Innovate, differentiate and create breakthrough on demand retail operations.

Using IBM Store Integration Framework to gain a competitive edge

ON **DEMAND BUSINESS**™

**Innovate, differentiate and create breakthrough
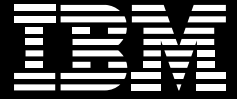on demand retail operations.**
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Introduction

Average no longer cuts it in the retail industry—retailers must excel in price and service. Several large global retailers, because of their purchasing abilities, are making it difficult for others to compete on price. Creating service differentiators is essential to surviving and being profitable in the current retail environment. The challenge is in gaining the ability to quickly and cost-effectively develop standout services. Business needs dictate IT infrastructure; IT infrastructure must support today's and tomorrow's business needs.

Customers want to enjoy cohesive shopping experiences before, during and after their store visits, whether perusing online offers, strolling store aisles or calling for post-sale support. Supply chains need to align with customer-facing systems to enable business models that are driven by consumer demand. Information should empower employees—not burden them. An On Demand Operating Environment for retail features dynamic sense-and-respond interactions among customers, products, employees and retail technologies. Customers, employees and suppliers interact with store systems via new touch points across multiple channels—shopping-cart assistants, radio frequency identification (RFID)-enabled solutions, PDAs, kiosks and advanced point-of-sale (POS) systems. Automation drives efficiency. Resilience and manageability help minimize expense. Flexibility generates more choice and cost savings. Innovation and convenience attract loyal shoppers. Responsiveness reigns. Processes connect from end to end—horizontally and vertically—across the enterprise. Systems seamlessly share data.

Speed and adaptability are essential to success. To gain a competitive edge, you need to differentiate your business in the market. Respond faster with new solutions. Handle hard-to-predict consumer and market change. Prepare for extended and new applications and new store systems that require interoperability. And this can be challenging, given the many constraints of the retail

![IBM logo]

IBM offers a comprehensive, store-centric technology infrastructure that delivers quick time to value and wide flexibility, while helping reduce TCO.

environment; traditionally limited IT budgets, low and unreliable wide area network (WAN) bandwidth, inadequate hardware, a lack of local IT support and long solution life cycles have restricted the functionality and reliability of mission-critical systems. Generic desktop solutions will no longer stand up to the needs of the retail store.

IBM can help you effectively manage your operations and contain costs while leveraging optimal flexibility to select, implement and deploy the exact technologies you need. We can help you build an efficient store operating environment that fits your business approach, balancing centralized control and local store execution. And IBM has enterprise- and store-level solutions ready now, so you can get started today. Through our aggressive commitment to open-standards-based technologies, IBM can help retail enterprises, like yours, become more competitive by making the transition to an On Demand Business retail environment. Beyond proven reliability and performance, IBM offers a store-level infrastructure that delivers:

- *Quicker time to value—Rapidly implement the right underlying structure to drive efficiency and improve the consumer experience. Speed future adaptation of your store environment by deploying new applications and systems more quickly, simply and intelligently than ever before. And achieve a quicker return on investment (ROI) for every solution you bring into your stores.*
- *Wider flexibility—From managing store systems to integrating applications, you require flexibility to achieve your strategic objectives. Leverage wide interoperability and skills bases, enabled by open standards, to bring together heterogeneous technologies within your existing environment and those you deploy in the future. Act quickly to seize new opportunities—and respond dynamically to change.*

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*This white paper presents the IBM
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*Store Integration Framework
provides a standard integration
path that enables you to add new
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as connect and extend islands of
store data and business logic.*

- *Lower total cost of ownership (TCO) — Contain the cost of enhancing, adapting and operating your store systems, while protecting and extending the value of existing technologies. Equipped with an open architecture, reduce the cost of acquiring, deploying supporting and managing new technologies.*

This white paper presents the IBM solution for the challenges faced by CIOs, IT architects and software developers in today's volatile retail world. It provides an overview of the architecture, features and competitive advantages of IBM Store Integration Framework. Finally, it highlights the underlying technologies that comprise the IBM solution and lays out a roadmap of how IBM can help your company get started on its retail on demand transformation today.

Creating standout services

Designed specifically for the retail environment, Store Integration Framework provides you with a standards-based infrastructure foundation that simplifies the creation of a flexible on demand retail environment. It provides a standard integration path that enables you to add new functionality and systems as well as connect and extend islands of valuable store data and business logic — across the store and up to and through the enterprise — while leveraging existing investments. A Store Integration Framework solution consists of a combination of the following:

- *Integration and management infrastructure.*
- *Runtime services and tools.*
- *Applications built on top of the infrastructure from IBM, independent software vendors (ISVs) and retailers' IT groups.*
- *The supporting hardware and operating systems.*

Highlights

Store Integration Framework can help you improve the consumer shopping experience, empower teams and optimize operations.

Store integration Framework delivers a flexible foundation on which to develop, integrate and extend heterogeneous business processes, applications and devices.

Using Store Integration Framework, you can rapidly implement ISV applications and connect them with existing and new systems. It also enables systems—including POS systems, kiosks and wireless devices—to share real-time information storewide and with the enterprise. Store Integration Framework can help you revolutionize the store on three key strategic fronts: improving the consumer shopping experience, empowering your teams and optimizing operations.

Solution overview: IBM Store Integration Framework

IBM developed IBM Store Integration Framework to enable retailers to become more responsive, and therefore more competitive. Store Integration Framework is a store-centric, Java™ 2 Enterprise Edition (J2EE)-based architecture and infrastructure built on open standards. The IBM solution provides a complete, flexible and robust retail-optimized infrastructure to enhance store-centered processes and connect them with the enterprise. It delivers the structure to maintain operational control at the enterprise level, while enabling rapid experimentation, development and deployment of innovative solutions across individual stores. This means you can quickly and easily extend existing applications. Integrate applications with other store and enterprise systems. Build and manage Java Enterprise distributed solutions and networked devices. Deploy new applications faster with automated capabilities and reusable business logic.

