IBM System z platform."

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ZSC03024-USEN-00

King Mongkut's University of Technology Thonburi improves the way it teaches its students while providing a more comprehensive curriculum.

Overview

King Mongkut's University of Technology Thonburi
Bangkok, Thailand
www.kmutt.ac.th

Industry
- Education

Product
- IBM System z

"The System z platform provides for us the flexibility to manage the computing infrastructure for our training courses. It makes life easier because we can install many servers and many tools on one System z server."

—Prasert Kanthamanon, Ph.D., Senior Dean of Administrative Affairs, School of Information Technology

King Mongkut's University of Technology Thonburi (KMUTT) is a science-and-technology-focused university that trains quality IT professionals. The university teaches students to understand and use the tools they need to develop successful careers in the IT industry.

Challenge

KMUTT had been relying on PCs to teach its students about IT tools and concepts. Professors had to install all of the teaching tools and software on each individual PC every time there was an update for an application or a change to a class or a workshop. With hundreds of PCs for each workshop, the images were difficult to manage and maintain. Further, with the solutions loaded directly onto the PCs, KMUTT couldn't provide remote learning.

Solution

To deliver a better learning environment, KMUTT implemented an IBM System z™ server and leveraged the platform's virtualization capabilities to launch a Virtual IT Playground, which enables students to study and learn from nearly anywhere, at anytime on individual virtual servers. Students can now connect their virtual servers together to create a system for working on group projects. What's more, by using the System z platform, students gain the experience and learn the skills they need to work on an enterprise-level mainframe.

Benefits

- Improves flexibility, enabling the client to better manage its computing infrastructure for training courses
- Shrinks the IT footprint and reduces resource consumption
- Provides students with the tools and skills needed for a career in the IT industry

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Rte 52
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04-08

ZSC03028-USEN-00

Marist College educates the next generation of mainframe administrators with IBM System z, IBM z/VM and IBM System Storage

Overview

- ***Challenge***
  To support the ongoing educational and operational technology requirements of a leading liberal arts college
- ***Solution***
  Consolidate and virtualize the IT infrastructure with IBM System z™, IBM z/VM® and IBM System Storage™
- ***Key Benefits***
  Simplifies systems management, increases utilization and capacity while reducing footprint, and enables virtual mainframe-based learning environments

Marist College is one of the leading comprehensive liberal arts institutions in the northeastern United States. Nestled in the Hudson River Valley, the college is home to approximately 5,300 students and 800 employees.

A neighbor of IBM's Poughkeepsie facility, Marist has maintained a long-standing relationship with the IBM Corporation. Marist first installed an IBM System/370™ mainframe with virtualization in 1978. Since that time, Marist's IT infrastructure has gone through many upgrades, but IBM mainframes and virtual machine (VM) technology have remained a constant presence on campus, supporting IT activities in development, production and the educational process. As a result, Marist has gained a reputation as a trailblazer in virtualization and mainframe technologies.

Marist installed their first IBM System z over six years ago—an IBM System z900 mainframe running IBM z/OS® and IBM z/VM. Pleased with the ongoing performance and benefits of System z, Marist recently decided to replace the z900 with a new IBM System z9® mainframe.

Virtualization on IBM System z mainframes

Not long ago, the popularity of personal computers and rack servers meant that most people didn't immediately think of mainframes as a low power or low cost option. In addition, the business world has only recently acknowledged the value of virtualization. However, virtualization on the mainframe has actually never been more powerful or cost effective, and modern mainframe systems such as System z have proven to be extremely competitive.

With the initial installation of System z900, Marist consolidated their IT infrastructure while expanding its capabilities. Because space is tight on campus, Marist maintains a fairly small data center. System z fits the requirements of small data centers by making extremely efficient use of computing

resources, power and money. Over the years, Marist has been able to continue adding more resources without negatively impacting the mainframe's processing efficiency or needing to make significant new hardware investments. Marist currently runs several hundred virtual servers on their z9™, servicing the needs of the entire college.

Martha McConaghy, strategic planner and project manager at Marist College, explains, "The cost to run a mainframe has decreased over the years. You can fit more on a mainframe, particularly the z9, than you could before—and at less cost. If we used rack servers to provide all the services we now run on the z, the footprint would be four or five times larger. And the cost in terms of space, power and cabling would be much larger."

Educating the next generation of System z administrators

This ongoing involvement in mainframes and z/VM demonstrates Marist's commitment to adopting vital technologies and applying them to both teaching and learning. Marist participates in the IBM Academic Initiative, a cooperative agreement between IBM, local businesses and higher education.

The initiative provides opportunities for students to access technology they wouldn't normally be able to and in real world situations.

Marist is leveraging this program to educate the next generation of mainframe administrators. McConaghy elaborates, "Companies still need those mainframe skills and they found that people who had them were all reaching retirement age. A few years ago they realized they'll still need people to carry those skills into the future." Employers now recognize that students are coming out of Marist internships with real world experience administering mainframes and z/VM on System z.

With z/VM enabling a complete virtualization of System z, students can practice managing everything usually done by hardware, including the layout of the network. z/VM enables Marist to run many complete instances of IBM z/OS simultaneously, providing a fully functional copy of the operating system to each group of students learning z/OS skills. It can even run complete, virtual instances of z/VM that can be further segmented into additional virtual mainframes as required.

Virtual clients for any application

z/VM also gives Marist the ability to run over 600 Linux® virtual machines for general student use, all on a single System z server. The consolidated architecture provides a great deal of flexibility and control over systems administration. On each virtual system, administrators can define minimum performance guarantees and workload characteristics. z/VM also enables dynamic system recovery from failures or outages, and the ability to quickly set up new Linux server environments or test environments for application programmers.

> *"Any mainframe customer demands high availability and high reliability, so you do have the expectation that when you bring in IBM Storage like DS8100 that it's going to work from day one and it's not going to have any major problems. We have certainly found that to be true."*
>
> – *Martha McConaghy, strategic planner and project manager, Marist College*

"We couldn't do it any other way but with System z and z/VM," says A. Harry Williams, director of technology and systems at Marist College, "Just in terms of Linux on z/VM, I've got over 600 virtual servers. For me to actually buy and try to manage that number of servers would be both cost and time prohibitive. We recently automatically applied two sets of security patches to every server in under 48 hours. If I tried to do that manually, I would still be going through the first set of patches."

Linux on System z

Linux environments on System z can take advantage of specialized technologies such as HiperSockets™ to improve performance. Linux virtual machines on System z are not emulations or stripped down versions, but fully functional installations of the operating system. Thanks to the fast and dynamic provisioning capabilities of System z and z/VM, Marist can test new applications they may not have previously tried and can easily revert to previous configurations.

A better option in virtualization with IBM z/VM

"z/VM is much easier to manage from a technology point of view," says Williams. "It takes less staff and provides more useful tools. z/VM lets us monitor performance data to see how the virtual machines are running. I can actually see how resources are being utilized so I can tweak and tune them so they can get the support they need." The result is extremely high resource utilization levels.

McConaghy adds, "On other platforms, the rule of thumb is to keep utilization at around 20 percent—go above that and performance starts to suffer. The norm on the z is to run between 80 and 90 percent utilization without any performance degradation. This means you can get as much as possible out of the environment."

Marist's System z9 includes the reliability of a disk farm structure for easier replication and the ability to use clustering more easily than other platforms. The virtual network increases security while reducing the need for a physical network and the administrative headaches that come with it. The z9 also supports Marist's green initiative of advancing environmental sustainability with its small footprint and reduced electricity bill. All of this translates to a reduced total cost of ownership.

