



# PROQUEST CSA - 2007 RED HAT INNOVATION AWARD WINNER

## FAST FACTS

Category	Increased Return on Investment
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## OVERVIEW

An innovative approach to drive out cost and achieve measurable ROI as a result of implementing a Red Hat solution. Results could include financial return or percentage increase in productivity, yield, efficiency, quality, or uptime performance.

### PLEASE DESCRIBE YOUR COMPANY. (NUMBER OF EMPLOYEES, PRIVATE/PUBLIC, INDUSTRY, ETC.)

With approximately 1,240 employees, ProQuest CSA combines the strengths of two leading and historic information technology firms: ProQuest CSA Information and Learning and CSA. As ProQuest CSA, the company provides seamless access to and navigation of more than 125 billion digital pages of the world's scholarship, delivering it to the desktop and into the workflow of serious researchers in multiple fields, from arts and literature to science, technology and medicine. ProQuest CSA is part of Cambridge Information Group.

ProQuest CSA's vast content pools are available to researchers through libraries of all types and include the world's largest digital newspaper archive, periodical databases comprising the output of more than 9,000 titles and spanning more than 500 years, the preeminent dissertation collection, and various other scholarly collections. Users access the information through the ProQuest® Web-based online information system, Chadwyck-Healey™ electronic and microform resources, UMI® microform and print resources, eLibrary® and SIRS® educational resources,

Ulrich's Serials Analysis System™, COS Scholar Universe, and Serials Solutions resource management tools. Through the expertise of business units Serials Solutions and COS, ProQuest CSA provides technological tools that allow researchers and libraries to better manage and use their information resources.

### PLEASE DESCRIBE THE BUSINESS AND/OR TECHNICAL CHALLENGES YOU FACED IN THIS PROJECT.

Up until 2000, ProQuest CSA was running on a combination of large, expensive SGI boxes and EMC storage. The company was experiencing exponential growth with additions of 1,000 to 1,500 users per year. With this growth came extremely large jumps in cost for the company's systems, challenging its bottom line. Additionally, ProQuest CSA began to notice a combination of technical and business challenges in terms of capacity. As soon as the company was able to get one customer past ProQuest CSA's capacity limits, it had to buy two more boxes and an additional EMC unit, costing the company millions of dollars. Challenged to find a more cost-effective, but still high-functioning solution, ProQuest CSA investigated Linux solutions and chose to migrate to Red Hat Linux 7.2 and eventually Red Hat Enterprise Linux 4.

The project began in 2000 when ProQuest CSA migrated its large mid-size servers to Red Hat Linux 7.2. The company migrated from a handful of big iron boxes to a number of smaller Intel boxes from HP.

The migration included shifting from a few hundred machines to an environment of thousands of machines, bringing up initial worries about how this would change the company's support model, operations, etc. Having made the decision to shift to Red Hat solutions, migration was a success and ProQuest CSA saw an increase in performance with higher uptime and improved availability. It also enjoyed incremental cost reductions, saved millions and consequently was able to keep costs lower for their customers. Consequently, the company was able to purchase a few additional HP Red Hat Enterprise Linux systems and simply add the additional capacity to augment the architecture. With its migration, ProQuest CSA was able to scale horizontally rather than vertically, giving it increased reliability.

#### **WHAT WAS THE DESIRED SOLUTION?**

ProQuest CSA desired a platform that could provide a low-cost, fast-deploying, performance-boosting and capacity-building opportunity for its digital library archiving products.

#### **PLEASE DESCRIBE YOUR VENDOR SELECTION PROCESS AND WHY YOU CHOSE RED HAT IN THE END.**

In choosing to migrate to Red Hat Enterprise Linux, third party vendor support was incredibly important. ProQuest CSA's backup software was unsupported by others and the company wanted the stability of knowing there was support available if necessary. The company considered using SUSE, but chose Red Hat because its solutions were more dependably supported and ProQuest CSA's System Engineering team had a greater familiarity and trust in these solutions.