Store Integration Framework delivers a comprehensive infrastructure built on an open-standards-based, J2EE software platform. You get a flexible foundation on which to develop and extend applications storewide. And to support component-based applications that require interoperability, we provide a service-oriented architecture (SOA) to integrate business processes, applications, systems and devices—throughout a single store or across your entire enterprise.

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*Retail Business Components in
Store Integration Framework support
cost-effective implementation, easy
integration and extension of existing
and new solutions.*

*Store Integration Framework
embraces existing industry open
standards, such as XML, IXRetail
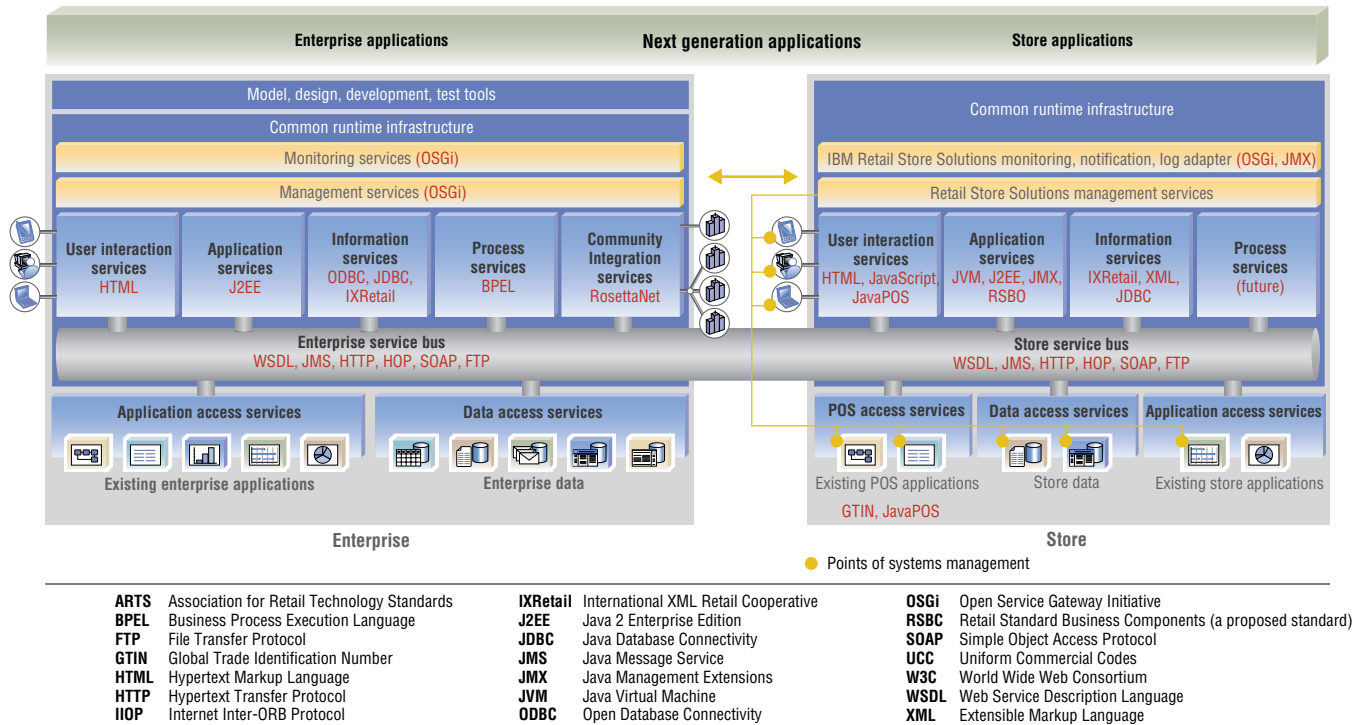and ARTS, to simplify integration
within retail enterprises.*

Store Integration Framework is designed to deliver a set of Retail Business
Components for cost-effective implementation, easy integration and exten-
sion of existing and new solutions. The first set of components allows you to
easily project POS functionality to touch points throughout the store, such
as kiosks, handheld sales tools and self-service scanners. Components follow
Web services and other open standards. This adherence to standards enables
quick time to value, encapsulation of applications for reuse and integration,
and extensibility. We also provide unique tools to automate critical solution
development processes, such as application modeling, design, deployment
and management.

Unlike proprietary infrastructure solutions, Store Integration Framework
embraces existing industry open standards, such as International Extensible
Markup Language (XML) Retail Cooperative (IXRetail) — established by the
Association for Retail Technology Standards (ARTS) — to simplify application-
to-application integration within retail enterprises. And it supports multiple
operating system platforms. This enables you to easily "snap in" component-
based applications, devices and tools from a long list of leading software and
hardware vendors. And take advantage of a readily available pool of expertise.
It also provides integration tools designed to convert data from heterogeneous
systems, so you can create applications that dynamically interact with Web
services. For example, it can leverage Simple Object Access Protocol (SOAP)
and the XML standard to allow applications running on disparate operating
systems to communicate.

Functional architecture
IBM has developed this infrastructure built on a proven service-oriented
architecture and optimized for retail store operations. This enables you to
establish enterprise-level control, while delivering store-level flexibility to
manage operations, make decisions and deploy new solutions.

