Independent Assessment

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IBM zEnterprise/z196 case study: JD Williams

z196 enables new mainframe workloads

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Executive Summary

Why does a leading online retailer invest in the most powerful general purpose mainframe in the world only to turn it into an image and video server?

Yet that is exactly what JD Williams did. The company is a leading UK-based online retailer, selling products through more than 50 websites and 30 catalogs. The company has experienced 50% annual growth for the past several years, and the Web has been key to that growth. Maintaining the top performance of its Web platform is paramount.

A big challenge for the Web platform was the increasing demand for fast delivery of images and videos. Customers want to see products before they buy. The conventional way to do this is to deploy many x86-based servers, and at various times the company, a long time mainframe shop, did just that. However, there are significant advantages in having the image and video serving on the mainframe alongside WebSphere Java workloads. It also simplifies and streamlines recovery in the event of a problem as well as ensures the quality of service and manageability that only a mainframe can.

When the z196 was announced and happened to coincide with the company's need to refresh its z9 JD Williams opted for the new machine, which came with generous support for the z assist processors. The company already was making extensive use of assist processors for its Java, WebSphere, and Linux workloads, which at times had become performance constrained. Between streamlined recovery, increased assist processor performance and integration, simplified operation, and substantial savings on software fees by shifting workloads from z/OS MIPS to the assist processors the z196 turned out to be smart decision.

JD Williams ended up putting the first z196 in the UK into production. The primary workload consisted of online Web image and video serving and WebSphere Java processing—as unconventional a workload as you will find on a corporate mainframe. The company, by the way, handles its traditional business and transaction processing with a new z10 BC, which it received around the same time.

The z196, the first hybrid mainframe of IBM's zEnterprise family, is about many things, but mainly it is about extending the mainframe beyond its traditional boundaries and using the industry leading performance of the machine for new enterprise-scale workloads. JD Williams demonstrates how the z196 performs such non-traditional mainframe workloads at enterprise-scale, and the early results look promising.

Challenge—Sustain and drive online shopping growth

JD Williams, a leading online retailer, offers a wide and growing portfolio of catalog brands focused on different segments of its customer base targeted by age and gender. The company handles womenswear, menswear, footwear, household, and electrical products although it may be most recognized for its wide selection of fashionable products for larger women.

Despite a generally slow economy the business keeps growing. For the first half of 2010, JD Williams's revenue rose 3.2%. The company is expanding its retail operations to North America, launching its SimplyBe brand in the US. It markets its products through various channels; primarily bi-annual catalogs supplemented by smaller monthly brochures and targeted media advertising and over 50 fully integrated websites covering all its main trading brands. The websites are central to meeting what it sees as the ever-changing demands of its customers.

SimplyBe, which focuses on fashions for larger women, sizes 10-28 operates US, UK and German websites. It features trendy styles including plus-size jeans, tops, dresses, intimate apparel, and shoes. The SimplyBe website and blog is packed with slick graphics, images, and videos and audio. The Plus-size market, according to Retail Week, is a rapidly growing segment.

The z196 plays a central role in driving online sales by delivering images and videos in response to customer clicks. The goal of the IT group is to be able to make changes in the various websites, which can be quite complex, without the customer noticing. Says Jeff Cattle, head of the company's computer service: "Our goal is to give the customer a better shopping experience and better continuity."

That focus on delivering a better shopping experience apparently is paying off. The company's online retail segment is hot. JD Williams reports e-commerce sales up 17% for the first half of the year. In previous years the company experienced approximately 50% Web growth. With the z196, which went into production in November, in time for the critical holiday shopping period, the company is positioned to fully deliver a top shopping experience no matter how high to volumes get.

Additional challenges include:

- Support for more and bigger images
- Ensure stability despite rapid changes
- Maintain only a small staff IT
- Provide a cost effective IT infrastructure

The key to all of these challenges is the performance and flexibility of the z196.

Background—JD Williams, N Brown Group

JD Williams is the main operating unit of N Brown Group. It describes itself as a leading direct home shopping retailer and financial services company with over 140 years of experience in the distance shopping market.

At JD Williams the strategy is to focus on the core business of direct home shopping while at the same time exploit the full potential of N Brown's complementary business in financial services. Referred to as the home shopping division, J D Williams follows a well established tradition of offering an extensive range of value-for-the-money products. Its wide and growing portfolio of catalog brands is focused on different segments of the customer base targeted by age and gender. The range of products offered increased over time through the development of its home and leisure lines. The various channels, developed over a number of years, are continually enhanced as the technology evolves, as evidenced by its investment in the z196.

