Performance Improvements at

Point Of Sale

A Guide to Getting the most out of your 4690 System

Performance Optimization Services

QVS Software

Preface

In today's highly competitive retail marketplace, IT executives are caught in the middle, trying to hold down IT costs while providing new application solutions that customers quickly grow to expect. The number of new application solutions available on the market today seems unlimited—self-checkout, mobile solutions, digital integration, specialty kiosks, and more. Retailers in pursuit of customer loyalty feel compelled to offer these new application solutions to their customers now.

Retailers have made *significant* investments in their existing POS applications, equipment, and the supporting back-end infrastructure. Financially and functionally speaking, they must continue to leverage those valuable assets as they integrate new application solutions.

For the last 20 years, QVS has worked with most of the retailers that continue to use the IBM 4690 system. Our many years of providing products and development services have enabled us to observe a variety of hardware and software changes.

Consequently, we have come to recognize significant deficiencies in much of the 4690 application code that is installed in stores today. The IBM Supermarket Application, General Sales Application, Chain Drug Sales Application, and ACE are installed in Large Tier-1 retailers worldwide and thousands of different programmers have made changes to these applications.

Many of these software changes effect the performance of the POS system overall. Poorly performing POS systems directly affect customer wait times and customer satisfaction at Point Of Sale and ultimately overall sales performance.

How QVS can help:

QVS has developed a number of internal monitoring and reporting tools over the many years we have worked on the 4690 system.

With these tools, we will identify PLU response times, file I/O usage, network traffic, load balancing, and a variety of bottlenecks where the system is either overloaded or simply waiting for something else to happen.

We then make suggested code modifications and configuration modifications to eliminate bottlenecks and improve performance.

What you get:

Improved performance. We will knock seconds off of the time it takes to check out your customers at the Point Of Sale.

An Optimized solution wherein you can be confident you are getting the most out of the systems you have installed.

Performance Optimization Services

The approach is simple and straight forward. Data is gathered and analyzed and recommended changes are proposed. QVS can make these changes or your own team can make them. Once the changes are made, performance tests are conducted and results are compared to pre-change tests.

Objectives

- Improved Performance…

    o Reduce controller load, increasing performance and providing capacity for future functional or serviceability enhancements.

    o Improve POS performance resulting in faster response times at front-end.

- Improved Coding Practices for future application changes.

- Cost Avoidance

    o Eliminate the need to invest in new hardware and software and keep existing systems longer.

Tools

- Terminal I/O Monitor (pos devices, controller file i/o)

- Controller I/O Monitor (controller file i/o)

- Multi-terminal stress testing using TC and TCTest

- Multi-terminal stress testing using real terminals driven by QVS automated operator (PosTest with InSight)

Techniques

- Trace analysis

- Before and after throughput analysis

- Review lengthy operations within transactions

- Look for excessive file opens/closes from pos terminal

- Look for unreasonable delays throughout transaction processing

- Look for excessive file operations from checkout support and other background tasks

- Source code review (optional): terminal sales, java gui, checkout support, other programs with excessive i/o)

- Often will find unintentional, low risk and easy to fix issues that will greatly reduce controller load and improve responsiveness.

Sample of Actual Results from an IBM 4690 retailer

The following data and charts are from a real customer environment. Performance improvements were performed and implemented over a 3 month period.

Environment

- 4690 OS
- Supermarket Application with a lot of modifications
- Java GUI

In a store environment with 32 registers at 10,800 items/hour...

- Decreased average PLU time from 2.3 seconds to 0.5 seconds
- Decreased longest 10% of PLU times from 11 seconds to 0.8 seconds
- Decreased end of transaction from 90 seconds to 2.7 seconds
- Decreased time to sign on to register from 100 seconds to 4 seconds

In a store environment with 32 registers at maximum volume...

- Increased max throughput from 10,800 items/hour to 48,000 items/hour
- Decreased average PLU time from 2.3 seconds to 1 second
- Decreased longest 10% of PLU times from 11 seconds to 3 seconds
- Decreased end of transaction from 90 seconds to 6 seconds
- Decreased time to sign on to register from 100 seconds to 7 seconds
- Before changes, controller sales (background processing) task falls way behind when volume reaches 10,000 items/hour. After changes, controller sales keeps up until volume goes over 32,000 items/hour.

With only 1 terminal active...