Figure 1: Reference architecture—functional view and industry standards supported
Standards (ARTS, IXRetail, UCC, UnifiedPOS, W3C)

Enterprise applications | Next generation applications | Store applications

Model, design, development, test tools

Common runtime infrastructure

Monitoring services (OSGi)

Management services (OSGi)

| User interaction services HTML | Application services J2EE | Information services ODBC, JDBC, IXRetail | Process services BPEL | Community Integration services RosettaNet |

Enterprise service bus
WSDL, JMS, HTTP, HOP, SOAP, FTP

Application access services | Data access services

Existing enterprise applications | Enterprise data

Enterprise

Common runtime infrastructure

IBM Retail Store Solutions monitoring, notification, log adapter (OSGi, JMX)

Retail Store Solutions management services

| User interaction services HTML, JavaScript, JavaPOS | Application services JVM, J2EE, JMX, RSBO | Information services IXRetail, XML, JDBC | Process services (future) |

Store service bus
WSDL, JMS, HTTP, HOP, SOAP, FTP

POS access services | Data access services | Application access services

Existing POS applications GTIN, JavaPOS | Store data | Existing store applications

Store

● Points of systems management

ARTS	Association for Retail Technology Standards	**IXRetail**	International XML Retail Cooperative	**OSGi**	Open Service Gateway Initiative
BPEL	Business Process Execution Language	**J2EE**	Java 2 Enterprise Edition	**RSBC**	Retail Standard Business Components (a proposed standard)
FTP	File Transfer Protocol	**JDBC**	Java Database Connectivity	**SOAP**	Simple Object Access Protocol
GTIN	Global Trade Identification Number	**JMS**	Java Message Service	**UCC**	Uniform Commercial Codes
HTML	Hypertext Markup Language	**JMX**	Java Management Extensions	**W3C**	World Wide Web Consortium
HTTP	Hypertext Transfer Protocol	**JVM**	Java Virtual Machine	**WSDL**	Web Service Description Language
IIOP	Internet Inter-ORB Protocol	**ODBC**	Open Database Connectivity	**XML**	Extensible Markup Language

Functional view, including open industry standards, of the IBM On Demand Operating Environment for retail

With a retail-optimized, service-oriented architecture, Store Integration Framework enables you to establish enterprise-level control, while delivering flexibility to mange operations at the store level.

Figure 1 showcases many operational capabilities of the IBM On Demand Operating Environment for retail as well as the industry standards that it employs. At the store level, Store Integration Framework can deliver:

- *User interaction services—Establish user relationships through intuitive application interfaces and via multiple devices. Create interactive venues, such as employee sales portals and customer kiosks, which deliver location-specialized services. Tailor access to meet the needs of in-store shoppers, online consumers, sales associates and store managers.*
- *Application services—Deliver a Web services foundation on which to build new applications and integrate leading solutions and technologies provided by IBM, IBM Business Partners and other ISVs.*
- *Information services—Synchronize data, in all formats and contexts, virtually everywhere across the enterprise. Provide a consistent, unified view of business information—within databases, across applications, on the Web, at headquarters, in the store and at the POS.*
- *Process services—Choreograph and synchronize processes, functions and activities across the store environment. Seamlessly connect systems to provide sense-and-respond interactions. Access databases. Update inventory. Cross-sell and up-sell.*
- *POS access services—Provide a standard application programming interface (Java or messaging API) to integrate new functions and extend existing technologies. Allow reuse of customized business logic.*
- *Data access services—Enable various store data systems to fluidly share information using message-based data exchange and customizable application connectors.*

- *Application access services – Provide an adapter to connect innovative enterprise and store applications and solutions. RFID-enabled solutions. Asset and content management applications.*
- *Development tools – Provide a sophisticated toolset to enhance the process of modeling, designing, developing, testing and tuning new applications and functions.*
- *Management and monitoring services – Collect and evaluate operational data across your store environment. Feed information to systems management agents at the enterprise or store level to help optimize performance. Proactively monitor hardware, software and device availability. Identify potential disruptions.*

For decades, IBM has actively participated in retail thought-leadership programs, and it continues to spearhead the formation of new open standards.

Highlighting the advantages of the Store Integration Framework platform

Through IBM's more than 30 years of engaging with and developing solutions for large retail customers around the globe, IBM has developed a deep understanding of the demands and intricacies of store operations. For decades, IBM has actively participated in retail thought-leadership groups, including those engaged in creating, expanding and improving open industry technology standards. And IBM continues to spearhead the formation of new open standards, such as those needed to streamline development of Java or Web services-based integration APIs.

IBM experience and attention to retailers' needs are reflected in the capabilities, features and standards of Store Integration Framework.

IBM's experience and attention to retailers' needs are reflected in the capabilities, features and standards of Store Integration Framework and in IBM's partnerships with leading ISVs—partnerships to develop innovative business applications based on this infrastructure. By extending the robust characteristics of the proven IBM market-leading POS system with a J2EE environment,

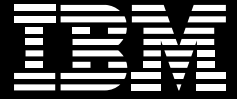**Innovate, differentiate and create breakthrough
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*Store Integration Framework
provides a comprehensive, retail-
ready On Demand Operating
Environment for stores.*

*Store Integration Framework
allows you to extend and integrate
systems using an evolutionary
approach or to replace the entire
store infrastructure using a
revolutionary approach.*

Store Integration Framework provides a comprehensive, retail-ready On Demand Operating Environment for stores. This environment extends to the store the ability to distribute function and workload (enterprise and store); leverage toolsets that increase productivity; and integrate new tools and applications with the existing store IT environment.

A complete solution—delivered through software, hardware and services
Store Integration Framework enables complete business solutions in a flexible and efficient way. The framework architecture and component portfolio allow you to build, integrate and extend solutions to address core business needs. What's more, IBM has global Business Partner relationships with application, hardware and services providers to implement standout solutions that can help differentiate your business. IBM created Store Integration Framework using a multilayered approach that is based on open standards at each level (including the interfaces between the layers): retail store devices, system infrastructure, management infrastructure, integration infrastructure, standards-based interfaces and ISV applications. As a result of this approach, you can extend and integrate systems using an evolutionary process at multiple entry points, including integrating and extending existing applications, incrementally adding new applications or migrating piecemeal to your next-generation platform. Alternatively, you can use an intermediate approach where many new sub-systems are integrated with your existing infrastructure. Finally, you can use a revolutionary approach, which involves replacing the entire store infrastructure.

Highlights

A standards-based approach can help you contain the cost of acquiring, deploying, managing, operating and adapting your store systems.

Store Integration Framework is supported by a high-productivity toolset that encourages best practices, with capabilities that encompass the full life cycle of development.