Marist intends to continue using IBM technology into the foreseeable future. They recently installed two IBM System Storage DS8100 disk storage systems to enhance the information infrastructure and are now in the process of developing a storage area network (SAN). McConaghy says Marist is pleased with the performance of the storage systems. "Any mainframe customer demands high availability and high reliability, so you do have the expectation that when you bring in IBM Storage like DS8100 that it's going to work from day one and it's not going to have any major problems. We have certainly found that to be true."

The current trend is to continue growing the System z capabilities and adding additional applications as required. "We're constantly looking at every application we implement and saying, 'Is this a good fit for the z9?' More often than not, the answer is yes," states Williams, "System z has been wonderful. Fabulous. A crown jewel. I can't say enough superlatives about what it's done for us."

> *"System z has been wonderful. Fabulous. A crown jewel. I can't say enough superlatives about what it's done for us."*
>
> – *A. Harry Williams, director of technology and systems, Marist College*

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For more information about Marist College, visit: www.marist.edu

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ZSC03026-USEN-00

St. Helens Council consolidates to a virtualized infrastructure with Triangle and IBM

Overview

- ***The Challenge***
  With 89 physical servers in its data centre, St. Helens Council lacked room for growth. As the servers neared end-of-life, it was time to re-think the IT architecture.

- ***The Solution***
  Working with Triangle (www.triangle-group.com), the council consolidated to an architecture based on four IBM System x3850s, one x3650 and an IBM BladeCenter, using VMware to virtualize the environment.

- ***The Benefits***
  Rack-mounted and blade servers provide high performance with a smaller footprint, freeing space. Virtualized infrastructure increases flexibility. Triangle ensured implementation met deadlines and budget targets.

St. Helens Council is responsible for providing a wide range of local government services for a population of more than 176,000 people in the metropolitan borough of St Helens, Merseyside.

The council is committed to providing excellent public service by leveraging technology – of its 8,000 staff, 64 work in the IT department. Its highly successful Web site offers an array of online services – helping local people with everything from school admissions to council tax payments.

St. Helens Council makes heavy use of IT, running IBM Lotus Notes and Domino to provide email and calendaring for 2,500 staff and local councillors, as well as a number of databases and applications that have been developed by its in-house team.

As the council strives to introduce new services and enhance existing ones, the demand for IT resources is increasing. Some years ago, a decision was taken to increase the flexibility and scalability of its underlying IT infrastructure by replacing its mainframe with a number of Intel-based servers.

"It was a good decision at the time, but as the council's reliance on IT increased, our data centre began to fill up with under-utilized servers," says Ste Sharples, ICT Business Manager at St. Helens Council. "We had 89 machines – many of them reaching end-of-life – and we were getting to the point where further expansion would mean moving to a new building."

Best of both worlds

St. Helens decided to rethink its entire infrastructure, and worked with Triangle to come up with a new solution.

"Triangle has been our partner for just over two years now, providing expert consultancy on all kinds of IT matters – from Lotus Domino upgrades to infrastructure solutions," says Miles Harrison, Domino Team Leader at St Helens. "A big advantage of working with Triangle is its UK-wide reach – we can get their consultants on-site very quickly if we need to."

Ste Sharples adds: "We wanted a solution that would provide some of the advantages of our original mainframe environment – centralised management, high reliability and

small physical footprint – without compromising on flexibility and scalability. Triangle came up with a great proposal that offered us the best of both worlds."

The Triangle proposal centred around server consolidation – moving the existing IBM Lotus Domino application and mail servers onto just four rack-mounted IBM System x3850 servers, with an x3650 as DMZ and an IBM BladeCenter with HS20 blades serving Citrix. The council's existing fibre-channel SAN (based on an IBM System Storage DS4000) was expanded with SATA disks and used as the storage environment for the new architecture.

The System x and BladeCenter servers are built around Intel Xeon processors, which provide industry-leading performance for application workload. With high memory bandwidth, high memory capacity, and high I/O bandwidth, the processors are an excellent choice for handling St Helens' Lotus Domino workload – and their energy efficiency is ideal for thermally-sensitive, space-constrained environments like the council's data centre.

"The IBM System x servers and BladeCenter deliver excellent performance and a robust environment for our critical applications," says Ste Sharples. "Triangle deserves credit for ensuring that we finished the project on time and on budget – helping us meet St. Helens' very ambitious efficiency targets."

High-speed provisioning

The new solution effectively delivers capacity on demand for St Helens' IT infrastructure – enabling a rapid response to the need to develop new services and handle increasing data volumes.

Shaun Taylor, Assistant Operations Manager at St. Helens, explains some of the benefits of the new solution: "Previously, we had to buy a new machine almost every time we wanted to run a new application. With the IBM System x solution, we use VMware to create a virtual server instead – so it takes minutes rather than weeks, and we utilise the hardware much more effectively."

St Helens uses IBM Director – a set of integrated hardware management tools – to help provide maximum availability and simplify system administration tasks. VMware technology also facilitates maintenance and disaster recovery, since an active system can be moved from a failing physical server to another machine without incurring downtime.

Miles Harrison comments: "Another advantage of the virtualized environment is that we don't need to pay for as many licenses, as much of our software is still sold on a per-machine licensing model."

"More importantly, the rack-mounted System x servers and the BladeCenter have a very small physical footprint," adds Shaun Taylor. "As a result, we can use the space in our data centre much more effectively."

Ste Sharples concludes: "By helping us consolidate to IBM System x and VMware, Triangle has delivered a solution that will deliver real value to St. Helens Council, both now and in the future."

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire
PO6 3AU

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University Health Care System improves patient care with enterprise grid storage system

Overview

- ***Business Challenge***
  The transformation into a digital healthcare facility had created the need to improve the scalability, reliability and resiliency of the hospital's information storage infrastructure.
- ***Solution***
  IBM helped University Health Care System (UHCS) develop a plan for using technology to enable caregivers to provide high-touch care. The IBM Grid Medical Archive Solution protects data and simplifies the deployment, operation and management of massive fixed-content storage systems.
- ***Key Benefits***
  - *Improved access to archived cardiology studies provides a competitive advantage for UHCS in the community while also helping to improve caregiver productivity*
  - *Grid-based storage can dramatically help improve application resiliency and data protection so doctors can continue to treat patients 24/7, even in the event of a disaster or failure in the data center*
  - *Data protection, automated administration and migration features can help improve IT productivity, enabling a small team to manage a large amount of storage*

University Health Care System is a not-for-profit community hospital network that serves 25 counties throughout Georgia and parts of South Carolina. The region served by UHCS is a very competitive healthcare environment, according to Bill Colbert, UHCS CIO. "Our use of technology can be a differentiator when local employers decide where to send their employees and when doctors assess the capabilities of local hospitals to determine where to send their patients. We position ourselves as a technologically advanced facility that provides high-touch care."

In recent years, UHCS has undergone a transformation into a digital healthcare facility, particularly with regard to clinical services. Caregivers have electronic access to patient records, medical images, lab results and other business data. According to Colbert, "Since starting our first Picture Archiving and Communication System (PACS) project four years ago, we are now primarily digital. The next step is to evolve the IT infrastructure to improve scalability and resiliency."

