SCO's Retail Architecture

An SCO White Paper
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Management Summary

The way consumers shop is changing. They can now purchase identical goods and services through stores, internet or catalog sales. Yet they expect a consistent experience, quality and price regardless of their chosen purchasing channel.

Behind this new array of channels to market is the need for totally integrated systems. Retail store systems need to be able to interact with web shopping applications. Web shopping applications need to interface to catalog sales staff. All of this needs to be synchronized in real time to ensure a high standard and consistent customer experience. Real time data also is needed by the decision management systems and staff to make the best business decisions to ensure business is efficient, profitable and meeting customer needs.

How does this happen? Store systems have traditionally operated independently of headquarter systems but now they need to share applications, data and systems. Store architectures are changing as they embrace this new level of integration.

SCO has invested heavily to understand the changing requirements of retailers and ensure we have the technology to allow store systems to transition into this new multi-channel world.

SCO has a retail architecture and product roadmap that provides industrial strength store infrastructure software whilst matching the economic model of the retail industry. We deliver enterprise class technology scaled and tuned for the retail market at a truly cost effective price. This combination of attributes is unique to SCO and recognized throughout the industry.

In this white paper we will look at the key trends in retail technology and then demonstrate how SCO's roadmap delivers the key components required to track these trends.

SCO in Retail

SCO has been a trusted supplier of retail products and services for over 20 years. SCO created a significant installed base of retail store infrastructure and is continuing to expand its retail presence.

Totally focused on delivering Linux and UNIX based solutions, SCO has an enviable set of customers in its installed base:

- Seven out of the top ten retailers in the US run SCO in their retail stores
- Six out the of the top ten global retailers use SCO

Key Technology Trends in Retail

In order to provide the most effective solutions for today's retail environment, it is important to understand and track changes and innovations in retail IT systems. SCO sees the following as key trends needing resolution for future success:

Server Consolidation
IT in retail has experienced evolution rather than revolution. New technologies and applications have incrementally changed the way retail stores operate as new pieces of store management have been automated. Unfortunately, in many cases, new vital applications mean additional servers in retail locations, often running different and incompatible operating systems. Further, the servers are unable to share applications, workload or data.

The result has become unmanageable for some retailers. Some of the most common problems are:

- Multiple servers running multiple operating systems is a nightmare to maintain
- Staffing operations teams to keep this complex set of systems running and efficient is very expensive
- If one server fails, none of the other servers is able to pick up that application because of incompatible operating systems

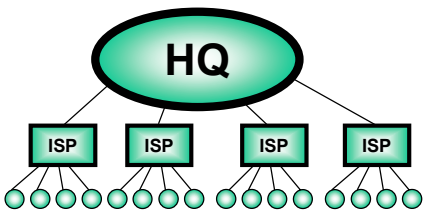
As a result of these and other problems, retailers are looking to consolidate servers. Server consolidation provides the following benefits:

- Combining applications onto a smaller number of more powerful servers reduces maintenance costs
- Consolidating with common operating systems enables the ability to fail over an application from one server to another in the event of application or server malfunction
- Simplifying the jobs of support staff while improving uptime and performance.

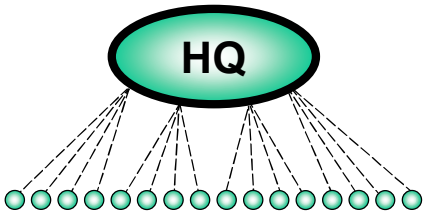
Divergence of Store Architectures
Traditionally, store applications have been hosted on the retail premises. These are typically small, Intel, servers running an instance of the store application connected back to headquarters through either private networks or dialup connections.

With the advent of higher bandwidth wide-area networking, a whole new model has emerged. Application logic is being centralized on large servers hosted at regional or headquarter locations. Each POS device is connected via high-speed

network back to application servers hosted at headquarters. In some cases the application is delivered via an Application Service Provider (ASP).