One size doesn't fit all—Store Integration Framework delivers choice and flexibility
With Store Integration Framework, you can use virtually any operating system on your enterprise mainframe, in-store servers and POS and other client systems. IBM embraces open systems—and Linux® technology in particular—because they facilitate operational flexibility, enabling businesses to become more competitive. By taking a standards-based approach with a flexible architecture, you can contain the cost of acquiring, deploying, managing, operating, enhancing and adapting your store systems—while protecting and extending the value of your existing technologies.

Rapid development and deployment
Store Integration Framework is supported by a high-productivity toolset that encourages best practices, with capabilities that encompass the full life cycle of development—from modeling to testing. By leveraging an open-standards-based infrastructure, you can increase productivity and efficiency in the development process through the ability to use a readily available skill set to quickly create or reuse lines of code. IBM Eclipse-based tooling enables you to develop and deploy sophisticated business applications. The Eclipse-based tools, which are built on the industry-standard J2EE platform from end to end, enable you to model, design, develop, test, deploy and manage new business processes and applications for the store, whether they run in the store or in the enterprise data center. Store Integration Framework also helps you improve quality; it provides a way to enforce best practices for development and to control solution deployments and life cycle operations.

IBM's initial focus for components is on POS integration, building on our application and integration experience that we have amassed by developing IBM's market leading POS systems and applications. One example is the POS

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programmers address the unique
challenges of the retail operating
environment.*

*IBM is working with a broad
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transaction component, which encapsulates lower-level POS API calls with
higher-level services calls to support an SOA. Other functions under consid-
eration include catalog, item synchronization, RFID and an offering for POS
and multichannel integration. IBM will work with ISVs to advance the compo-
nents technology as well as to standardize the interfaces.

Retail-optimized computing models
Store Integration Framework uses computing models that are optimized
for retail operating environments — minimizing barriers around application
development, hardware deployment, systems management and device support
associated with delivering solutions for stores. The retail environment poses
unique challenges for application developers, so Store Integration Framework
helps keep programmers focused on the retail operating environment. Store
Integration Framework utilizes the J2EE programming model, providing con-
nectivity to a variety of Java and non-Java applications and back-end systems.
Industry-leading support for Web Services technologies like Web Services
Description Language (WSDL), SOAP and XML make a wide range of integra-
tion scenarios feasible. The Store Integration Framework environment also
provides choices with respect to security and business requirements based on
the operating system you select.

An all-inclusive hardware and software ecosystem
IBM is working with a broad community of ISVs and independent hardware
vendors (IHVs) to create an ecosystem underpinned by Store Integration
Framework. On the server side — in stores and at the enterprise — many ISVs
have embraced the J2EE environment for POS, inventory, merchandising,
guided selling and other applications. Store Integration Framework provides
facilities to enable integration across these applications. On the device side,

*Store Integration Framework
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merchandising, guided selling
and other applications.*

*The Store Integration Framework
approach to systems management
embraces open standards and
provides both instrumentation
and infrastructure.*

the Java runtime and management infrastructure have also enjoyed strong
support from many hardware and device providers for RFID devices, kiosks,
PDAs, handhelds and other retail devices. The Java-based JavaPOS standard
also supports all key retail peripheral devices. Altogether this ecosystem pro-
vides end-to-end application functions for the retail environment. The Web
services standard supported by Store Integration Framework is an open one
that enables integration with other ISV or IHV environments, including legacy
applications and Microsoft® .NET technology-based applications or devices.

Built-in, next-generation systems management capabilities
A viable systems management solution requires three common components:
instrumentation, infrastructure and applications. Instrumentation is the
information provided by the device or software being managed and can be
thought of as counters, configuration data and events. In short, it is the ele-
ment describing itself to the outside world. Infrastructure is the means or
mechanism by which that instrumented data is made available, both locally
and remotely, across the enterprise. And finally, the applications are those
components that consume the instrumentation by using the infrastructure to
accomplish a given task, such as event reporting or inventory.

The Store Integration Framework approach to systems management embraces
open standards and provides both instrumentation and infrastructure.
Embracing instrumentation means that both hardware and software must be
enabled with standards-compliant instrumentation, which means they must
comply with Common Information Model (CIM) and/or be based on Java
Management Extensions (JMX). On the infrastructure side, Store Integration
Framework provides middleware for both in-store and enterprise-wide use.

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*Store Integration Framework
provides middleware for both in-
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*With the help of Store Integration
Framework, you can manage
the store and enterprise as a
continuum in a single holistic
environment.*

The in-store middleware will include an agent that can be deployed on both
J2EE and Microsoft .NET technology-type devices. The agent can take advan-
tage of both JMX and CIM-provided instrumentation and report it through
the rest of the Store Integration Framework infrastructure to the enterprise.

In traditional store environments, each device and application is managed
individually by a unique agent—or not managed at all. This not only makes
management difficult, it also inhibits retailers from deploying new applications
or devices, because nontechnical store staff do not have the time to monitor and
manage all of the individual components. Store Integration Framework, how-
ever, provides a management infrastructure with common agents that enable
you to manage the store and enterprise as a continuum in a single holistic envi-
ronment, thereby allowing you to monitor tools at the store level and propagate
events to the enterprise. In essence, it uses a three-tiered approach to monitor
store systems (applications, systems and devices) from the enterprise.