Business Benefits

- Continual access to archived cardiology studies, harnessing technology to help improve healthcare
- GMAS delivers three important capabilities to ensure UHCS clinicians are assured of reliable data access: data protection, business continuity and automated recovery from disasters
- Grid-based storage can help improve resiliency so doctors can continue to treat patients 24/7, even in the event of a failure in the hospital's storage infrastructure
- Support for open, standard interfaces enables UHCS to leverage the storage system across the enterprise
- GMAS provides a flexible storage platform that scales to increase capacity, the number of storage tiers and the number of disaster recovery sites

The move to a digital healthcare facility has resulted in astronomical growth in data storage needs. The cardiology system alone produces over 15 TB of new data each year. That has driven the need for the UHCS IT staff to evaluate fresh, transformative approaches to information storage and archiving.

IBM and Dynamix Group propose an innovative storage solution

The IT staff wanted an open storage infrastructure that could be initially deployed in a department or two and then evolve over time into a single virtualized storage pool to support enterprise storage needs across all facilities. According to Rob Tiller, manager of Technical Support Services, "Virtualization is an ideal way for us to meet the hospital's storage needs in a cost-effective manner."

Colbert adds, "We wanted to partner with key vendors to help us plan strategically for how to use technology to further our business objectives. We had a growing relationship with the IBM healthcare group. IBM and local IBM Business Partner Dynamix Group had taken the time to learn our business, so they could propose solutions to some of the toughest challenges we had in improving efficiency—which in turn can improve patient care."

The team of IBM and Dynamix Group proposed the IBM Grid Medical Archive Solution (GMAS). GMAS combines the power of IBM Global Technology Services, IBM eServer™ xSeries® servers and IBM TotalStorage® hardware with industry-leading storage grid software to deliver a simple and cost-effective enterprise storage solution for

fixed-content data. GMAS is designed to provide data authenticity, scale on demand, automate recovery from disasters and deliver a cost-effective platform for long-term data retention by leveraging tiered storage and automating data migration to deal with hardware obsolescence.

According to Ken Sweatman, lead systems programmer, "GMAS has the scalability we need to support our enterprise and can expand to archive all our enterprise fixed-content data—cardiology and radiology studies, clinical records and business documents. We've also increased the resiliency of business systems by making GMAS the storage system for our database snapshots."

GMAS fits the demanding requirements of cardiology archiving

Archival storage for the cardiology system was the first deployment of GMAS at UHCS. Integration with existing systems was simple using the solution's CIFS and NFS support. Each night, cardiology studies are transferred from the cardiology system to an archive to make room for new images the next day. But with increased volume, archiving took more than three hours each night. With GMAS, storage systems were able to accommodate the transfer without administrator intervention or system downtime while reducing the transfer time to only 45 minutes.

Previously, the cardiology archive was maintained on a non-IBM system that was reaching its capacity. Says Tiller, "When we forecasted the cost of scaling that non-IBM system over the next several years, it was going to be very expensive due to its proprietary design."

"The GMAS storage platform was the ideal solution to the requirements of cardiology archiving," says Colbert. "Not only was GMAS cost-effective, it would protect the image data in case of

Key Components

Software

- StorageGRID software

Systems

- IBM eServer xSeries servers featuring Intel Xeon processors
- IBM TotalStorage DS4100 storage servers

Solution

- IBM Grid Medical Archive Solution

Business Partner

- Dynamix Group, Inc.

a disaster at the facility. Performance looked outstanding." Adds Tiller, "Our cardiologists need rapid access to studies, and they were complaining about slow retrievals." Availability was an issue with the EMC Centera because the system had to be brought down for maintenance. "That was a serious problem for cardiologists because they needed 24/7 access to their studies to provide the best care for their patients," says Tiller.

GMAS provides a platform for long-term growth

The GMAS storage grid software helped enable a more affordable phased deployment at UHCS. This grow-as-you-go approach allowed UHCS to benefit while leveraging new hardware advancements. Initially, the grid had two IBM TotalStorage DS4100 disk storage systems, which would handle about six months of cardiology images. Then UHCS added four more DS4100 systems to raise the total capacity of the grid to 21 TB—enough capacity to handle approximately a year or more of images. GMAS allowed UHCS to exploit the performance of new hardware advancements and benefit from the cost savings.

To provide computing power for GMAS, UHCS began their enterprise-class IBM hardware deployment with just four eServer xSeries servers powered by Intel® Xeon® processors and running the Linux® operating system. Coinciding with the storage upgrade, four xSeries 336 servers and two additional xSeries 346 servers were added. Tiller says, "This invest-as-you-grow approach is ideal for a hospital environment, where large upfront investments are difficult to justify."

The IBM products underlying the grid were all familiar to the UHCS IT staff. Says Tiller, "We already use xSeries servers and TotalStorage systems in other areas. They offer great price/performance and have been very reliable. We have been particularly impressed with the high quality and durable construction of xSeries servers. They have proven to be a solid foundation for our server and storage virtualization initiatives, which have led to us standardizing on those products for new deployments."

GMAS brings healthcare-class reliability and resiliency

In a digital hospital, fast, reliable storage systems help nurses and doctors respond quickly to changing patient conditions. Says Colbert, "Our objective is to give our staff quick access to the information they need—available at their fingertips—to make rapid medical decisions."

The IBM GMAS storage platform supports 24/7 operations, which is a major advantage relative to the prior system, which incurred downtime when UHCS needed to add capacity or perform maintenance. With GMAS, all management and maintenance is being performed while the system is operational. Management downtime has been virtually eliminated. "Now, we add capacity without disrupting the staff's use of the cardiology studies," says Sweatman.

GMAS delivers three important capabilities to help assure healthcare providers of reliable data access:

- *Data protection*
- *Business continuity*
- *Automated recovery from disasters*

GMAS maintains two physically independent copies of data to help ensure high availability and data integrity. Thus, if one storage server fails, a second replica can be used to fulfill immediate data retrieval requests and to transparently self-heal and restore a new replica on another storage resource. Automated recovery saves tremendous IT resources.

The next phase of the evolving grid is to split it between two locations to enhance disaster recovery. Says Tiller, "The distributed storage grid can help us protect our data in case we lose one site. We can continue without interruption with services delivered by the other site."

Grid helps UHCS address regulations

The grid helps UHCS address regulatory guidelines, such as the Health Insurance Portability and Accountability Act (HIPAA), which require that patient data be protected and not modified. GMAS assigns a unique digital signature to every image that is saved in the archive and then automatically checks those signatures to help ensure the integrity of the data throughout its life. Says Tiller, "With so much data and so many people wanting to access it, GMAS provides the security and flexibility we need to adapt to evolving regulations."

Cost-effective mass storage is budget-friendly

GMAS is an open system built from industry-standard hardware. According to Sweatman, "We had an investment in storage that we did not care to give up. The PACS and storage vendor neutrality of GMAS allow us to capitalize on existing investments. Further, the solution's implementation of open standards protects us from the vendor lock-in we have experienced with past investments."

The storage grid at UHCS is expected to evolve into a two-tiered storage system, beginning with disk-only storage that can archive two years of studies so cardiologists can quickly retrieve the information most relevant to patient care. Once the grid maintains two years of images on disk, the UHCS IT staff plans to add IBM tape libraries to hold the older studies. The information lifecycle management feature of GMAS will automatically manage the migration of images from disk to tape based on policies set by the IT staff. Furthermore, data is protected and authenticity assured during the migration between tiers through GMAS digital signature checks. Says Tiller, "We like the idea that as the disk-based archive grows based on the number of studies done per day, the growing collection of past studies will be stored on low-cost tape."