Traditional In-store Processor Model



Emerging Centralized Server Model

This new model changes the nature and function of the application logic on the POS system and reduces administration costs by removing servers from the store.

However, the traditional store model is not disappearing, but rather retailers are choosing the model that suits their business and application model.

POS Operating Systems in Transition

There are hundreds of thousands of POS devices in use today running legacy operating systems and applications. Variants of MSDOS, OS/2 and UNIX are still running the majority of POS devices.

However, this will not be the case much longer. Traditional POS Operating Systems are difficult to manage and are becoming increasingly expensive to maintain. They don't run the latest graphical and Java based applications and are unable to support the next generation of peripherals. For example, in Europe the introduction of chip security for credit cards is often through USB based readers. Most versions of OS/2 and DOS do not support USB devices.

Even retailers who have recently deployed Windows are now starting to reconsider their decision. Microsoft's new licensing and upgrade policies are creating huge additional costs. Additionally Windows has not proven itself to be reliable and is an overly complex solution to the needs of retail.

However, Linux is lightweight, fast, customizable, cost effective and most importantly, its reliable. Consequently Linux is growing in popularity as the new de facto operating environment for POS devices.

Multi-Channel Retailing

In many retail segments the concept of integrated store, web and catalog shopping is now expected by consumers. They are being trained to expect to be able to order on the web or through telesales, and then collect the goods from a local store. Items which are not stocked by the consumers local store are now being sold through in-store self service kiosks for delivery to the consumers home.

In Europe and the US, consumers can now order groceries by web with the goods being picked from the shelves of their local supermarket by staff who then deliver the goods to the consumer's home.

This new integrated shopping model is totally dependent on integrated IT systems. The connection to the store is becoming business critical. The old style dialup connection from store to headquarters is now becoming commercially unacceptable. Moreover, low bandwidth private networks are no longer up to the task – new high-speed broadband connections are needed to implement these new models.

Infonetics Research estimates the sales of VPN solutions will be $21.3 billion in 2002 and is projected to more than double by 2006. This will most likely drive the cost of VPNs down, but it will be several years before significant savings are realized.

At present, DSL and cable technology is often the only cost effective way of providing the necessary connectivity in many business situations. This level of integration with the internet creates new problems to solve. For example, Virtual Private Network (VPN) functionality, firewall systems, and virus scanning must now be catered for at every store.

Evolution of Application Technologies

To support the business model that multi-channel retailing brings and to support new supplier customer/ partner relationships application technologies are also evolving.

There is a need to drive down the overall cost of a business transaction by automating as much of the process as possible through the use of appropriate application technology. Indeed in certain regions, the larger retailers are penalizing suppliers that cannot do business with them electronically.

Trading exchanges are emerging for suppliers to trade goods in a highly cost effective fashion as market demands ebb and flow. For example, in the clothing industry, goods soon go out of fashion and these can be traded through the exchanges to retailers in other markets or market segments where these out of date goods are still desirable.

Underlying this is the technology needed to do business electronically in a distributed environment.

Technologies to allow efficient e-business applications to be built such as web services, SOAP, and XML are key to many implementations. Messaging middleware allows the reliable delivery of purchase orders, invoices and other business documents across an essentially unreliable medium – the internet.

Java and competitive technologies such as .NET will also have a significant impact here.

It is not expected that e-business to this scale will reach the SMB retailer until 2004 to 2006, but the impact will start to be felt much sooner as suppliers begin to expect to do business electronically.

SCO's Retail Architecture

SCO believes that Retailers should have the freedom to choose the right model for the task at hand. Components of the architecture should be flexible enough to be built into different configurations and work within a heterogeneous world.