First, starting from the store floor, general agents (GAs), which are based
on standard JMX technology, monitor individual components, such as POS
systems, devices, kiosks and air conditioning systems. Second, master agents
(MAs), which live in the store server, track all of the GAs being used in a store
and notify the enterprise of any events. And third, at the enterprise level,
IBM Tivoli® Management Environment or other JMX-based management
system software notifies designated personnel when actions are required to
fix an issue. Since JMX is a published standard, any enterprise management
framework based on JMX can be used for monitoring and management. For
example, if a store kiosk runs out of paper, the GA would recognize the event
and prompt a JMX interface to send a message to the MA. The MA would
then send the information to the messaging service, such as a call center at

Figure 2: Systems management—converging to a common management structure
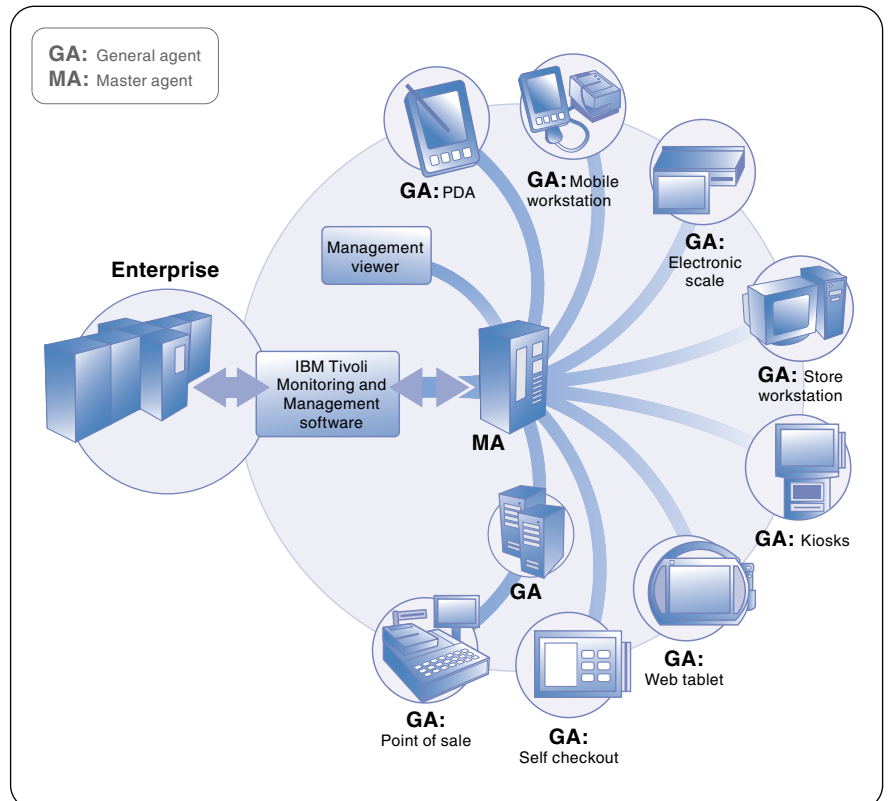
Store Integration Framework enables you to distribute updates and new applications automatically from the enterprise, reducing the challenges of not having an IT staff in the store.

headquarters, which manages events using Tivoli Management Environment software. The central management application or the call center personnel could then alert store personnel that someone needs to refill the paper in the kiosk. Additionally, updates and new applications can be distributed automatically from the enterprise, reducing the challenges of not having an IT staff in the store.

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*Store Integration Framework
provides a robust infrastructure on
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base infrastructure.*

The right services at the right time

Store Integration Framework is designed to provide a robust infrastructure
on which a you can rapidly experiment with, develop, test and implement
differentiating functions—be they new POS applications, a guided selling
application or an RFID solution—either on store servers or as a distributed
application across the enterprise and stores. Store Integration Framework
provides a common runtime with built-in management functions. It can also
enable you to customize an ISV package, develop a new application or extend
an existing system—all using a common runtime supported by a rich set of
tooling. This allows you to focus on getting new functionality running quickly
without having to constantly revamp or upgrade the base infrastructure.

The same design feature also enables ISVs and IHVs to focus on their func-
tional value-adds without spending precious resources on the runtime, tooling
and management infrastructure. With the ISV and IHV ecosystem bringing
more new function to market faster, you have more choices of new applica-
tions to select from for rapid implementation projects. For example, a specialty
retailer recently brought a J2EE POS application to production in record
time—and developed unique new store functions in parallel—using the SOA
supported by Store Integration Framework.

Built for retail to be operationally sound (robust and secure)

In the retail environment, high availability systems have long been mis-
sion critical in enterprise and POS business processes. And as new systems
are added to the store environment, their availability will also be essential
to promoting customer satisfaction and optimizing operations. IBM used its
deep experience with developing high-availability solutions for a variety of

Highlights

Store Integration Framework is designed to extend high availability capabilities from enterprise computing and the POS throughout the entire store environment.

Because it can help you reduce the cost of acquiring, deploying and supporting new technologies, Store Integration Framework has a lower TCO than proprietary solutions.

industries when it created the Store Integration Framework infrastructure. As a result, Store Integration Framework is designed to extend high availability capabilities from enterprise computing and the POS throughout the entire store environment. It also gives you unprecedented choices and flexibility over the hardware and software solutions you use to support availability — enabling you to choose what systems and data to protect as well as how to go about protecting them. Components in Store Integration Infrastructure are enabled by distributed runtime stacks (for example, IBM WebSphere® Application Server, WebSphere Application Server Embedded or Service Management Framework [SMF]-based stacks). They can, however, also be enabled by non-Java technology-based applications, such as C++, through a Java Native Interface (JNI).

Better controlling the IT infrastructure TCO
Because Store Integration Framework is based on open standards, it can help you contain the costs of managing, operating, enhancing and adapting your store systems. At the same time it allows you to protect and extend the value of existing technology investments. As a result — because it can help you reduce the cost of acquiring, deploying and supporting new technologies — Store Integration Framework has a lower TCO than proprietary solutions.

Going forward, Store Integration Framework will include elements of IBM's autonomic computing capabilities. Autonomic computing provides a system view of computing, which is modeled after self-regulating biological systems. Retailers could significantly benefit from autonomic computing, because IT skills aren't available in stores, yet the store must support advanced systems. The ability of systems to configure themselves for optimum performance and

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*Store Integration Framework
provides a data architecture and
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services that support the
information-driven enterprise.*

*You can build retail-optimized user
interfaces, using user interaction
services with the help of Store
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*IBM has established a proven full
life cycle management approach
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to heal and protect themselves is important to maintain the high availability
of mission-critical services at a low support cost. An autonomic system resolves
faults without manual intervention, proactively reports events and provides
problem diagnostic tools and efficient repair processes.

