

Office of the State Controller
Division of Computer Services, Application Development Bureau

2005 ITRMC Information Technology Achievement Award Submission

Category: **Innovative Use of Technology**

Product: **SCO Online Reporting Application**

Executive Summary

The Office of the State Controller, Division of Computer Services, under the leadership of State Controller Keith Johnson, provides technology resources, and development and application support services to state agencies. The division is totally funded from revenues generated through charges for resources consumed. While the division provides services to all agencies statewide, our principle customers are the Department of Health and Welfare, and the State Controller's divisions of Statewide Payroll and Statewide Accounting.

As a service organization, the division is constantly monitoring and adjusting charge-back rates to correspond with actual costs for the technology services provided. Historically, we have seen continued reduction in billing rates for processor and data storage while the cost of producing printed reports has grown exponentially. Added to this was the cost of physical handling and transporting the printed reports from the Controller's Office to the agencies.

We had earlier, in 2001, reduced printed output drastically by publishing employee pay stubs on the internet rather than distributing them on paper. The success of that effort gave us confidence that we could achieve yet greater savings by focusing on the elimination of hard copy reports.

We found ourselves in a unique and opportune position. Our expensive mainframe printers were scheduled for replacement and we were looking for a suitable application to exploit zLinux and open source technology on the mainframe through server virtualization.

Initial cost benefit analysis reflected a positive return on investment in the first year with greater returns in subsequent years. Funding constraints had prevented much needed projects from taking shape in recent years and it became obvious that a substantial return on investment would be possible by investing time and resources in this project.

We've come very close to achieving the savings goals on that initial analysis. Those savings have been invested in new replacement printer solutions and in new development efforts such as IBIS, the Idaho Business Intelligence System, that will benefit all agencies.

The Online Reporting application was developed using in-house design and programming staff. It is a multi-platform application, processing mainframe reports on the Controller's Z890 mainframe computer and porting them to application and web servers that have been dynamically created in another image on the same mainframe hardware. Open source development, database and web tools were used, eliminating ongoing license and maintenance fees. No hardware or software was purchased for the creation of this application. Capitalizing on the talents of our own application development and software support staff continues to keep the cost of ownership low and the return on investment high.

Project Description

The Online Reporting application was a product of necessity for multiple groups within the State Controller's Office.

For the Divisions of Statewide Payroll and Accounting, it was a way to distribute payroll pre-processing reports in a method more effective than fax or courier. For the Data Center Operations bureau, it was a way to eliminate paper handling, massive bulk-print operations and very expensive printers, for the

Systems Programming bureau, it was a way to prove the feasibility of virtual machines in a production web environment. For the State Controller, Keith Johnson and his Deputy State Controller's it was a way to generate savings in dollars that could be spent on higher profile, in-demand projects.

In late January of 2003, developers and a project manager attended training in the use of the PHP open source programming language and the MySQL open source relational data base. Upon completion of that training, and a few practice exercises later, design activities commenced on the Online Reporting application that is in use today.

Our goal was to design and develop an enterprise level utility that would give application owners the authority and power to control which reports were published and the named users who would be able to see them.

The primary components of Online Reporting are the mainframe administrative processes. These functions allow report owners to define reports that will be published and their run cycles. By reading these definitions, the Online Reporting mainframe component dynamically creates daily job streams used to load reports to the publishing database on the virtual server.

Access to view the Online Reports is granted by security administrators through a distributed access control interface that takes advantage of our WASP (Web Access Security Program) authentication product. Rights can be assigned to allow a user to view specific pay locations or all locations, or specific agencies or all agencies and so on.

Report selection is made through easy to navigate HTML pages on the Controller's secure site. Once a report is displayed, the user is able to perform search, print or save operations against the report and to their local network devices.

We have most recently provided users with the ability to perform bulk bundling and saving of reports to local network resources for future reference.

The Online Reporting application has been a tremendous success. The first reports were published in November of 2003. During the previous month there were 298,078 pages of eligible Accounting reports and 291,654 eligible pages of payroll reports. In February of 2005, only 30,719 pages of accounting reports and 14,256 pages of payroll reports printed. This represents overall print reductions of 90 and 95 percent respectively.

Significance to the Improvement of the Operation of Government

Members of the Information Technology community have had long standing jokes about various types of information delivery processes that appeared would stand every test of time. Terms like "Snail Mail" (conventional postal service) or "Tenny Net" (courier delivery) were common and, in this world of endless connectivity, we continued to find ourselves shipping reports across the state over voice lines with fax machines. The notion that a piece of string securing a manila envelope will keep information secure is also an urban myth that needed to be dispelled.

The common bond between all of these processes is paper, and more paper. As members of the public sector, a yet costlier commodity that is often overlooked is time. The number of people who have to handle a piece of paper from the time it's delivered from the supplier to the time it arrives in a fiscal officer or payroll clerk's hand would be startling, the human resource cost would be shocking.

Online Reporting has made it possible for fiscal officers and payroll clerks to have secure access to the information that they need in order to perform their jobs as soon as it is collected and loaded to the data base. The Online Reports have all the search and print capabilities provided by Adobe Acrobat Viewer and is easy to use. Electronic storage is safe, compact and inexpensive. It's also much easier to store duplicate reports in a form of electronic backups than on paper.

