

Engineering truly adaptive and dynamic planning //

By Linda Whitaker, Chief Scientist, Quantum Retail

Combing the art of retailing with automation

Much of the inventory management software in use today has significant performance and scalability issues. Such constraints limit the ability of retailers to improve business performance and further scale these processes and systems.

It's time for a better toolbox

For example, centralized systems and processes means that most retailers are working with aggregated information, months in advance and miles away from the action. Planners are utilizing historical data, which can be as old as two or three years, a timeframe during which the customer landscape is likely to have altered dramatically. These systems are unable to account for rapid changes in consumer behavior, the shifting strategies of competitors, the evolution of product ranges or the variety of consumer buying behaviors at individual stores and SKU level.



Circumventing the scalability and performance constraints of the technology inevitably means simplifying the solution leading to inaccuracies as well as a loss of opportunity. With increased complexity in the retail environment, the ability of these systems to provide accurate and timely information is further strained. Even if all this were not the case, there is also the matter of operating the system. The multiplicity of levers, dials and attributes that individuals need to set creates a further barrier to achieving the result they require.

Inventory management: a better way

Q from Quantum Retail is a totally new approach to inventory software management. Q takes a completely different and intelligent approach to solving the problems of scalability and performance that beset today's forecasting, replenishment, allocation and inventory planning systems. Q is a system that operates in the here and now. It does not need to process two or three years' worth of historical data every time it runs to drive its forecasting, fulfillment and inventory planning processes; in effect each day. Q's smart technology means it processes the current inventory and sales transactions and learns from that information to update its recommendations.

Unlike other solutions, Q processes continuously: There is no need to allocate system time for processing. This cycle also delivers near real-time updates for unparalleled responsiveness, agility and adaptability in decision-making. There are no delays with Q that occur with other

systems: Q is uniquely able to modify and update the way it chooses to fulfill to each and every SKU and location, based on its own behavior and goals. Q can detect and react to micro trends at store and unit level and does so without having to analyze or maintain massive historical data sets. Just as significant is that Q does not require the user to maintain continuous input or to change the configuration.

Application Architecture

Q's application architecture has been designed specifically to ensure it enables retailers to solve real operational and technology problems. It is a 100% web-based application, which means there is no client install. Depending on customer preferences it can be hosted by Quantum Retail for zero in-house IT overhead or deployed on site by the retailer. The application has been designed to minimize hardware outlay and total cost of ownership.

Q has been designed for focused client side data manipulation, with the right information to empower the user to make the right commercial decisions, Q uses server side functions for all database transactions. The database layer is totally discrete. The data access layer consists of PL/SQL for complex transactions and Q hibernates ORM for simple queries. The backend executes directly against the database server and Q utilizes embedded SQL for complex queries.

The application architecture also features an isolated data model which prevents data contention between the user interface and backend data. Simulation processing is performed in a separate cycle and on an isolated model keeping operational and simulation functions separate: today's learning and tomorrow's decisions never cross. Q also offers database partitioning options to lowest level product and/or location set. The full separation of business, process and data logics makes it easy to manipulate one without affecting any of the others.

From the ground up, Q has been designed to be a highly robust and scalable solution with minimal IT overhead, delivering responsive results that ensure retailers simultaneously maximize product availability while minimizing the need for markdowns.

Scalability and performance

Q operates on a continuous processing cycle and does not retain historical data. These fundamental features, combined with the fact that it separates critical path processing (execution) from simulation (learning) to allow parallel processing, makes Q uniquely able to scale at the lowest level possible.

In application performance and volume tests Q has consistently indicated true linear scalability on various platforms including 2-way and 4-way HP servers; 4-way IBM Blade Centers and 16-way Sun Solaris. Application throughput has been measured to in excess of 6000 rps on a 4-way server: the sort of results that place Q's performance beyond compare with current systems and architectures. In recent customer volume and performance tests, the application was proven to scale linearly to actively manage 25,000 products at over 1,000 locations. All processing completed within a constrained window.

Q scales quickly and effectively with the growth of the retailer's business, with no exponential drop-off in system performance as the enterprise and transactional data continue to grow. Q also utilizes built-in resource management techniques to allow simulation processing to run throughout the online day without impact to user performance. This provides a more even resource usage profile for the application and minimizes overall hardware requirements.

Integration

Q utilizes integration techniques such as:

- Master data changes capture and synchronization
- Specialized operational data stores (that can leverage existing custom ODS if available)
- Comprehensive integration staging data approach for interfacing with legacy systems
- Simple view only approach for synchronizing with other Oracle based systems
- JMS messaging and webservices framework for application integration

Technical architecture

Q leverages open standards in all of the architecture choices it has made. There is no proprietary technology in Q.

- Oracle 10g database
- J2SE Java 1.5 backend processing
- JMS Integration – (near real-time integration)
- JSP 2.0 User Interface allows tooling an configuration to be easily managed • and displayed in other applications, such as IBM

Quantum Retail Technology, Inc.

The market is asking new questions... you need new answers.

Q answers the new questions facing grocers and retailers today with solutions that enable them to profitably buy, move and sell merchandise, solving the most complex and costly problems they face - **quickly and permanently.**

Q is the answer for: Assortment and Range Planning - Forecasting and Order Planning - Replenishment and Allocation

Every Quantum Retail customer has achieved 100% return on investment in less than 6 months. For more information visit <http://www.quantumretail.com>. Follow Quantum Retail on Twitter at <http://twitter.com/quantumretail>.