Data integrity and data availability are foundational IT underpinnings for
effective retailing. Clean and complete data available at the point of action
in the right timeframe enables fact-based decision making and execution of
retail processes. Store Integration Framework provides a data architecture
and synchronization and delivery services that support the information-
driven enterprise.

Store Integration Framework also enables you to build retail-optimized user
interfaces, using user interaction services. User interfaces for store employees,
managers and now consumers must be intuitive. New task-oriented interfaces
must be provided that are optimized for following peoples' actions and activi-
ties rather than being office and/or thought output oriented.

Store Integration Framework is optimized for store-relevant performance. In a
retail store the function at hand dictates the response time required. The user
paces the system—and should never be required to wait for a system to respond
before proceeding. For example, store personnel and consumers must never be
required to wait while scanning items—the system has to respond in the time it
takes to pick an item, scan it and place it in a bag or shopping basket.

Simplify life cycle management
Through our market-leading POS system, IBM has established a proven full
life cycle management approach for POS systems software, applications and
devices—including system deployment; fault detection, diagnosis and correction;

and upgrades. Store Integration Framework builds on this experience by applying a life cycle approach for all store systems, which is built on a combination of the following:

- *An IBM Rational® software tool that supports life cycle tooling for modeling through development, testing and deployment*
- *A middleware stack composed of WebSphere Application Server, IBM DB2® information management software and IBM WebSphere MQ advanced messaging services*
- *Tivoli management tools for system inventory, software distribution, remote monitoring and management, and other management facilities.*

Creating an environment that can flex with business needs

A flexible IT infrastructure is essential to developing the business solutions that enable you to respond with flexibility and speed to customer demands, market opportunities or external threats.

The retail industry is undergoing seismic shifts, with industry leaders moving to focus their operations on either low prices or first-rate service. And a flexible IT infrastructure is essential to developing the business solutions that enable you to respond with flexibility and speed to customer demands, market opportunities or external threats to support either approach.

Sized for the store, with room to grow

Store Integration Framework provides bundled, enterprise-class, industry-leading software and services that are preintegrated, packaged and configured for the retail topology and function set.

Not only does Store Integration Framework extend the enterprise infrastructure to the store, it provides bundled enterprise-class, industry-leading software and services that are preintegrated, packaged and configured for the retail topology and function set. You can transform operations and roll out enhancements using a phased approach that is based on your own schedule and needs. And whether your initial requirements are small or large, Store Integration Framework supports virtually unlimited scalability to help meet increasing business demands.

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Highlights

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*IBM is helping to simplify integration
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enable a wide range of devices
in the store, including kiosks,
handhelds, consumer-facing
devices, device concentrators
or proxy devices.*

Thin, browser-based client device deployment

IBM also is helping to simplify integration by actively participating in the
development and use of standards-based integration interfaces, such as compo-
nents. The components concept includes a standards-based interface (based on
WSDL) and standards-based runtime (Java virtual machine [JVM], SMF and
embedded application server). Over time the components concept will extend
the enterprise service bus concept to enable process choreography in compos-
ing, developing and deploying integrated functions for in-store applications.
Eventually, you will be able to use components for device-to-POS integration,
application-to-POS integration and application-to-application integration.

Support for retail-specific devices

A wide range of devices in the store — including kiosks, handhelds, consumer-
facing devices, device concentrators or proxy devices — can be enabled by
Store Integration Framework. Store Integration Framework supports common
management and file/data transfer for both Java technology-based devices and
other device types with the help of agents based on JMX, SMF and the CIM.
As a result you can use Store Integration Framework to enable and support
everything from digital-media-based smart scales to more common devices,
such as barcode scanners, biometric scanners and MICR (magnetic ink char-
acter recognition) readers.

Operations in a retail store involve many application systems. Some run in
the store to provide optimal performance. Some run on enterprise servers for
better access to corporate systems. Some operate with a distributed architec-
ture with various system components running in the store, while others run
in the enterprise data center or in an application services provider's (ASP)

Store Integration Framework allows you to easily move workloads between the store and enterprise to deploy or back up IT resources based on business needs.

Store Integration Framework enables you to transform business processes by deploying new front- and back-office applications quickly and efficiently.

hosted environment. Many retailers have decided to redeploy some in-store applications to run in the enterprise data center, creating a "thinner" store environment, while at the same time bringing new store applications into the store environment.

Web technologies enable retailers to use a common browser interface to access either in-store or enterprise applications. The Store Integration Framework J2EE architecture allows you to move workloads in either direction—in-store or at the enterprise—to deploy or back up IT resources based on business needs. An example of a store device accessing a central application is the Store Manager's Workbench, which is based on a centrally run portal application (IBM WebSphere Portal Server). From their PDA browsers, managers can access the Store Manager's Workbench application and other in-store applications, such as data reports on the POS application server. The same idea could be applied to access enterprise inventory applications. Or for environments that are conducive to browser-based interaction (low transaction volume, low item count per transaction), even a POS application could be built based on accessing centrally run applications.

Innovation in action: supporting leading-edge retail applications

Store Integration Framework enables you to transform business processes by deploying new front- and back-office applications quickly and efficiently. From customer assistance and self-service to sales and merchandising to employee and inventory management, you have the freedom to choose retail-optimized solutions from a wide selection of independent vendors.

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*Store Integration Framework
allows you to develop, deploy and
manage applications using one
consistent approach on a shared
infrastructure, helping to reduce
IT TCO.*

Once in place, Store Integration Framework can assist you in experimenting with, perfecting and quickly executing new ideas—at a relatively low TCO. The low TCO is possible because the same infrastructure can be shared by multiple applications that are developed, deployed and managed in one consistent approach. It also increases operational flexibility by allowing you to move processing power back and forth between the store and enterprise at deployment time in support of changing business requirements. For example, you could start transforming an in-store inventory application by developing and deploying a new application to run in the store. As business requirements change, you could centralize some of the processing onto the enterprise systems. You could also use the enterprise system as the backup for in-store systems. This deployment and operational flexibility is enabled by the underlying J2EE infrastructure—a single, common application infrastructure that spans the enterprise and stores with a common integration bus and a common management infrastructure.