Success adds to the perception of leadership

Commenting on the results achieved, Colbert says, "We now have an environment where caregivers can spend more time at the bedside dealing with patients instead of the logistics of cardiology studies. GMAS is part of the technology infrastructure that has led the public and the healthcare profession alike to perceive UHCS as a leading healthcare facility in our region. We look forward to expanding the use of GMAS in other areas of the hospital."

For more information

For more information, contact your IBM sales representative or IBM Business Partner, or visit us on the Web at:

ibm.com/innovation

ibm.com/grid

IBM Systems and Technology Group
Route 100
Somers, NY 10589
U.S.A.

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IBM storage graduates with honors for performance and reliability at the University of Calgary

UNIVERSITY OF CALGARY

Overview

- ***Challenge***
  Build a responsive, reliable and scalable data storage infrastructure that can support high-performance student applications and administration processes while improving administrator productivity in a rapidly growing university environment
- ***Solution***
  A virtualized storage environment based on IBM System Storage™ SAN Volume Controller (SVC), IBM System Storage DS4800 disk storage systems and IBM SAN Switches connected to virtualized IBM System p5™ 570 application servers
- ***Key Benefits***
  - *Storage virtualization simplifies data and disk management, increasing system flexibility and freeing up valuable time for IT data administration staff*
  - *Storage virtualization with SVC provides boot-from-SAN capabilities that also free up management time for IT data and server administration staff*
  - *Storage utilization is increased due to ability to allocate storage to applications when and where it is needed*
  - *Performance speeds have risen from 2 Gbps to 4 Gbps, resulting in an increase from 4,000 input/output operations per second (IOPS) to 13,000 IOPS*
  - *Built-in reliability helps keep mission-critical systems running for thousands of users, with no noticeable latency*
  - *Backup times are cut in half compared with previous third-party SAN*

The University of Calgary is one of Canada's top public universities, graduating more than 120,000 alumni since 1966, including the current Canadian prime minister. Today, the university offers more than 80 programs to around 40,000 full- and part-time students, including an extension program in Qatar. And the goal is to keep on growing.

Fuelled by Alberta's nation-leading economic growth, the university's five-year plan includes adding capacity for 7,000 more students and a host of new teaching and research activities, including a new digital library and an experiential learning center. Several initiatives to transform important on-campus administrative processes, especially student registration services, are part of the plan.

"Our students and staff here in Alberta and in southwest Asia expect state-of-the-art services 24x7," explains Don Zarsky, technical architect for PeopleSoft support in the administrative systems IT group at the university. "At any given time, we might have thousands of students logging into our systems looking for and updating information related to their learning experience. These services are critical to the university's success."

IBM supports explosive data growth

Initially, the university had developed most of its student and business operations applications on an IBM mainframe. But these homegrown systems were proving too slow, expensive to support and difficult to scale. Faced with another huge wave of student registrations, the university decided to upgrade its finance, supply chain, human resources, payroll and student services software and build out a new, reliable infrastructure that would meet the high performance demands of a large university.

After an extensive request-for-proposal process, the university chose a suite of PeopleSoft software deployed on four IBM System p5 servers running IBM AIX 5L™ and three IBM System x™ 365 servers with dual-core Intel® processors. "This configuration not only offers us performance speeds we need but also enables us to move further with our virtualization efforts to prioritize system resources," Zarsky says.

During the testing phase, Zarsky and his team ran the PeopleSoft software powered by Oracle database platforms connected to an older model IBM SAN—with the goal of migrating over to a new third-party SAN that another IT group had just purchased. However, Zarsky soon discovered that the new SAN couldn't scale quickly enough for the rapid growth in data from the human resources, finance and student registration services.

Performance was disappointing, too. "The performance simply wasn't there," Zarsky says. "Since we had been using an older IBM SAN during testing, we knew that the new IBM DS4800 with an IBM SAN Volume Controller would provide the reliability we needed and work well with our existing systems. A key advantage of the DS4800 is speed—we could move up to 4 Gbps performance."

> *"Since we had been using an older IBM SAN during testing, we knew that the new IBM DS4800 with an IBM SAN Volume Controller would provide the performance and reliability we needed and work well with existing systems. A key advantage of the DS4800 is speed–we could move up to 4 Gbps performance."*
>
> – *Don Zarsky, Technical Architect, PeopleSoft Support, IT Group, University of Calgary*

Attractive lease option reduces TCO

After presenting the university's senior staff with empirical results and convincing administrators that the new SAN Volume Controller and IBM SAN would deliver the performance and reliability the PeopleSoft production systems required, Zarsky received the green light to place the order.

Since budget is a major concern for this publicly funded institution, the university arranged a lease program through IBM Global Financing Services. In addition to helping reduce the total cost of ownership, leasing helps the university keep technologies current and make flexible equipment decisions to support student growth and changing administrative needs.

IBM SAN management optimizes resources

Deployment was quick and easy. Two members of Zarsky's team worked with IBM Global Technology Services to set up the entire SAN system supporting the PeopleSoft applications quickly and smoothly, and in plenty of time for the next wave of student registrations. In addition, IBM training in SVC management helped ensure that the system would run optimally from the start.

Using IBM System Storage SAN Volume Controllers, IBM Tivoli® Storage Manager software and a pair of Fibre Channel IBM SAN Switch devices, the PeopleSoft support database and server administrators can back up vital production data from IBM AIX 5L, Microsoft® Windows® and Oracle Standard Edition (SE) operating environments.

The IBM DS4800 offers 4.7 TB of raw storage capacity with 32 drives, each turning at 15,000 rpm and each with 147 GB of capacity. "In less than three years, the University of Calgary moved from mainframe-based applications for finance, supply chain, human resources and student services to a completely new PeopleSoft environment," says Harold Esche, university CIO. "With such an aggressive timeline, it was essential to ensure that technology issues didn't derail the project. As expected, the IBM systems and storage performed flawlessly."

> *"In less than three years, the University of Calgary moved from mainframe-based applications for finance, supply chain, human resources and student services to a completely new PeopleSoft environment. With such an aggressive timeline, it was essential to ensure that technology issues didn't derail the project. As expected, the IBM systems and storage performed flawlessly."*
>
> – *Harold Esche, CIO, University of Calgary*

High performance improves efficiency

Performance has also improved significantly with the IBM SAN environment. Data network speed increased from 2 Gbps to 4 Gbps—a significant boost that the university IT department attributes to both the cache on the System Storage DS4800 device and the cache of the SVC.

Furthermore, the evening batches that used to max out at only 4,000 IOPS now reach speeds up to 13,000 IOPS. This performance improvement translates to a more than 50 percent reduction in the time that it takes to back up production servers and databases. Says Esche, "Not only have we seen a tremendous improvement in performance, but software upgrades have been completely non-disruptive—a level of efficiency we were never able to achieve on our previous SAN."

"A key measure of the success of a technology is a lack of awareness by the customers," Esche adds. "From a user perspective, the best technologies are the ones that are transparent. They just work. The IBM SAN has been just that—always available with no performance problems. That's exactly what we needed for this high-profile and critical project."

Virtualization increases flexibility

By virtualizing the storage environment, Zarsky has also increased system flexibility and improved ease of management. "Virtualization simplifies data and disk management," he explains. "We've been extremely impressed with the management capabilities of the IBM virtualized storage network because it provides the flexibility that our other SANs lacked. For instance, we no longer have to deal with the compatibility issues of using third-party device drivers, and this means no more scary moments when upgrading system software on production application servers."