The division has over two million established active customers. Continuing developments in its database management systems enable the business to improve its ability to match customers with offers of the right products and services. Continued investment in the underlying technology platform, including the addition of the z196 and a new z10, ensures the company can continue to efficiently deliver a top customer experience.

The z196 comes to JD Williams

As early as 2008 Cattle recognized that the company needed to do something with the mainframe. The company been relying on a z890, but both the CPU and memory were constrained under the growing workloads. With projected business volumes exceeding capacity and a planned move from WebSphere 5.0.3 to v 6.1, an upgrade was essential. In April 2008 the company deployed a z9 EC 503.

The z9 and the addition of three zAAPs and one zIIP along with an increase in LPAR memory to 22GB from 12 GB solved the problems temporarily. But by October the company needed to upgrade again to a z9 EC 504 and added another zAAP and IFL specifically for Linux on z image serving.

The JD Williams online business, however, continued to grow rapidly, almost 40% from February 2008 to February 2009. By June of 2009 it now was doing video and flash image serving through Linux on z. It had two IFLs deployed for Linux on z, one of which ran z/VM. Another four zAAPs and a zIIP handled WebSphere, DB2, and more under z/OS. The plan called for shifting HTTP serving to Linux on z, Java, and WebSphere. The company, however, experienced performance constraints with the specialty processors, which forced it to tap more general processor MIPS. The stage was set for the z196.

The z196 was optimized from the start to handle diverse workloads beyond conventional z/OS workloads. It could handle Linux, Java, WebSphere, Cognos, and any combination of workloads, including image and video serving. As importantly, it was designed to tightly integrate the full range of specialty assist processors and manage other Linux/AIX and x86 systems as virtual platforms through the new mainframe's Unified Resource Manager. Able to handle large amounts of memory and cache and with specialty processors that delivered better than two times the MIPS of previous specialty processors, the z196 could easily take on the new workloads JD Williams needed to deploy.

“The Web is an integrated part of our business as a whole,” noted Cattle, explaining the company's immediate interest in the z196. The company's rapid online revenue growth made the z196 inevitable. About the same time it also ordered a new z10 BC to run CICS and its traditional legacy mainframe systems.

Mainframe pricing, especially for the z10, always has long been regarded as a complicated, arcane issue involving general processor MIPS and specialty processor MIPS and various levels of firmware and middleware and still is. JD Williams, however, found IBM's pricing of the z196 continued the trend toward improved software price performance improvement. In the end, the company brought in the z196 for the same cost as a z10 with comparable aggregate MIPS although they would be distributed differently between specialty and general processors. “It was just more cost-effective to go with the z196,” Cattle concluded.

By shifting more of the workload to specialty processor MIPS, the company also could realize significant software licensing advantages. In addition, z196 memory pricing turned out to be advantageous.

The net result: JD Williams took a 2-book, 28 processor z196. It amounts to fewer central processor MIPS deployed than it had previously but more specialty processor MIPS. By pushing more of the workload onto the specialty processors, the company is able to minimize software charges while leaving extra MIPS as a buffer.

New workloads—the future of the mainframe

The z196 was designed from the start to extend the scope of the mainframe beyond the classic high volume transaction processing and batch processing workloads that are the hallmark of the mainframe. Given the rock solid security, reliability, availability, scalability (RAS), and manageability of the mainframe, these workloads aren't going anywhere else anytime soon.

Java, Linux, Web 2.0, rich media, analytics, mobile—new workloads—represent the mainframe future. JD Williams, with its image and video serving through its z196, has become an example of new mainframe workloads driving business growth. It received the machine in mid October and put it in production by early November, just in time for the peak holiday shopping season.

The use of the z196 for image and video serving, as JD Williams does, certainly represents a new workload for traditional mainframe shops. But that's not all IBM means when it talks about new workloads. The new workloads to which IBM often refers—revolving around databases and OLTP—may seem familiar to mainframe shops, but when given the kind of performance available on the z196 they change the possibilities of what can be done and the economics.

Similarly, new workloads may revolve around Web infrastructure, like JD Williams, or analytics or other highly computational workloads. It is not even necessary that the new workloads be radically different from what mainframe data centers have done before. Just the speed of the z196 and the additional horsepower that can be packed into the new zBX extension cabinet in the form of optimizers enable the organization to run similar workloads bigger and faster and in ways that were not possible before.