Figures 3 through 5 illustrate how the SOA enables the data and information flow for three different solution types—all enabled by Store Integration Framework. Figure 3 shows how RFID technology can help streamline inventory management. Figure 4 illustrates how you can use Store Integration Framework to empower employees to improve productivity. And figure 5 provides an example of how Store Integration Framework can help improve the customer shopping experience to increase loyalty and sales.
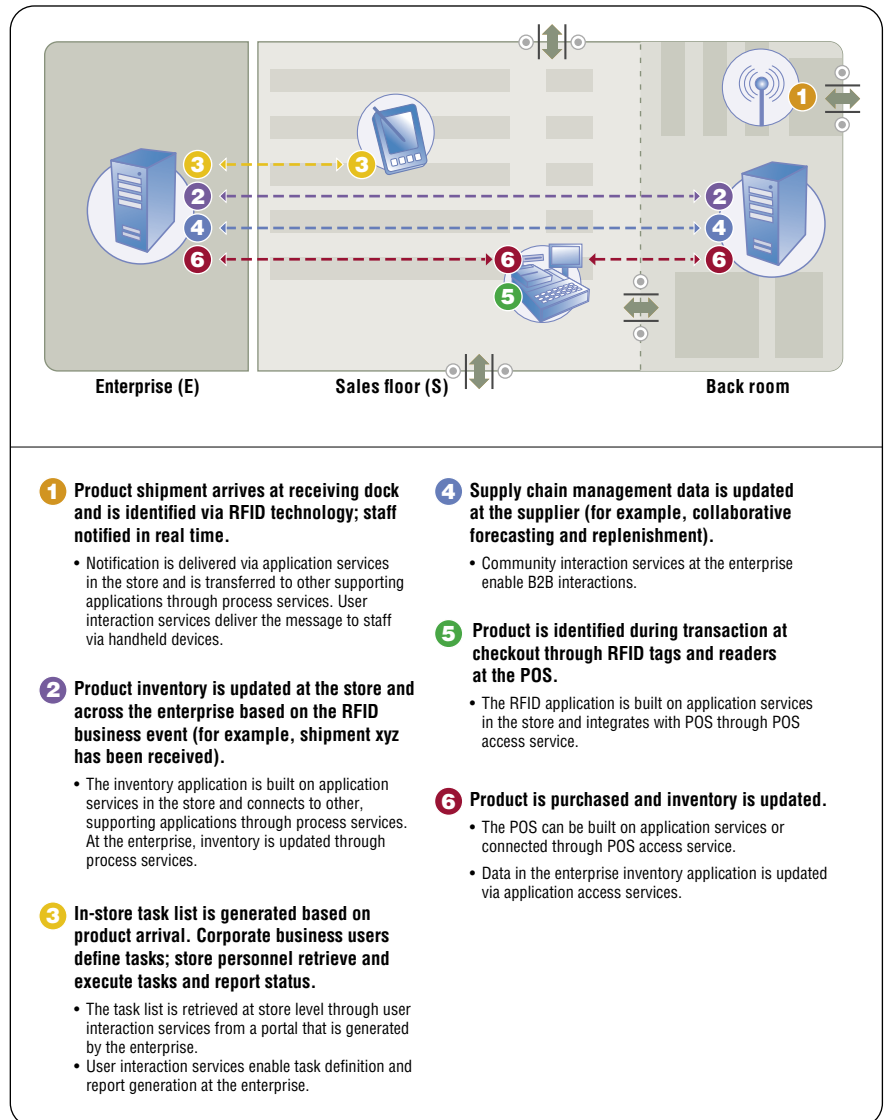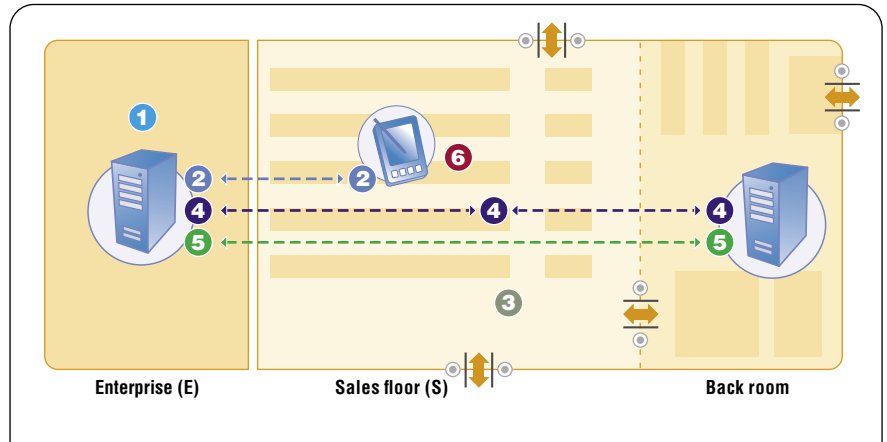
Figure 3: Innovation in action—operational efficiencies

Enterprise (E)   **Sales floor (S)**   **Back room**

1 Product shipment arrives at receiving dock and is identified via RFID technology; staff notified in real time.

- Notification is delivered via application services in the store and is transferred to other supporting applications through process services. User interaction services deliver the message to staff via handheld devices.

2 Product inventory is updated at the store and across the enterprise based on the RFID business event (for example, shipment xyz has been received).

- The inventory application is built on application services in the store and connects to other, supporting applications through process services. At the enterprise, inventory is updated through process services.

3 In-store task list is generated based on product arrival. Corporate business users define tasks; store personnel retrieve and execute tasks and report status.