- Increased max throughput from 1,200 items/hour to 4,600 items/hour
- Decreased average PLU time from 1.5 seconds to 0.4 second
- Decreased end of transaction from 15 seconds to 2 seconds
- Decreased time to run a 10 item cash transaction from 30 seconds to 9 seconds

Number of Terminals	1	4	10	32
Maximum items per hour before changes	1,200	4,700	13,750	10,800
Maximum items per hour after changes	4,600	13,500	29,000	48,000

Before and After Maximum PLU's per Hour
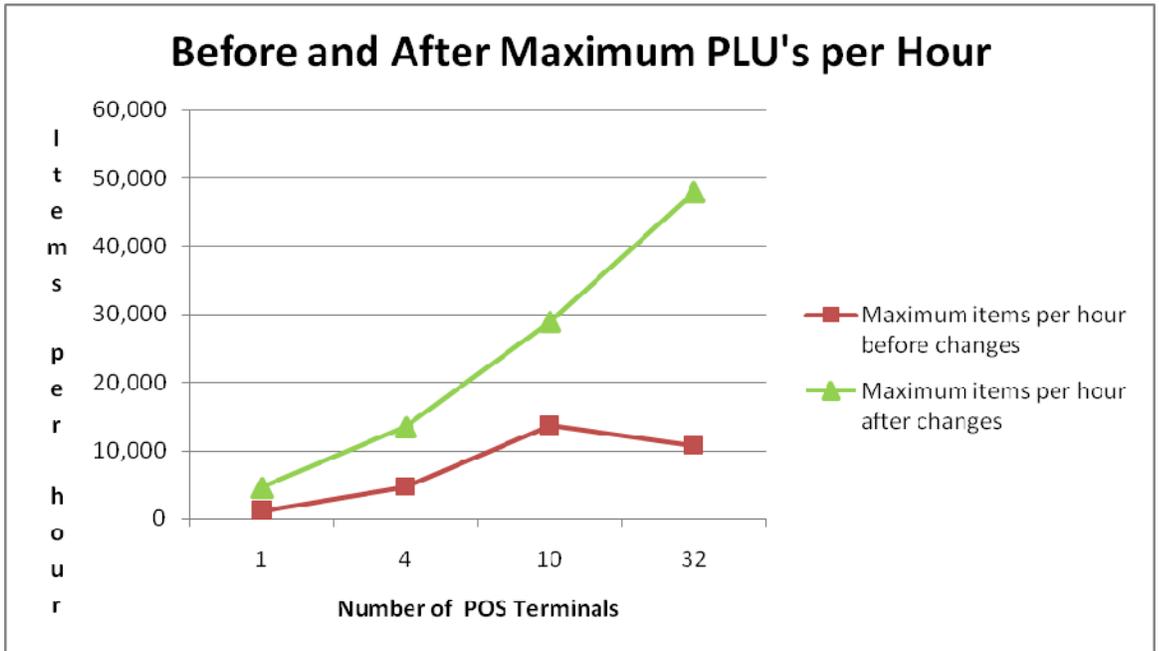
Number of Terminals	1	4	10	32
Avg PLU response time in secs. before changes	1.50	1.60	1.85	2.30
Avg PLU response time in secs. after changes	0.40	0.50	0.60	1.00

Before and After PLU Response Times
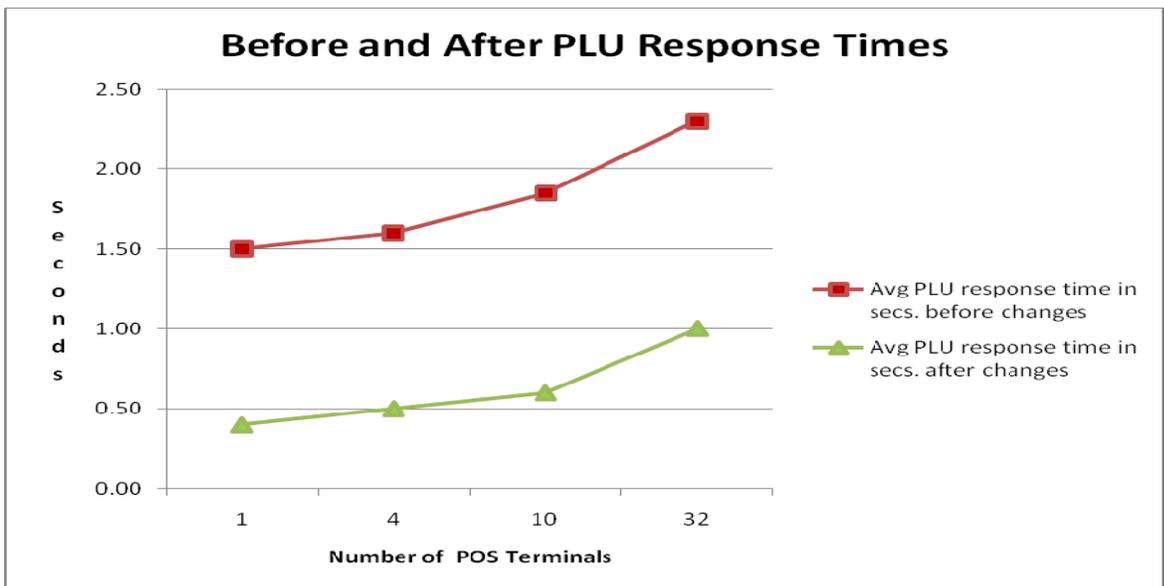
Summary