The timely delivery of information helps all agencies perform their specific duties and provide services to citizens more efficiently. The reduction in the use of paper and the chemicals used in printing also help protect Idaho's environment for the next generation.

Benefits Realized by Service Recipients, Citizens, Businesses, Agencies, etc.

In the first year of operation, cost savings from reduced print alone were sufficient to cover the cost of developing the application.

Electronic report delivery has proven itself to be efficient, fast and reliable (and doesn't require postage or money for the parking meters).

Distribution control is in the hands of the owners of the data at all times rather than in the hands of a computer operator or delivery service.

One of the greatest benefits realized is the experience gained in the process of developing the utility. That experience has opened up opportunity for us to expand on web services that are provided by the Division of Computer Services. The virtualization of hardware and use of open source will allow continued development of products to meet the needs of agencies and the citizens they serve at a much lower cost than traditional development and deployment efforts.

Cost Benefit Analysis at Project Inception

Print Statistics for Statewide Payroll and Statewide Accounting

EIS Annual Savings from Online Reporting (based on FY 2003 Production)

Production pages printed in FY 2003	2,800,700	\$84,021.00
Less Special Forms**	- 101,124	- 3,033.72
Total Production Print	2,699,576	80,987.28
Assume 20% will not go away	- 539,915	-16,197.45
Pages/Dollars saved with online reporting	2,159,661	\$64,789.83

Statewide Accounting Annual Savings from Online Reporting (based on FY 2003 Production)

Production pages printed in FY 2003	5,081,979	\$ 152,459.37
Less Special Forms**	- 138,288	- 4,148.64
Total Production Print	4,943,691	148,310.73
Assume 25% will not go away with	-1,235,923	-37,077.69
Pages/Dollars saved with online reporting	3,707,768	\$ 111,233.04

** Special Forms Print is print costs on forms supplied by CSC and does not include actual vendor warrants, W2's, 1099 forms or other special forms that may be provided by the customer. It is assumed that the 20 - 25% reserve provides for those printed documents

Estimated annual savings from online print system

Statewide Payroll	2,159,661 pages	\$ 64,789.93
Statewide Accounting	3,707,768 pages	\$111,233.04
Total Customer Savings	5,867,429 pages	\$176,022.97
CSC Losses on Print (@ .02 per page)**		\$117,348.58

Total Projected Annual Print Savings 5,867,429 pages \$293,371.45

**The actual cost per page was .05, only .03 of the cost was recovered through charge-back, the remaining .02 was absorbed as a loss by the Division of Computer Services

Hardware Cost Considerations

We were using two Xerox Docuprint 96 page per minute printers in the Data Center for mainframe reports. Maintenance and printer supply costs, not including paper, were in excess of \$116,000 annually.

Maintenance alone was \$8,000 per month. Replacement cost for these printers could easily exceed \$100,000 each.

By reducing the volume of print, we were able to replace these two printers with a five 50 page per minute printers with a first year cost of \$75,000 (hardware and supplies), with subsequent years costing approximately \$60,000 for supplies and \$3,000 per printer replacement cost. Maintenance is optional since the replacement cost is so low.

We would expect to see hardware and printer supply cost savings of over \$40,000 in the first year. In subsequent years that savings could exceed \$55,000.

Since our Xerox print solution was already fully depreciated, the cost savings are understated by the replacement cost if we were to choose to stay with the faster, larger printers.

Excerpts from Product Recognition in Trade Publications

Case Study: zLinux Cuts Costs at Controller's Office

The state of Idaho has tapped a zLinux solution to achieve immediate ROI
by Stephen Swoyer [Contributing Editor for Enterprise Systems 8/17/2004](#)

If you think mainframe Linux is an over-hyped phenomenon, take a look at the state of Idaho. The government has successfully implemented Big Iron Linux to reduce its dependence on highly distributed Intel servers, paving the way for a transition from costly zOS application maintenance fees, and helping achieve positive ROI after cutting costs by nearly \$400,000 each year.

How's that for a mainframe Linux value proposition?

Says Marla Marchant, application development bureau chief with the State Controller, "we used to have intervention of clerical staff shuffling lots and lots of paper around. Before we started the project, we put together some projections by doing some analysis of the print statistics of our customers' production systems. We know that we can't totally eliminate printing of special forms like Accounts Payable remittance advice, but we felt like we could do away with the largest share of production reports," she comments.

"When we went through and did our analysis, it came out very close to the data center saving in the area of \$180,000 a year, and in between the two customers, something like \$200,000 a year in print costs, and that was just the dollars that we charged them. We'd been supporting two large Xerox page printers, with maintenance costs, and by rolling out this application, we're able to put in a bunch of small HP printers to reduce the maintenance costs."

Now finished and in production, Idaho's new zLinux-based Web publishing system taps a .PDF reporting format, PHP coding, and a MySQL repository. Best of all, says Marchant, it's both user-friendly and user-empowering: "We've been able to build user interfaces where report-owners actually perform all of the maintenance activities that will trigger their reports to be pushed [from] the mainframe to the application running on zLinux," she observes.