#### **WHAT ROLE DID RED HAT AND/OR JBOSS PRODUCTS PLAY IN THE FINAL SOLUTION?**

In recent years ProQuest CSA has experienced great growth and with it, a migration from a mixed SGI Irix and Sun Solaris based infrastructure to one that primarily based on Red Hat Enterprise Linux across multiple product lines. Migration to Red Hat solutions began in 2000 and has continued into the present, providing increased performance and significant cost savings to the company and its customers.

With this migration, ProQuest CSA has incorporated Red Hat solutions into every company product line. ProQuest has also used JBoss (currently using JBoss 3.2.7) as the application server for the Middleware component of its online system. JBoss provided an application server that faithfully implemented the J2EE specification along with a modular architecture that allowed us to install and configure only those components that were needed. In addition, JBoss provides additional capabilities, such as Interceptor stacks and Service Archives, that our development staff was able to take advantage of. As a result, the application provides more functionality and monitoring capabilities than would have been available with other non-Open Source application servers. JBoss also provided superior performance in a highly distributed environment.

#### **WHAT WAS THE OVERALL IMPACT OF THE PROJECT ON YOUR BUSINESS? (E.G. IMPROVED ROI, INCREASED COMPETITIVE ADVANTAGE, BETTER TIME TO MARKET, ETC.)**

With ProQuest CSA's original SGI and EMC solutions, the cost to support the company's 91 million documents was over three million dollars. After migrating to Red Hat solutions on HP hardware, the cost for the same 91 million documents was lowered to just \$250,000. After savings millions of dollars migrating to Red Hat solutions, ProQuest CSA was able to expand its infrastructure to initially include 21 DLs running Red Hat 7.2, allowing the company to support an additional 47 million documents. This initial SGI/EMC to HP/Red Hat migration allowed for a linear growth as capacity warrants. Previously, 45 million documents required an overhaul and roughly \$1.5 million to maintain. With Red Hat solutions, ProQuest CSA was able to become more granular in its spending of a mere \$15,000 for every seven million additional documents.

Additionally, ProQuest CSA saw a significant reduction in support costs and maintenance contracts for hardware with Red Hat/HP solutions. Instead of spending money on hardware maintenance contracts, the company established a self support model in which it bought extra pieces of the necessary hardware and merely switched the pieces out as failures occurred.



This allowed for rapid recovery in an environment with real redundancy at the system level, available to ProQuest CAS for the first time. For previous installations redundancy was out of reach financially. This “parts depot” mindset allowed ProQuest CSA the ability to save capital and enjoy greater flexibility.

**WHAT VALUE DID YOU GAIN FROM IMPLEMENTING RED HAT SOLUTIONS? IF A GAIN IN EFFICIENCY, HOW WERE THOSE ADDITIONAL RESOURCES ALLOCATED WITHIN YOUR COMPANY?**

With its cost savings in the millions, ProQuest CSA was able to gain significant value in allocating this money to other areas of development. Since migrating to Red Hat solutions, ProQuest CSA can now buy N+1 boxes for a particular product, allowing for a scaling approach that reduces outages. With this approach, if an application goes down, end user capacity is still maintained. Maintenance can be completed on the problem box with only the loss of a node in the grid. Previously ProQuest CSA would have had to buy two big iron boxes to fix such problems. With Red Hat solutions, availability to all of ProQuest CSA’s products was dramatically increased.

ProQuest CSA also saw value in its increased capacity. The company put out a product based on Solaris and discovered that it was unable to perform to capacity. Unfortunately, buying additional Sun boxes to boost capacity was too expensive. With the switch to a Red Hat and HP solution, ProQuest CSA saw a 3-to-1 CPU increase that allowed the company to launch the same product without the outages experienced with Solaris. Where weeks of outages had occurred with the Sun platform, capacity and performance were perfectly maintained after migrating to Red Hat.