Although the opportunities for retailers today are great, the challenges today are:

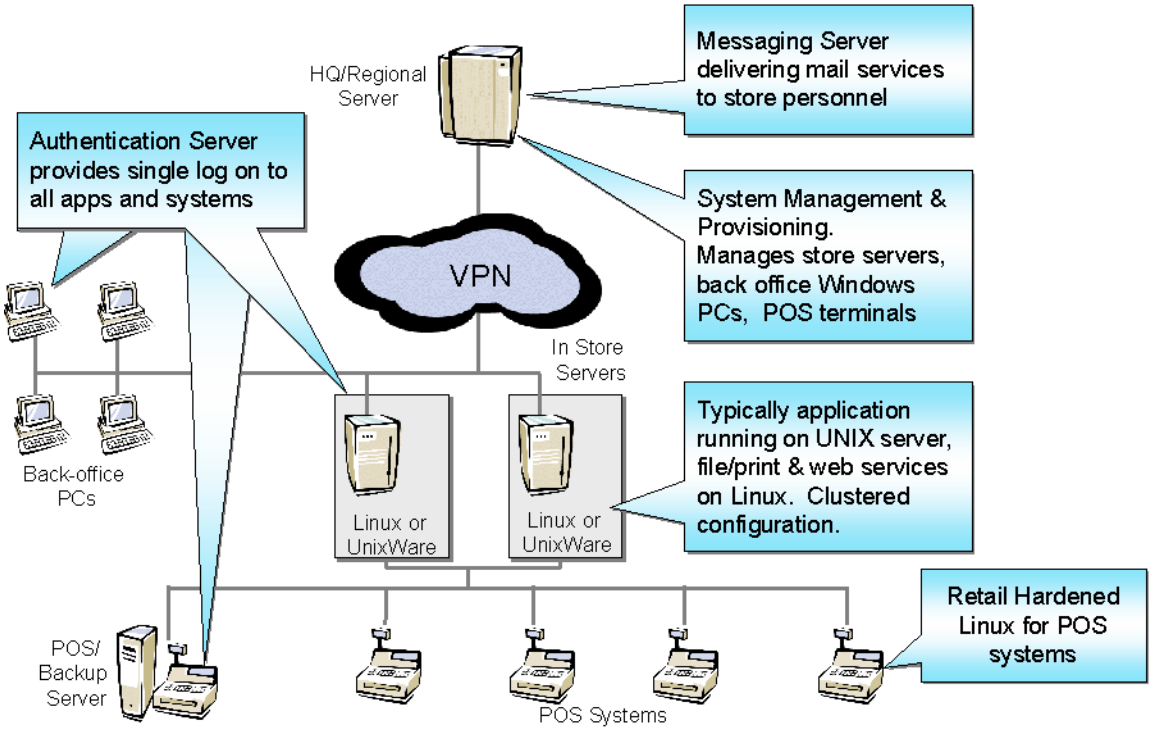
- Maintaining a single view of the customer across all sales channels
- Tracking ROI by product, by customers, by season, and distribution point on a real time basis
- Ability to maintain competitive pricing and be responsive to rapid change in the market
- Providing service through all channels 24 hours a day, 7 days a week
- The need to improve service levels and respond to increasing customer expectations

All of these requirements make demands on the retail IT infrastructure and the architecture chosen must be flexible and open. SCO's goal is to allow retailers to track and embrace the trends we examined earlier as the build out their IT systems. As a result the basic tenants of SCO's architecture are as follows:

- Provide best of breed components based on open systems and standards to enable maximum interoperability and reusability
- Allow deployment of a classic in-store server model or the emerging centralized headquarter based model as appropriate
- Allow choice of the right in-store server operating system for the job. Business critical compute intensive applications requiring scalability past 4 CPUs are best suited to UNIX where as infrastructure services such as file and print, web services are well suited to Linux.
- Enable construction of POS devices with thick application logic or very thin lightweight POS devices
- Ensure the widest choice of vendors for underlying hardware and application software
- Deliver mainframe class computing using industry standard, commodity hardware and software components to create cost effective solutions