The hybrid nature of the z196/zBX also enables organizations to expand the types of workloads. About the time of this writing the AIX blades will begin shipping. IBM does not expect wholesale migration of AIX workloads to the zBX but some workloads that benefit from z management quality of service (QoS) or tight integration with z resources or data are top candidates.

The same can be said for the wide variety of Java, WebSphere, and Linux workloads. Some already run on the z, such as Cognos BI. Expect the numbers to slowly increase as organizations feel out which workloads can benefit from the integration with other z resources and data, with z RAS and QoS as provided through the Unified Resource Manager, or from the sheer power of the z196. What, for instance, might a communications-intensive organization do with Lotus Domino running on the z196?

Not every workload, of course, is right for the mainframe or the z196/zBX. Those that will benefit from the RAS capabilities of the mainframe should be considered as should those applications that can benefit from the close proximity of data, especially transaction data, on the mainframe. IBM actually offers a methodology called fit-for-purpose to help enterprises make

these decisions. Fit-to-purpose recognizes that enterprises today are inherently multi-platform and not every workload benefits from running on the z196

Ironically, the hardest part of implementing new workloads on the z196 will not be the technical considerations. It may not even be the cost since IBM has been demonstrating its willingness to address the cost obstacles. Rather, it may be convincing management and the rest of the organization that they can run Java, Linux or even .NET workloads better and more cost-effectively consolidated on the mainframe than on some commodity platform.

z196 Deployment

JD Williams took delivery of z196 in mid September. It turned out to be fewer mainframe MIPS than the company previously had although the specialty processor MIPS more than made up for fewer central processor MIPS. The z196 specialty processors deliver 1,200 MIPS each, compared to 580 MIPS for the z9 specialty processors.

While awaiting delivery the IT group completed some tasks that facilitated the deployment, such as moving cables. Previously, a new z10 had been deployed to handle the company's legacy applications, CICS workloads, and core business processing.

The initial plan called for implementing as many 10 specialty processors. The z196 implements specialty processors through microcode. As a result, the company started with 4 zAAPs, 1 zIIP, 4 IFLs. If it wants to add more specialty processors later, it can do so easily, without having to add more hardware or central processor MIPS first, as was the case with the z9.

The z196 implementation team consisted of three mainframe FTEs with Java programmers helping out at various points. By early November they put the z196 into production, and it began serving image and videos in response to customer requests.

Simplified backup and recovery, a key reason for moving to the z196, is handled through a third party site. In the event of a problem, only one server instead of many need be restored.

Key JD Williams z196 Components

z196 (2 books, 28 processors)
z/OS
z/VM
IFL (4)
zIIP (1)
zAAP (4)
WebSphere Application Server
SUSE Linux
DB2
CA Wily Introscope
HDS and IBM storage (20 TB)

Results: good early signs

It is very early in JD Williams' experience with the z196 but already the company is noticing benefits. At the end of November, it experienced its heaviest 2-day shopping levels to date (over 200,000 unique visitors each day) with no noticeable performance degradation.

When comparing December 2010 with December 2009, JD Williams saw a reduction central processor MIPS by 20%, due to the shift in workloads to assist processors.

In general, anecdotal evidence suggests the customer online shopping experience is as good as ever, maybe even better, although improvements cannot be directly attributed to the z196 alone. At the same time, JD Williams implemented a number of enhancements, including an operating system upgrade and an enhanced checkout function written in Java.

The z196, however, has removed one vexing problem. Previously, performance would be impacted when the z9, running short of specialty processor MIPS, had to tap general processor MIPS. That will not happen with the z196 in the foreseeable future.

Independent Assessment analysis

The conventional way of serving images and video for online commerce is through a set of x86 servers running the appropriate Java or C++ applications. This works but it gets costly and complicated when you need to scale, deliver high levels of RAS, and recover fast in the event of problems.

JD Williams certainly was familiar with the conventional approach. It had opted to use the mainframe for file and image serving and Java applications back in its z9 days. To the company, this wasn't a new workload, just a new machine. It recognized that the z196 could do it bigger, better, more efficiently, and more cost-effectively.

When IT presented with the case for the z196 to top management, the executives understood the constraints of specialty processors, and they recognized the risks involved with any new technology. However, they also saw the business advantages of what IT was proposing. The early results have proven the value of the decision to become a z196 early adopter, and the speed of the JD Williams IT team in putting the new machine into production is impressive.