Since the PeopleSoft applications are critical to university operations, building a reliable and secure infrastructure was key to the success of the PeopleSoft upgrade project. "We don't have to worry about the reliability of the IBM devices; they've been rock solid," Zarsky says. "Our users are able to access everything they need, when they need it, which saves us a lot of time by reducing the number of help calls we must field."

Strong IBM infrastructure supports campus life

In the meantime, Zarsky and his team are focusing on consolidating test and development data onto the IBM DS4800 environment and building out a redundant storage area network for disaster recovery purposes. He's also sharing his knowledge and experience with the IBM SVC and DS4800 with other groups at the university.

"The new IBM SAN has attracted a lot of attention from other IT groups within the university," he explains. "While some are interested in implementing a similar system, others are already asking if they can put their data on the IBM SVC."

For more information

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IBM Systems and Technology Group
Route 100
Somers, NY 10589
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IBM helps the University of Cincinnati move to a modern infrastructure with SAP ERP on System p and DB2

Overview

■ ***The Challenge***

The University of Cincinnati wanted to improve the efficiency of its financial processes and provide more flexible access to HR systems. However, its existing IT infrastructure was based on legacy code and aging mainframe technology, and lacked the flexibility to support the new functionalities required.

■ ***The Solution***

IBM Global Business Services and Sirius, an IBM Business Partner, helped the University design and deploy a new environment based on SAP ERP Financials and SAP ERP Human Capital Management solutions. The SAP software and an IBM DB2 database run on virtualized IBM System p servers, maximizing price-performance and simplifying management. The University plans to move to new IBM POWER6 technology in the near future.

■ ***The Benefits***

Industry-standard SAP software helps align processes with industry best practices, increasing efficiency and promoting collaboration with other institutions. IBM Advanced POWER Virtualization and Virtual I/O reduce hardware costs and simplify the set-up of new virtual servers. IBM DB2 offers a cost-effective, high-performance database platform. Upgrading to POWER6 will increase performance and energy-efficiency even further.

■ ***Key Solution Components***

Industry: Education
Applications: SAP® R/3® Enterprise, SAP ERP Human Capital Management, SAP Solution Manager, SAP NetWeaver® Business Intelligence, SAP NetWeaver Portal
Hardware: IBM System p5™ 570
Software: IBM AIX® 5L, IBM Tivoli® Storage Manager, IBM DB2®
Services: IBM Global Business Services, IBM Business Partner Sirius

The University of Cincinnati (UC) is one of the top-rated public research universities in the US, and is committed to offering its 35,500 students not only academic excellence, but preparation for a successful life in the wider world. Cooperative Education – where students alternate periods of study with periods of professional work in a complementary field – was invented at UC in 1906, setting an example that has been followed by universities around the world.

With a history of paying closer attention to the wider world than many ivory towers choose to do, UC naturally takes its responsibilities as a 21st century educational institution very seriously. UC understands that reputations are built not only on academic excellence, but on the overall value that the University can offer. In the increasingly competitive higher education marketplace, there can be no excuse for inefficient fiscal management or inflexible administrative processes that make life difficult for staff and students.

"Virtualization on the IBM System p platform is a mature and proven technology, helping us utilize the hardware more effectively and increasing price-performance without compromising on reliability."

Dan Kuhlmann
Manager of the Basis Team
University of Cincinnati

The effective delivery of these key financial and administrative services depends on making the right use of IT. UC's existing IT infrastructure was based around a set of legacy applications, written in COBOL and running on a mainframe. It was becoming increasingly difficult to develop these applications to meet the needs of staff and students, so the University decided to find a new solution.

"The University wanted to find a new suite of software to handle its financial and HR processes – one that would not only provide the flexibility to introduce new functionalities as and when we need them, but that would also help us to align with current best practices," says Mark Young, Director of the Infrastructure Services Group at the University of Cincinnati. "We also saw this as an opportunity to move these systems off the mainframe and onto a more modern infrastructure."

Finding a solution

UC sought the opinions of stakeholders across the University community, and evaluated a number of different solutions before choosing to implement SAP ERP Financials and SAP ERP Human Capital Management (HCM) solutions, together with the SAP NetWeaver Business Intelligence component to provide data warehousing and analysis.

"We knew that a number of US universities were moving to SAP software, and that it had already been implemented successfully at 150 academic institutions worldwide – which means that there is a strong support group for SAP ERP in the education sector," explains Dennis Yockey, Associate Vice President – Business Core Systems at UC. "Also, the fact that SAP provides a fully integrated environment, so that data entered into the financial system can be accessed by HR and vice versa, was a compelling argument in its favor."

Choosing a partner

Having chosen the software, UC needed an implementation partner, and performed a full RFP. IBM Global Business Services came out a clear winner, as the University's Vice President and CIO, Fred Siff, describes:

"For the Best and Final Offer [BAFO] stage, the other leading contender brought a roomful of management and techie types to meet with us. When it was their turn, IBM was represented by one person, who had been identified as their potential project manager. He

alone was far superior to the other roomful – he understood our situation, he was the one who was going to be on the ground, and he was wonderful to talk with.

"That made it a very easy selection process. He became our project manager, stayed with the project over four years, and brought it to a successful conclusion – he proved to be every bit as terrific as he promised to be in the BAFO meeting."

IBM Global Business Services and Sirius, an IBM Business Partner, helped the experienced in-house team at UC design a blueprint for the SAP application environment that would use as much as possible of the software's standard functionality, minimizing the need for customization work and helping to align the University's processes with current best practices. Where customization was necessary – for example, to add grants management functionality – IBM Global Business Services had the resources to complete the work quickly and efficiently.

Mark Young comments: "IBM Global Business Services had a very active role in the project, ensuring that the design of the solution would meet all of our requirements and that the implementation went smoothly. The GBS team also put in a lot of effort with knowledge transfer, ensuring that our staff would be self-sufficient in terms of managing the SAP application environment after the go-live. Thanks to the contribution of GBS and Sirius, as well as our dedicated in-house team, we have been able to meet all of our deadlines for the launch of the new environment."

Implementing the solution

IBM, Sirius and the UC team implemented the SAP R/3 solution on an IBM System p 670 server, followed by SAP ERP HCM on a System p5 570. Nearly all 7,000 University staff use the HR systems on a self-service basis, while 1,300 power users have access to the whole SAP application environment – and the IBM System p servers have sufficient capacity to provide excellent performance for this large user-base.

The p5-570 has 16 IBM POWER5 processors, offering the benefits of Advanced POWER Virtualization and Virtual I/O. Production, test and development environments for SAP ERP are provided by a total of 16 logical partitions (LPARs) distributed across the two machines.

"Virtualization on the IBM System p platform is a mature and proven technology, helping us utilize the hardware more effectively and increasing price-performance without compromising on reliability," says Dan Kuhlmann, Manager of the Basis Team at UC. "Features like Virtual I/O, which enables different LPARs to share the same physical network interfaces, minimize expenditure on adapters and cabling, and make it much easier and faster to set up new virtual servers when the need arises."

Upgrading to POWER6

UC plans to replace the existing System p servers with new IBM POWER6 processor-based System p

"Our relationship with IBM has delivered much more than just hardware and software. IBM Global Business Services provided a team with the right industry experience and expertise in SAP applications to help us build an environment that will deliver real value for the University."