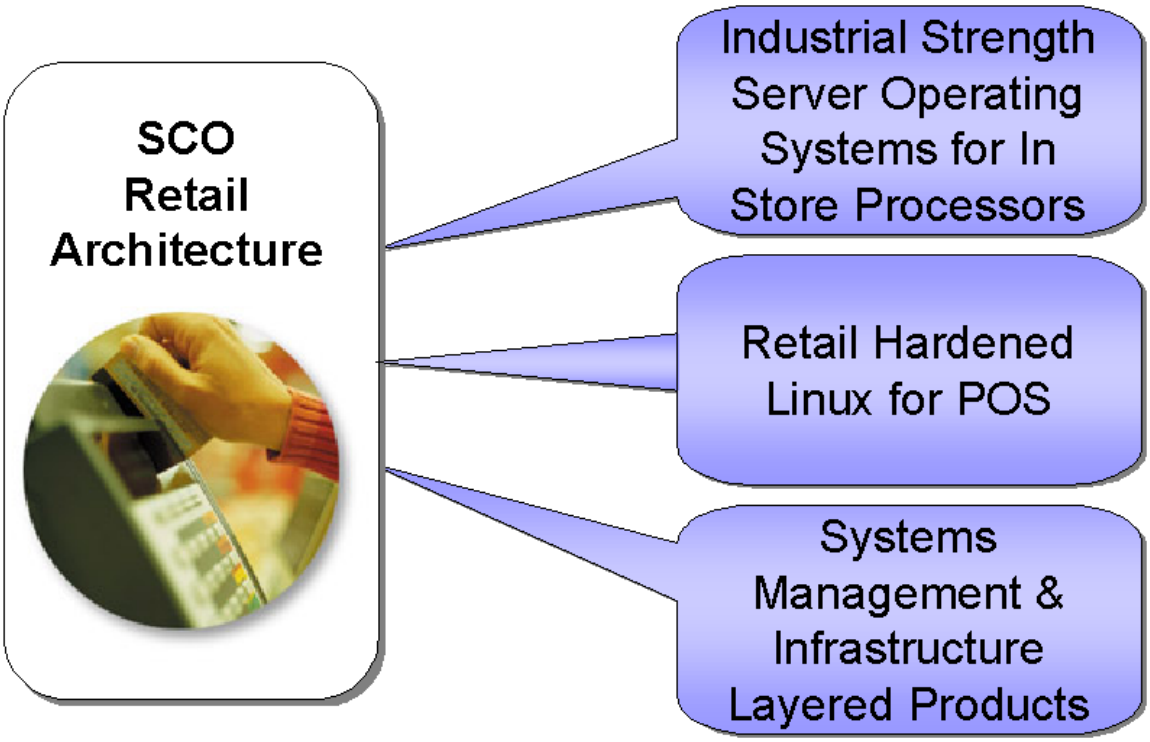
SCO's recommended architecture revolves around solid multi-functional server infrastructure as the backbone of each store. While SCO's products fully support a centralized approach, SCO does not believe that networking infrastructure is reliable enough or fast enough to be a truly reliable solution today. Over time as bandwidth and reliability increases centralized models will become viable.

The following illustration is a sample store configuration built from SCO's architecture:



SCO's Retail Product Strategy

SCO is focusing on three key product areas to meet the needs of retail customers:



Server Operating Systems for In-Store Processors
This is a traditional area of strength for SCO. Providing a range of powerful choices for its customers, SCO enables the right operating system to be chosen for the task at hand. SCO OpenServer, SCO UnixWare and SCO Linux each have specific niches and benefits for business critical servers.

SCO OpenServer and SCO UnixWare provide excellent scalability and reliability and are well suited to running business critical applications. SCO Linux is excellent for less compute intensive applications and infrastructure such and print and web services.

Extensive interoperability allows applications to be moved between systems seamlessly. With fail-over clustering technologies, servers can be configured to transfer applications in the event of operating system or hardware failure.