It is clear that many of the IBM 4690 POS applications could use an overhaul. But who has the time? And where would one start?   These questions and others often put a halt to such efforts before they even begin.

 QVS isn't advocating re-architecting your POS system but rather fixing what is there to begin with. Dozens of programmers may have modified your POS system over the many years that it has been used, and without a doubt, mistakes have been made. It may work, but isn't it about time to really 'have a look under the hood'?

With the use of a few tools and a focus of what to look for, a number of processes can be analyzed and recommended changes for improvements can be made.

The result can be a smoother and faster checkout.

A smoother and faster checkout is often the key to customer satisfaction.

Customer satisfaction translates to a loyal customer.

And, in the end, isn't that what retailers put at the top of their priority lists every year?

The old adage – Time Is Money – has its own meaning at the Point Of Sale.

Customer Satisfaction and Improved Store Productivity both result from a more efficient and faster checkout experience.

IT executives are faced with more choices than ever in POS systems and new application solutions to attract and retain customers. Implementing a new POS system may be an option, but rarely can it be cost or time justified. So, making sure you are getting the most out of the one you have should be an annual goal.

QVS products and technology make it possible for retailers to get the most out of what they have installed today. Give us the chance to show that you can improve the POS without having to rip-and-replace what you have spent all these years putting together.

About QVS Software, Inc.

For more than 20 years, QVS Software has been providing software and services to Tier 1 retailers around the world. Kroger, Sears, Albertson's, Safeway, Carrefour, and Hudson's Bay Company are just a few of the major retailers who have benefited from QVS products and services. Our mission is to provide enabling software that makes it easy for retailers to benefit from advanced retail system technology. Several of our staff members can trace their experience with the retail system evolution back to the 1970s.

Based in Raleigh, North Carolina, the company derives its name from the _Quality_, _Value_, and _Service_ that its retail clients and business partners have come to rely on. Because QVS works closely with all the leading retail equipment providers, many retailers are already experiencing the benefits of QVS products. Numerous solution vendors have already imbedded innovative QVS software components in their system design. All the major POS manufacturers—Fujitsu, IBM, NCR, and Wincor Nixdorf—are QVS business partners. QVS also partners with other important players in the retail space, such as Motorola, Ingenico, Verifone, Datalogic, Radiant Systems, Cornell-Mayo Associates, TriSoft Solutions, and other solution providers.

QVS is the voice of experience when it comes to "state of the art" store systems concepts such as migration strategies, operating systems, and pervasive computing technology. The company is committed to enabling retailers to use best-of-breed equipment in deploying both mainstream and exciting new application solutions.

Products

QVS offers products and technology that extend the value and reach of IBM 4690-based systems.

Terminal Services

This product is used to provide support in the more traditional (thick client) POS implementations, as well as in newer application solutions, such as self-checkout. Existing 4690 POS applications can now run on pervasive and open platforms. Programming interfaces for Java and Microsoft platforms are available.

Terminal Concentrator

This product is used to provide support in newer thin client POS application solutions for fuel pumps and mobile devices. It is also the product that many retailers are using to extend the life of legacy POS hardware. Terminal Concentrator currently allows up to 80 thin clients to be serviced by a single server. Terminal Concentrator is available for the IBM 4690 controller or may also run on a Windows server.

InSight

InSight product is a set of powerful tools that assist Help Desk, Programmers, and Analysts in the areas of:

> Problem Isolation
> Problem Recreation
> System Performance
> Systems and Asset Management
> and much more!

InSight extends the IBM 4690 Operating System with features available in many of today's non-proprietary Operating Systems. InSight enables access to management information and remote monitoring and control of 4690 POS terminals. It also allows additional inter-operability with outside systems, improved performance of the 4690 controller, and more capable diagnostic and performance analysis.

To obtain more information about QVS Software or to make inquiries about a solution for your organization—

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Email us at **sales@qvssoftware.com**

or

Visit **www.qvssoftware.com**