Better still, says George Judge, Deputy Controller and Administrator of the Division of Computer Services, the new zLinux application lets the Idaho State Controller's Office provide much better service to its customers: "People get their reports almost instantly, instead of us having to box them up and mail them." He adds: "What's really slick about [the application] is that our customers don't need anything but a Web browser and Adobe Acrobat. They get their reports in the morning when we get to work. Nobody has to box them [or] pick them up, so this is a real, real money saver for the state of Idaho."

Idaho's MySQL repository current stores almost 2.9 million pages, all of which are accessible from the Web, according to Judge. The new application currently supports as many as 600 concurrent users, a number that's expected to continue to grow as the Idaho State Controller's Office rolls the application out to a broader audience, such as vendors who provide goods and services to the state. "Our authentication database has 26,000 active users [state employees and others] over the course of a year, and any of those users are eligible to view online reports," notes Marchant.

One of the best things about zLinux is that—thanks to its zVM underpinnings—system managers can husband compute resources to make more effective use of compute capacity. The result? The Idaho State Controller's Office is using only a fraction (three to four percent) of its overall capacity, thus giving it plenty of room to grow. Even so, Judge is taking a very pragmatic approach to zLinux.

"As we've moved down the path with these mainframe Linux applications or implementations, we've realized that there are some things that make good business sense to move to, and others that [do] not. The more I/O intensive [an

application is], the better the mainframe is. If it's a heavy-duty high-compute-[intensive] application, maybe that's not the best to do. But this kind of [Web publishing] application is great; [there's] very little cost," he says.

State of Idaho realizes strong ROI with Linux on zSeries

by Elliot King

Idaho's State Controller, Keith Johnson, believes in the innovative exploitation of technology to reduce the cost of government for Idaho's taxpayers.

The staff at the data center that serves the State of Idaho's Controller's Office did not have a specific solution in mind when they began exploring the possibilities of running Linux on their IBM 9672 mainframe computer around three years ago. But the first fruits of those efforts is an enterprise-wide printing utility application that the state estimates will produce savings of more than \$300,000 a year and the establishment of Linux on zSeries as a significant new platform for additional applications.

The story began in 2001, when data center staff began looking at running Unix systems services on the z/OS. "We were toying with the idea of running a Web server," said Matt Lashley, a systems programmer, who was deeply involved with establishing the Linux environment. "Looking at running Web services on a traditional mainframe got us running Linux."

Once the infrastructure was built, it was made available to the applications development group, which quickly identified a compelling project. "Our customers had wanted to publish reports on the Internet," said Marla Marchant, the applications bureau development chief. "So we started to look at the cost of supporting traditional print services."

They found that the costs were high—very high. "It cost us five cents a page to print," Marchant said. "And legacy applications produced boxes and boxes of paper." Payroll reports generated 15 to 20 boxes of paper each payroll cycle. The month-end accounting processes generated approximately 27 boxes of paper.

In total, the team estimated that the printing services for the legacy applications cost the data center and the application owners \$300,000, without taking into consideration the costs incurred by the outside agencies. Moving the application to the Web would not only eliminate those costs, it would allow the state to replace expensive, high-end printers with much less expensive commodity printers. The state could save around \$40,000 a year on hardware and maintenance costs alone, Marchant estimated.

The applications development team decided to develop a utility reporting program to deliver reports via the Web, cutting down printing and distribution costs. They initially targeted two customers—the Division of Statewide Accounting, which manages the accounting system of record for the State of Idaho, and Statewide Payroll and Human Resources, which manages payroll records. "We could see how we could use the saving to fund some large projects that everybody wanted, but we hadn't been able to get funding for," Marchant said.

Marchant and IT Manager Steve Falter focused on three issues. One of the key selling points was that the application would be running on a mainframe. Another was the idea of virtualization—that resources could be easily and dynamically expanded. The third benefit was improved disaster recovery.

There were several tricky aspects to the application design process including the establishment of multi-tiered security and access control. "We couldn't have people looking at a page of print they didn't have rights to," Marchant said.

The application, which uses an open source Apache Web server for Web serving and an open source MySQL database to store documents, took approximately nine months to develop. One of the initial application owners now distributes virtually all reports via the Web and the other is aggressively moving in that direction. Moreover, additional Linux on zSeries applications are in development.

The system has also met expectations in terms of performance, manageability and disaster recovery. "Running the legacy applications and the Linux servers on the same hardware speeds the upload process into the database," said Lashley, the systems programmer who supports the environment. "Moreover, since the Linux servers are running under VM, one administrator can manage all four Linux servers." Finally, Lashley noted, "For disaster recovery, the entire system is backed up to tape. Should something happen, the tape can be restored at a remote facility and the entire network is operational again."

Enterprise online reporting is only the first application that Idaho will run on the Linux on zSeries platform. The team is currently working to port its Domino Notes applications, as well. "People should not be hesitant to jump in," said Falter. "We had a goal and started right in. This is a viable environment. We have proven that."