As some retailers move to a more centralized application server model in store processors are going to evolve. They will become edge of network appliances ensuring secure and rapid communication back to corporate based applications including services such as:

- File and print for back office clients
- Firewall and virus protection
- Authentication and user management
- Boot services and software repair for POS devices
- Caching of web, pricing, and application data

Retail Hardened Linux for POS
Linux has tremendous advantages in a retail environment. Being highly reliable it proves its worth in keeping shopping lanes open around the clock. Linux is easily customized and is well suited to modern POS device hardware footprints as well as legacy systems with reduced memory and CPU power.

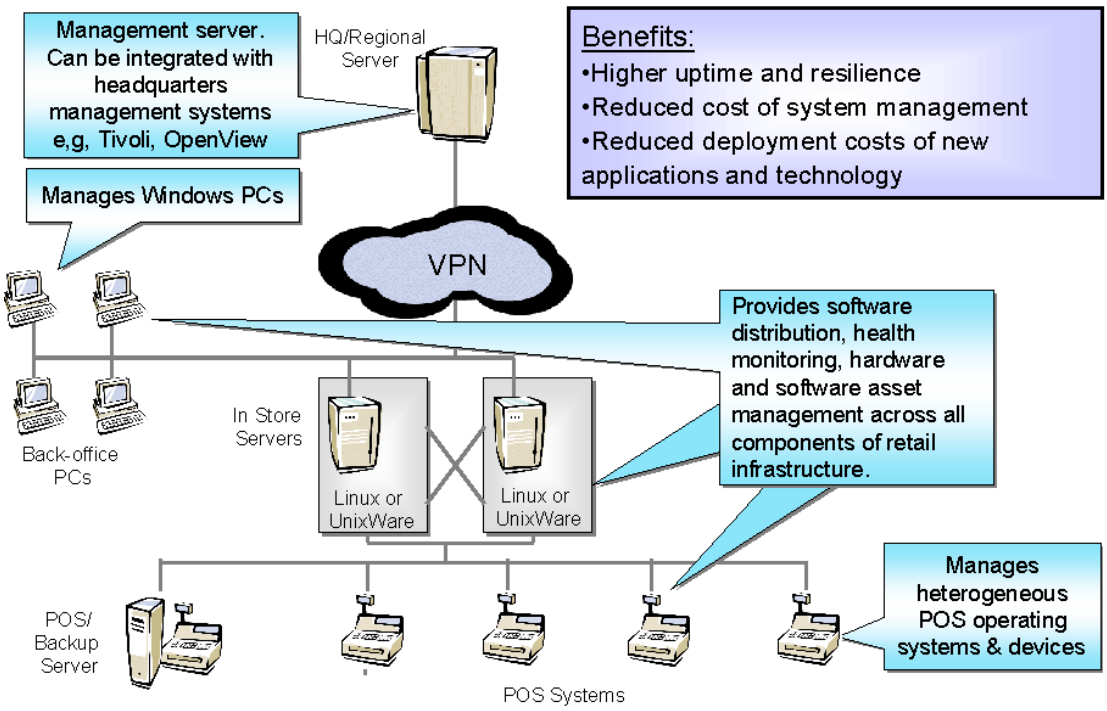
SCO has introduced a framework for creating retail hardened Linux-based POS systems with an extensive range of features that make Linux simple to install, manage and ultra-reliable. Several major POS vendors and ISVs are endorsing this technology as the next generation operating system for retail POS devices.

This framework enables construction of thick standalone POS devices as well as very thin, diskless devices. This gives the flexibility of building thick clients for more centralized application models. In this case a master POS device can provide basic services to local thin POS clients such as boot-up support, price list and data caching as well as basic network services.

SCO bases this technology on SCO OpenLinux, its Linux distribution. Later in 2002, SCO will release OpenLinux Powered by UnitedLinux and will start deploying Linux for POS based on this next generation Linux platform.