Mark Young
Director of Infrastructure Services Group
University of Cincinnati

570 servers soon, which will enable the University to benefit from IBM's leading-edge technologies.

"We are very excited about POWER6," says Dan Kuhlmann. "The ability to move LPARs from one physical machine to another without shutting down the SAP applications is going to make server maintenance much more flexible. In addition, the greater energy efficiency of the new POWER6 chipset will help us reduce electricity costs. Combined with the Live Partition Migration capabilities, which will help us collocate under-utilized LPARs on a single server, this will help us meet our green computing commitments"

The IBM-SAP roadmap for DB2 is very well-defined, so we were sure it would be the right choice for the foreseeable future. Moreover, from a software licensing point of view, it was a lot more cost-effective than Oracle."

Mark Young
Director of Infrastructure Services Group
University of Cincinnati

Leveraging DB2 and Tivoli

As the database for its SAP application environment, UC chose IBM DB2. The production database for SAP ERP now totals 130 GB, while the data warehouse holds 300 GB. Including the development and test systems, the University's DB2 landscape holds around 3TB of data.

"IBM and SAP are working together very closely at the moment to make DB2 the database of choice for SAP applications," explains Mark Young. . "The IBM-SAP roadmap for DB2 is very well-defined, so we were sure it would be the right choice for the foreseeable future. Moreover, from a software licensing point of view, it was much more cost effective than Oracle."

The University is currently upgrading to DB2 9, which should deliver improved performance and reliability, while giving UC access to a number of leading-edge features such as Deep Compression.

UC has also deployed IBM Tivoli Storage Manager for Enterprise Resource Planning (TSM for ERP), which enables simple, incremental backups of the entire SAP software environment from the University's disk storage systems to its tape library. The software is fully integrated with the SAP applications and the IBM DB2 database, providing simple management of the whole environment. TSM for ERP also supports policy-based hierarchical storage management, enabling frequently accessed data to be stored on high-speed disks, while less important information is diverted to lower-cost storage.

An ideal infrastructure

Thanks to the successful collaboration between IBM Global Business Services, Sirius and UC's in-house team, the University now has a modern, centralized ERP solution to handle its core HR and financial processes.

Equally, UC has been able to start offloading its aging mainframe onto newer, more cost-effective hardware. In the future, the University hopes to be able to move its student information system off the mainframe too, which will significantly reduce hardware licensing and maintenance costs.

"The IBM System p servers and the DB2 and Tivoli software form an ideal infrastructure for our new SAP applications," concludes Mark Young. "But our relationship with IBM has delivered much more than just hardware and software. IBM Global Business Services provided a team with the right industry experience and expertise in SAP applications to help us build an environment that will deliver real value for the University."

IBM Deutschland GmbH
D-70548 Stuttgart
ibm.com/solutions/sap

SPC03023-USEN-00 (03/08)

University of Pittsburgh Medical Center partners with IBM to make tomorrow's patient care a reality.

Overview

- ***Challenge***
  UPMC, a leading IT innovator, sought to become a truly integrated, self-regulating healthcare system, utilizing evidence-based medicine to produce superb clinical outcomes and lower costs.
- ***Why Become an On Demand Business?***
  UPMC knew it needed an innovative relationship combined with world class technology to achieve its goals. It saw IBM's pioneering vision and technology as a way to simplify its IT systems, facilitate the sharing of data and improve its flexibility.
- ***Solution***
  In a landmark strategic partnership valued at $402 million over 8 years, UPMC's systems will be transformed into an On Demand Business environment using IBM products and services. On this foundation, IBM and UPMC will work together to bring new healthcare solutions to market.
- ***Key Benefits***
  - *Expected IT cost savings of up to 20%*
  - *Major increase in efficiency through server consolidation and virtualization*

>> **On Demand Business defined**
"An enterprise whose business processes—integrated end-to-end across the company and with key partners, suppliers and customers—can respond with speed to any customer demand, market opportunity or external threat."

ON DEMAND BUSINESS™

UPMC is the premier health system in western Pennsylvania and one of the most renowned academic medical centers in the United States. Its 40,000 employees and 4,000 doctors are spread across a network of 19 hospitals and 400 smaller sites throughout western Pennsylvania.

This is a story of how two important players in the healthcare space—one a leading integrated health system, the other a leading provider of IT solutions—discovered they had a shared vision of tomorrow's healthcare delivery model, and how their common goals became the foundation of a new kind of relationship. It's the story of how these players, IBM and the University of Pittsburgh Medical Center (UPMC), saw the opportunity to combine and complement each other's strengths to forge a new generation of healthcare solutions. Perhaps most unique, it's an example of how they went outside the

"We are combining IBM's unparalleled infrastructure knowledge with our medical knowledge. At the end of our eight-year transformation project, we expect to see cost savings of 15 to 20 percent."

– *Dan Drawbaugh, CIO, UPMC*

On Demand Business Benefits

- Project up to a 20% reduction in overall IT costs
- Simplified infrastructure, facilitating integration of data from across the UPMC enterprise
- Increased cost predictability through IBM Open Infrastructure Offering financing model
- Increased flexibility to grow systems and add new technologies by virtue of open systems support
- Single point of access for all clinical applications, improving caregiver efficiency and quality of care
- Improved ability to develop, commercialize and profit from clinical innovations

boundaries of a customer-vendor relationship and selected each other as partners, an arrangement likely to serve as a template for the healthcare business in the coming years. Here's how it happened.

From its roots as a major academic medical center, UPMC (www.upmc.com) has evolved into Pennsylvania's largest integrated health care delivery system—with revenues of $5.8 billion—and one of the nation's most influential healthcare institutions. In addition to operating the nation's largest transplant program and an array of highly specialized clinical services that draw patients from across the nation and around the world, UPMC acts as the major source of routine healthcare services for residents of western Pennsylvania. UPMC is also closely affilated with the University of Pittsburgh, one of the top recipients of National Institutes of Health research funding. As the term "integrated delivery network" implies, UPMC's mission is to provide outstanding patient care and to shape tomorrow's health system through clinical innovation, biomedical and health services research and education. With UPMC's rapid growth and large investments in advanced IT initiatives, being integrated hasn't always been easy. Each new hospital added to the network added to the complexity of the organization; each new system added to the complexity of its IT infrastructure. In combination, these factors made it that much harder for UPMC to integrate its resources for the benefit of its patients. In the big picture, this created a tremendous challenge—finding an effective way to leverage integrated information across its large and diverse system. UPMC's early efforts to address this challenge led to its first contacts with IBM.

Every relationship has a starting point, and for UPMC and IBM it was a specific engagement focused on improving the performance of its Cerner Millennium electronic health record system. One of the many solutions that place UPMC among the healthcare industry's leading innovators, the Cerner system performed adequately but fell short of UPMC's high expectations due to response time and availability problems. IBM proposed that it could address it by consolidating and simplifying the infrastructure on which it ran. UPMC engaged IBM to redeploy the new Cerner system, which had been running on HP servers, on the IBM eServer™ pSeries® platform. The improvement was immediate and dramatic, with response time going from five seconds to "blink speed" and downtime falling precipitously. But more important, the engagement gave UPMC concrete proof of how IBM's vision and expertise could be applied to its broader vision—the integration of all of its healthcare information resources. That's where the real story begins.