Similarly, ProQuest CSA saw value in terms of its flagship product, ProQuest for Smart Search. The product was migrated to Red Hat solutions in under a year and displayed the features that product management needed. Without Red Hat solutions and a Java implementation, it would have been 2-3 years for the same cycle. Even with the greatly reduced time spent on the product, the product launch was a critical success. Eventually ProQuest CSA Smart Search was

voted by librarians as the “Best Specialist Search Product” by the International Information Industry Awards, an award given to the most innovative product that best helps a user through the search experience.

**PLEASE PROVIDE A TECHNICAL DESCRIPTION OF IMPLEMENTATION, INCLUDING THE SIZE OF DEPLOYMENT. (I.E. HARDWARE SPECS, APPLICATIONS, O/S, DATABASES, ETC.)**

In 2000 ProQuest CSA replaced its six SGI Origin 2000’s and EMC Sym Storage with 39 HP DL360 (DLs) G-2’s running Red Hat Linux 7.2. Next, ProQuest CSA added additional DLs to support additional documents: in 2003 60 DLs, in 2004 56 DLs and in 2005 51 DLs, all on Red Hat Linux 7.2. In 2006 SSS (Search Sub System) was migrated from DLs to Blades running Red Hat Enterprise Linux 4. Here, 75 Blades replaced 167 product SSS DL servers providing additional capacity, a smaller footprint and a cleaner install.

Additionally, in 2004 ProQuest CSA began testing for a “core” ProQuest migration to Linux. In 2005, 49 SGI servers were replaced by 87 DLs at a fraction of the cost, providing a more realistic environment in comparison to product and a smoother and easier addition of additional resources as capacity warranted it. In 2006 ProQuest CSA replaced 527 DLs with 322 Blades and 28 virtual hosts, all running Red Hat Enterprise Linux 4.

**DID YOU LEVERAGE RED HAT SUPPORT SERVICES, TRAINING, OR CONSULTING? IF SO, PLEASE DESCRIBE YOUR EXPERIENCE?**

ProQuest CSA uses Red Hat support services for limited support engagements, as the company follows more of a self-support model. The ProQuest CSA staff is highly knowledgeable in Linux and while it realizes that sources are readily available, the company has a resilient horizontal layout that allows for ample time to correct outages or other problems internally.

ProQuest CSA has engaged Red Hat support from a sales perspective, looking for guidance on particular smaller projects. When the company rolled out Red Hat years ago, it patched in an XFS kernel before the code became part of the standard kernel. Initially, the base 2.4.x kernel was 20 percent slower than the XFS patch.



The application specific performance that ProQuest CSA was accustomed to achieving with the XFS patch was surpassed with the 2.6.9-22 and later kernel. With continued innovation, ProQuest CSA was able to upgrade and match the speeds of the kernel and the XFS patch. Throughout this implementation, ProQuest CSA consulted and received guidance through varied conversations with Red Hat experts. Later in the process, Red Hat traveled to ProQuest CSA offices and conducted Oracle testing and installation and gave guidance on managing Oracle systems. This project was successful, with the help of Red Hat support, and provided a sustainable opportunity to use the platform with cheaper Oracle support.

#### **DO YOU HAVE ADVICE FOR OTHER COMPANIES FACING A SIMILAR BUSINESS CHALLENGE?**

ProQuest CSA did not jump into its Red Hat migration and associated projects lightly and encourages other companies to research potential solutions heavily. The company notes that Linux is very stable, very scalable and provides great performance results. With the company's initial conversations about expanding from hundreds to thousands of machines, there were concerns of how the company and its IT department would be changed. After investing in Red Hat solutions, ProQuest CSA has seen excellent results and benefits including cost savings and more with the same staffing levels. The company's only regret is that it didn't invest in Linux and Red Hat sooner. Their advice? Just do it.

#### **RED HAT SALES AND GENERAL INQUIRIES**

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