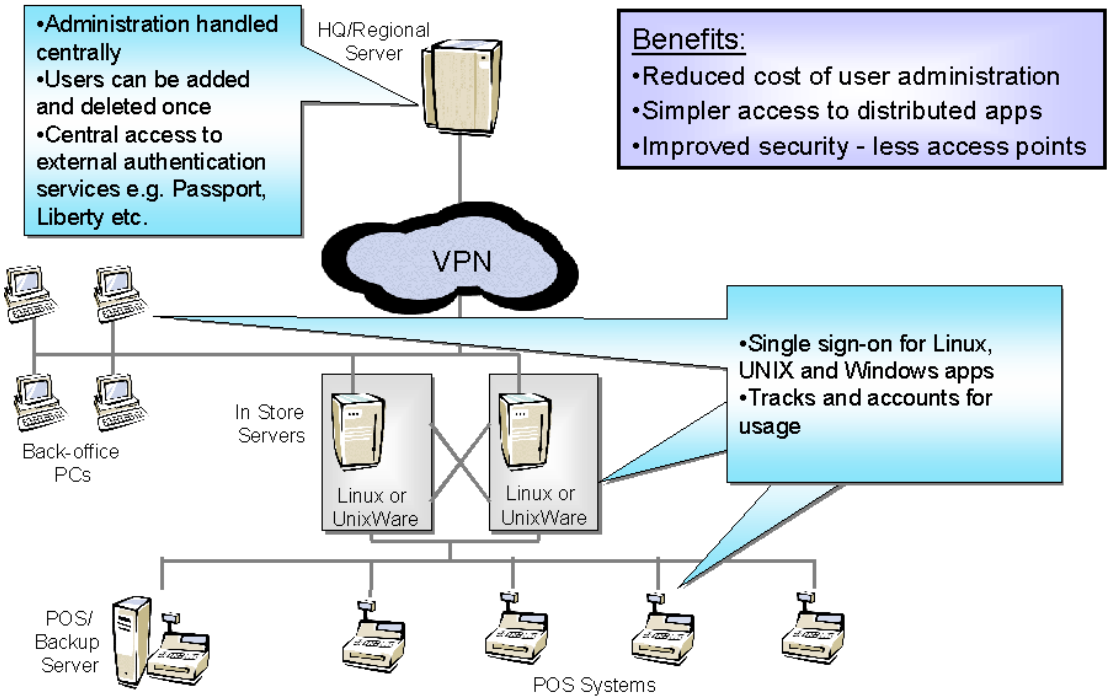
System Management & Infrastructure Layered Products
In order to support retail technology trends SCO is introducing a range of key infrastructure products that fit and function together to enable innovative new solutions to retail problems. These products are sold as part of the Volution Server Suite. Each product is available separately or as a suite but they each share common installation and management interfaces. The following is a discussion of each of the key components in the suite:

Systems Management and Provisioning
Branded Volution Manager, SCO's award winning systems management system enables central management of Linux and UNIX clients and servers. Later in the year, SCO will release a new version to allow management of Windows clients and POS systems as well as additional UNIX operating systems such as Solaris and AIX.