Building a foundation for the future

Having established a new level of credibility with UPMC, IBM sought to provide it with a fuller picture of its own healthcare vision and the depth and breadth of resources it had to back it up. UPMC—interested in hearing more about IBM's roadmap for integration, transformation and simplification—provided a willing audience. In extensive meetings involving a cross section of top UPMC decision-makers, an equally broad-based IBM team presented its vision of how On Demand Business supports the emerging requirements for world-class healthcare delivery. Hearing IBM articulate its strategy for On Demand Business, UPMC was struck by how closely it resonated with its own needs and vision— this realization marked the foundation of the partnership between IBM and UPMC.

UPMC looked at the dynamism of the healthcare industry and saw a host of challenges and opportunities that mandated the need for a strategic partner. The challenge was to establish, support and pay for an infrastructure that is flexible, robust and secure enough to support its healthcare vision. The opportunity for UPMC was to bring a stream of innovative new solutions to the market without diluting its focus. UPMC saw IBM—with its common vision, unmatched strengths in research and development and solid track record in the Healthcare and Life Sciences—as being singularly well-equipped to meet them. IBM saw UPMC as the perfect center of evidence for IT solutions for healthcare. Both companies realized that the close-knit, long-term nature of the mission, and the shared vision and high reward stakes, called for a new kind of customer-vendor relationship that would serve as a model for healthcare in the 21st century.

A new relationship model, a new era

The result was an 8-year, $352 million agreement under which IBM Global Services – Integrated Technology Services and IBM Business Consulting Services—will work with UPMC to transform its IT infrastructure through consolidation and standardization across the entire enterprise. Under the deal, UPMC's 931 servers will be reduced to 319 (IBM eServer xSeries, pSeries, zSeries and BladeCenter servers), nine operating systems reduced to four, and 40 storage databases reduced to just two (running on IBM TotalStorage Enterprise Storage Servers). To manage the infrastructure centrally and efficiently, the solution will employ a common toolset based on IBM Tivoli products. Moreover, its reliance on standard technology enables a high degree of virtualization within the infrastructure, further driving efficiency and leading to overall IT cost savings of up to 20 percent. IBM's integration efforts were guided by its Component Infrastructure Roadmap, a defined and agreed-upon blueprint for integrating the appropriate capabilities into a client's IT environment.

What makes the deal truly groundbreaking is its second major component: a $50 million strategic partnership—funded equally by UPMC and IBM—aimed at supporting the co-development and commercialization of new healthcare solutions. The partnership, whose value could potentially reach $200 million,

Key Components

Software

- IBM WebSphere® Application Server
- IBM WebSphere Business Integration
- IBM Tivoli® product suite

Hardware

- IBM eServer xSeries®
- IBM eServer pSeries
- IBM eServer zSeries®
- IBM eServer BladeCenter®
- IBM TotalStorage®
- Lenovo PCs

Solution

- IBM Component Infrastructure Roadmap

Services

- IBM Global Services - Integrated Technology Services
- IBM Business Consulting Services
- IBM Healthcare and Life Sciences
- IBM Research
- IBM STG Services
- IBM SWG Services

5 Reasons Why UPMC Partnered with IBM

- On Demand Business for people, process and technology
- IBM's "unmatched" R&D capability
- IBM's strength in Healthcare and Life Sciences
- Availability of Open Infrastructure Offering pricing model
- Breadth, depth and cohesiveness of IBM team supporting the partnership

Dan Drawbaugh, CIO, UPMC

"A question that may be asked is, 'How did UPMC select IBM?' In reality, however, it was IBM and UPMC selecting each other."

enables UPMC to turn its full attention to its strong suit—clinical and research innovation—while leveraging IBM's proven ability to bring open solutions to market. Moreover, the new revenue stream created by the venture provides UPMC with a solid return on its investment in innovations as well as a means of sustaining and expanding them.

In the final analysis, though, the relationship's true value has to be measured by its support of UPMC's efforts to transform the way it cares for the patient. Here are some fundamental examples of how it will. UPMC's new infrastructure will enable the seamless and secure sharing of patient data across applications and multiple locations, thus providing caregivers with instant access to the information they need to deliver the best possible patient care. At the core, infrastructure simplification—characterized by the flexibility, adherence to standards and data model consistency of IBM's service-oriented architecture approach—is what makes it possible. These same infrastructure properties will enable UPMC to add new capabilities rapidly and seamlessly. And as UPMC develops new solutions for the broader market, its open infrastructure, combined with IBM's go-to-market expertise, will speed their fruition.

While it's easy to view technology as the driver of UPMC's choice to partner with IBM, the deal in fact rests on several of IBM's unique strengths, such as its ability to pull together resources from across the company into "one IBM" and present it to UPMC as a single offer. Indeed, UPMC's access to the flexible funding of IBM's Open Infrastructure Offering—a key aspect of IBM's On Demand Business framework—enabled it to avoid large upfront expenditures, while guaranteeing access to all the IBM resources it needs to realize its vision. As IBM Executive Sponsor Dan Pelino sees it, IBM is eager to bring its mix of vision, expertise and technology to its partnership with UPMC to develop new and better ways to improve healthcare. "As partners, UPMC and IBM can make the difference in healthcare, nationally and globally. This is about two world class organizations coming together to deliver on a single vision—world class health care for each and every one of us."

For more information

Please contact your IBM sales representative or IBM Business Partner.

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New Orchard Road
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Computer Services

Centrinet launches UK's first operational zero carbon data centre with help from IBM

Overview

■ ***Customer challenge***

To help companies reduce the carbon footprint of their business-critical IT systems.

■ ***Solution***

- *Centrinet launched an innovative business service – Smartbunker – based on renewable energy and energy-efficient technology*
- *UK's first managed data centre service committed to zero carbon energy*
- *Powered by renewable energy from Ecotricity*
- *Based on energy-efficient IBM BladeCenter servers and Cisco networking hardware*
- *Secure and scalable.*

■ ***Customer benefits***

- *Drastically reduces environmental impact – power consumption cut by around 60%*
- *Unique proposition, offering high-performance data centre services powered by renewable energy*
- *Highly-scalable IT infrastructure provides business flexibility.*

With the current legislative, economic and social backdrop, many companies are reviewing their energy use and looking at ways to cut power consumption. CIOs, meanwhile, are trying to balance the increasing desire to be more environmentally friendly with the need for extra computing power to drive business transformation initiatives.

Centrinet, a Lincoln-based organisation that provides IT management services, recognised that most UK data centres were designed with business needs in mind, rather than the environment. It also recognised that reversing the emphasis was neither straightforward nor inexpensive and set out to devise a new solution.

Its unique idea was to build a data centre, designed to run efficiently on entirely renewable energy, and to offer this as a hosting service to clients. Named Smartbunker, the facility was built in a remote nuclear bunker that had undergone a £15m Home Office refit in the early 90s, and then stood empty for a decade before being bought by Centrinet.

Centrinet's business strategy was to power their 30,000sq ft purpose-built data centre entirely from renewable energy. They brought in Ecotricity, the wind turbine specialist that offers clients a zero carbon tariff.

Ecotricity has operated since 1996 and is the only independent green electricity company that builds its own renewable energy sources. It supplies many large organisations and its customer numbers have doubled each year for the past three years. Ecotricity builds and operates wind turbines on partner sites, and these partners then receive a dedicated supply of green power at reduced rates. The company has ambitious plans to change the way electricity is generated in the UK.

Having established the power supply, Centrinet, which supports more than 24,000 end-user organisations in 65 countries, looked for an IT platform to offer a green alternative to clients.