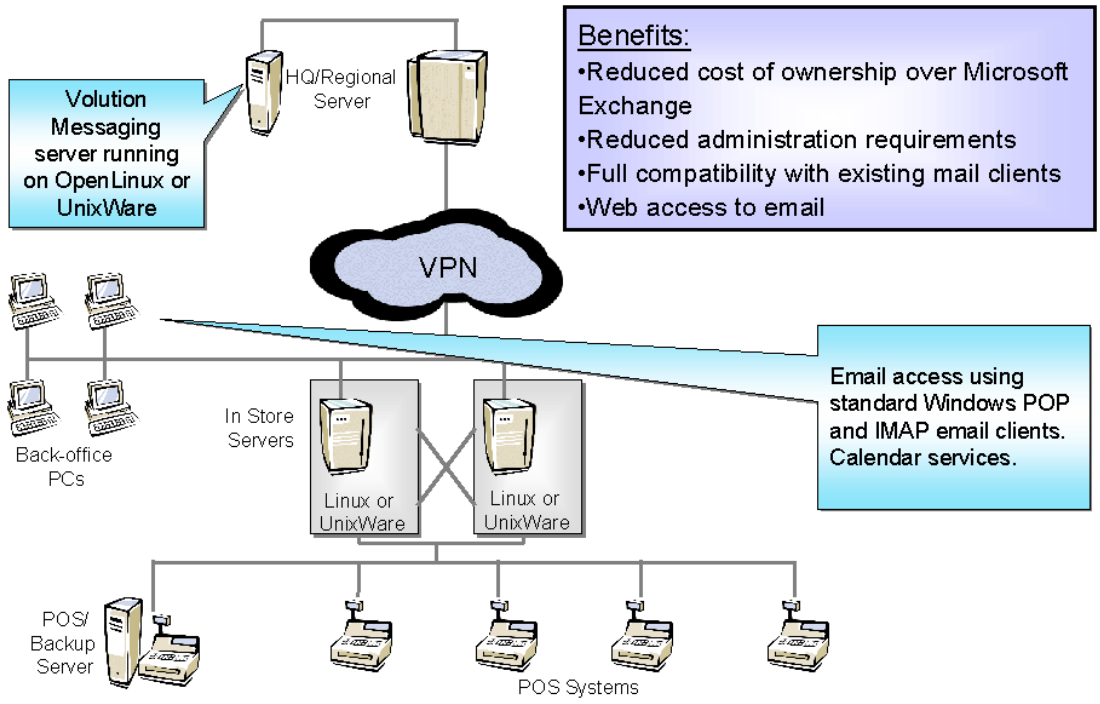
Authentication Services

Key to reducing management costs and improving security is single point authentication for users. Previously considered a high end server feature SCO is introducing a product to bring the benefits of this approach to retail store systems:



Mail and Messaging

Email access for employees is becoming a vital method of communication internally and externally with customers. However, the cost of deploying mail services using solutions from established vendors, such as Microsoft and Novell, is prohibitively expensive. SCO has released Volution Messaging Server which delivers web-based and Windows mail client access to enterprise class mail services:



Future releases of this server are planned to include instant messaging capability to provide key service discovery and exploitation capabilities for in-store and on-floor staff.

Application Services

Increasingly, retailers are deploying applications based on Java 2 Platform, Enterprise Edition (J2EE). The portability and reusability of code is a key benefit but thus far has only been available on high end server systems and at a very high price. SCO plans to bring to market a certified J2EE platform that meets the price point required to allow deployment on every in-store server. Other components of a complete J2EE architecture such as message queuing, common directory services and infrastructure such as SOAP for implementation of web services and e-business based applications will also be part of this application services architecture.

Backoffice Services

Increasingly, customers are looking for alternatives to Microsoft back office server functionality. Increasing licensing costs as well as new punitive maintenance models is causing retailers to consider new options.

Leveraging the in-store server, SCO will be providing a product that will act as a direct alternative to a classic Microsoft® Exchange Server. Based on open standards, Microsoft clients can access all the standard services they require to perform typical back office functions.

Network and Security Services

As retail companies start to roll out DSL and cable based VPN networks there is a requirement to provide firewall security, virus scanning, and security management systems in-store. Traditionally these functions have been fulfilled by deploying additional “black box” solutions which are both costly and overly complex. SCO will be releasing a software solution that will allow an existing server to be re-deployed to perform these functions.

Summary

SCO is continuing to build on its strong legacy of retail-ready products. New trends in retail IT architectures demand new infrastructure for store systems. SCO is committed to building the necessary infrastructure products to enable retailers to take full advantage of the business benefits to be realized from these new retail trends.