"Right from our first dealings with IBM, we were very impressed," says Kelly Smith, Managing Director at Smartbunker. "We were not an IBM customer prior to this, but we were aware of its green credentials, and that undoubtedly helped.

"The products put forward by the other companies could not match IBM's in terms of performance, energy efficiency or reliability. The solution we chose will also enable us to expand the business very quickly, without any concerns about overloading our IT infrastructure."

IBM has been committed to reducing waste and minimising its impact on the environment for decades, and its green heritage adds credibility to its client offerings – from hardware to consultancy. The solution proposed for Centrinet was based on the IBM Blade system. This takes up much less space and uses less energy for the same computing tasks, which is important given the physical size and environmental aims of Smartbunker's operational base.

"We now have an innovative proposal to take to our target market, which can be any size of company from a web-design agency to a Blue Chip enterprise," says Kelly Smith. "Our unique offering is based on three key aspects. First, we're environmentally efficient through both our power supply and the fact that the IBM computers are helping us to cut our energy usage by about 60%. Second, our base is underground within three-metre thick walls in the depths of Lincolnshire, so our physical security levels are exceptionally high.

And third, we provide high-performance, highly-resilient managed hosting services with year round, 24x7 support."

Over the next 18 months, Smartbunker intends to expand rapidly and IBM's flexible infrastructure will enable the company to scale up its operations. "We were impressed right from the very first call we put into IBM, in terms of both the product and the levels of service," concludes Kelly. "It was a competitive bid, and IBM was head and shoulders above the competition."

For more information

Please contact your IBM representative or IBM Business Partner. Visit us at: **ibm.com**/services/uk/cio

IBM United Kingdom Limited
PO Box 41
North Harbour
Portsmouth
Hampshire
PO6 3AU

Tel: 0870 010 2503
ibm.com/uk

IBM Ireland Limited
Oldbrook House
24-32 Pembroke Road
Dublin 4

Tel: 1890 200 392
ibm.com/ie

IBM South Africa Limited
Private Bag X9907
Sandhurst
2146
South Africa

Tel: 0860 700 777
ibm.com/za

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Global Data Vaulting delivers disaster recovery services for as little as 3 USD a day with IBM Tivoli software.

Overview

- ***Challenge***
  Help clients decrease the time and cost of recovering from service outages and disasters
- ***Solution***
  A fully-managed secure backup service based on IBM Tivoli® Storage Manager family software
- ***Benefits***
  Enabled delivery of enterprise-level business continuity services to small and medium-sized businesses for as little as 3 USD a day; reduced client recovery times from days to under 30 minutes; improved governance

With limited budgets and personnel spread thin, many small and medium-sized businesses struggle to backup and protect critical data in the event of a disaster. It's a challenge that is helping drive the adoption of Software as a Service (SaaS) for disaster recovery.

With SaaS, companies no longer need to purchase and deploy an application and its supporting infrastructure. The SaaS provider simply delivers the application functionality via a subscription model over the Internet, with the customer renting the service for a monthly fee.

"The Software as a Service model provides companies with the staffing and technology needed to help ensure business continuity in the event of an outage or data loss. And working with IBM, we can deliver an enterprise-class solution that was previously out of reach for most small and medium-sized businesses."

– Jeffrey Beallor, President, Global Data Vaulting

Key Components

Software

- IBM Tivoli Storage Manager
- IBM System Storage™ Archive Manager

Servers

- IBM System x™

"Maintaining hundreds of versions of backed up data can create a management nightmare for companies. Tivoli software simplifies the process immensely to strengthen governance and improve risk management."

– Jeffrey Beallor

Consider the success that IBM Business Partner Global Data Vaulting (GDV) has experienced. GDV is a leading SaaS provider of fully managed, automated online data protection, archiving and recovery solutions. Through its Secure Managed Backup Service based on IBM Tivoli Storage Management software, GDV can offer companies a comprehensive disaster recovery solution for as little as 3 USD a day.

"The Software as a Service model provides companies with the staffing and technology needed to help ensure business continuity in the event of an outage or data loss," says Jeffrey Beallor, president, Global Data Vaulting. "And working with IBM, we can deliver an enterprise-class solution that was previously out of reach for most small and medium-sized businesses."

Near-miss drives change

For a Canadian property management firm with a 25-year history of service, the use of GDV services and IBM Tivoli software for a small monthly fee helped avoid a disastrous situation. With three employees managing more than a hundred properties in the greater Toronto, Canada area, one of the last things the firm's staff had time to do was ensure that data was being backed up properly. However, when thieves stole the company's servers, staff faced the daunting task of having to piece together client records. Luckily, police recovered the computers before the company's revenue or reputation was impacted.

This near-miss drove the firm's founder to leverage GDV's Secure Managed Backup service. It was a decision that soon proved its value.

"Six months after we began working with Global Data Vaulting, our offices were robbed again and our servers were never found," recalls the company's founder. "However, this time, we were covered. GDV was able to restore our data to temporary systems within 30 minutes of the loss so we could resume operations."

Easily responding to and recovering from any disruptive event

GDV's use of IBM Business Continuity solutions, including IBM Tivoli Storage Manager software and IBM System Storage Archive Manager software, helps ensure that data is backed up and archived according to each client's policies. The progressive incremental methodology used by Tivoli Storage Manager, which only backs up new or changed versions of files, helps speed data backup and recovery processes so that operations can resume in less than an hour.

During the backup process, client data is encrypted by Tivoli Storage Manager and then transferred via a virtual private network to GDV's tier 1 data center. To strengthen the responsiveness and resiliency of its service, GDV uses IBM System x technology as the platform for Tivoli Storage Management solutions.

IBM Tivoli software provides GDV with the flexibility to deliver a wide-range of business continuity solutions. For example, a large Canadian retailer uses GDV's service to support its goal of high service availability. If one of the company's servers goes down, the retailer can temporarily switch operations to GDV's data center to minimize interruption to its operations. Additionally, the service enables the retailer to easily maintain 120 days of transactions for governance requirements.

"Maintaining hundreds of versions of backed-up data can create a management nightmare for companies," says Beallor. "Tivoli software simplifies the process immensely to strengthen governance and improve risk management."

Likewise, GDV's Secure Managed Service has enabled a leading Canadian bankruptcy firm to reduce the time and cost of ensuring the integrity of financial transactions. "Using Tivoli Storage Manager, we've been able to take Software as a Service and adapt it to different industries for their particular needs," says Beallor. "Companies don't have to lay out money for the infrastructure. They can rent the technology from us on a temporary basis or on a long-term basis to suit what they need. In the case of the bankruptcy law firm, this has provided tremendous cost savings."

According to Beallor, GDV's SaaS offerings will continue to evolve thanks to IBM. "IBM offers leading-edge hardware, software and infrastructure technologies to help us launch and efficiently run SaaS solutions," adds Beallor. "For example, IBM solutions will soon enable us to run and restore data in a virtualized environment so that in the event of a disaster, the data is available immediately."

For More Information

Contact your IBM sales representative or IBM Business Partner, or visit us at: **ibm.com**/tivoli

You can get even more out of Tivoli software by participating in independently run Tivoli User Groups around the world. Learn about opportunities near you at **www.tivoli-ug.org**

For more information about Global Data Vaulting, visit: *www.gdv.ca*

IBM Corporation
Software Group
Route 100
Somers, NY 10589
U.S.A.

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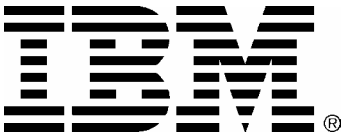

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