- The task list is retrieved at store level through user interaction services from a portal that is generated by the enterprise.
- User interaction services enable task definition and report generation at the enterprise.

4 Supply chain management data is updated at the supplier (for example, collaborative forecasting and replenishment).

- Community interaction services at the enterprise enable B2B interactions.

5 Product is identified during transaction at checkout through RFID tags and readers at the POS.

- The RFID application is built on application services in the store and integrates with POS through POS access service.

6 Product is purchased and inventory is updated.

- The POS can be built on application services or connected through POS access service.
- Data in the enterprise inventory application is updated via application access services.

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Figure 4: Innovation in action—employee view

Enterprise (E)   Sales floor (S)   Back room

1 Enterprise designs tasks for store manager.

- Applications:
  - Task management application residing on portal (E)—By means of a portal user interface, corporate business users define tasks and make them available for store managers and associates.
- Functional service:
  - Store level–User interaction services (portal).
  - Enterprise level–User interaction services (portal), application access services.

2 Store manager receives tasks for assignment and monitoring.

- Applications:
  - Task management application residing on portal (E)–Store manager retrieves tasks from corporate via a portal user interface.
- Functional service:
  - Store level–User interaction services (connects to portal).
  - Enterprise level–User interaction services.

3 Store manager delegates tasks to associates for execution.

- Applications:
  - Task management application residing on portal (E)–Store employees can retrieve tasks and report status from many devices that are connected to the portal. They can also access local applications through an applet with a browser.
- Functional service:
  - Store level–User interaction services facilitate portal access; application access services provide access to local applications.
  - Enterprise level–Portal based on user interaction services.

4 Store manager sends task results and other store data to the enterprise.

- Applications:
  - Time and attendance and task management application (S)–Store data, such as information about task completion, scheduling and employee attendance can be seamlessly shared with corporate.
- Functional service:
  - Store level–Other store applications can be built on top of the application services.
  - Enterprise level–Data access services are used to access information from the portal.

**5 Store performance data is organized as key performance indicators (KPIs).**

- Applications:
  - KPI tracking and report (E)–Enterprise analytics applications analyze current and historic data to generate KPIs and post them on the portal.
- Functional service:
  - Enterprise level–Data access services enable analytics applications to access and process data.

6 Store manager uses KPIs to prioritize in-store tasks.

- Applications:
  - IBM On Demand Workplace™ Portal (E)—A portal interface allows the store manager to access multiple applications, including the KPI indicators.
- Functional service:
  - Store level–User interaction services to access portal.
  - Enterprise level–User interaction services to drive the portal applications and integrate with other systems.

Figure 5: Innovation in action—customer view

Enterprise (E)   Sales floor (S)   Back room
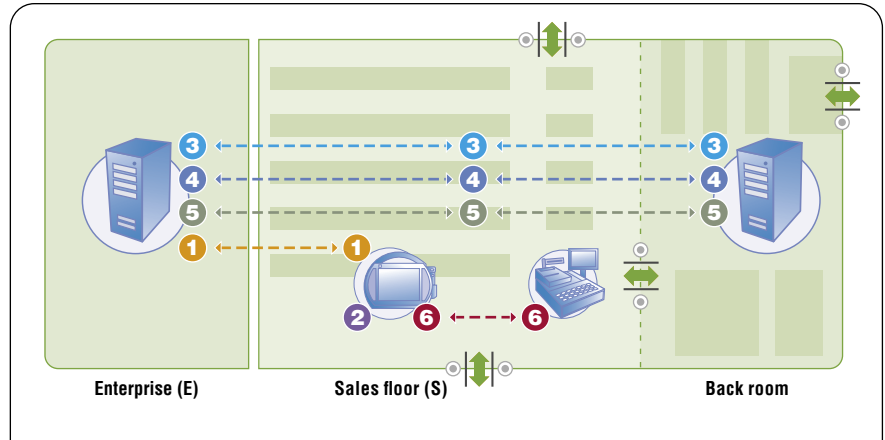
1 **Customer uses a personal shopping assistant and scans loyalty ID card to retrieve personalized shopping information.**

- User interaction services in the store enable customers to enter loyalty IDs via multiple devices. Customer profile is retrieved through data access services at the "home store."

- Data access services access customer information at the enterprise when customers are not at their home store. The store and enterprise bus makes this two-step search seamless.

2 **Customer is presented with one-to-one offers on the personal shopping assistant device based on loyalty data, promotional programs and guided selling capabilities.**

- The guided selling application is built on application services in the store.

- Merchandising applications are built on application services at the enterprise to produce dynamic, one-to-one special offers.

3 **Customer selects an item and is presented with additional, targeted offers.**

- User interaction services in the store drive the user interface.

- Catalog and product information are accessed through information services at the enterprise.

4 **Customer is presented with offers based on product availability, offering alternative choices and/or to specify deliver dates.**

- Process services in the store connect to process services at the enterprise to integrate data.

5 **Customer is presented with additional services (non-SKU items), including delivery, installation and warranty information.**

- Process services in the store and at the enterprise integrate data across multiple special services applications.

- Community services at the enterprise integrate with service providers through B2B integration.

6 **The personal shopping assistant transfers order to POS or payment station; customer selects payment option for fast checkout.**

- Multiple services are involved during the checkout process. Application services are used to build the personal shopping application, which integrates with the POS via POS access services.

- Community services at the enterprise integrate with payment switches to process transactions.

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*Store Integration Framework
delivers an end-to-end infrastructure
solution comprising industry-
leading software technologies.*

Technology underlying IBM Store Integration Framework

IBM offers Store Integration Framework as a complete, end-to-end infrastructure solution that is compatible with most major retail operating systems—including Microsoft Windows®, the IBM Retail Environment for SUSE LINUX and IBM 4690 Operating System—and is available today.

IBM WebSphere Remote Server software provides the core components of Store Integration Framework. It is a bundled group of enterprise-class, industry-leading software that is now preintegrated, packaged and configured for the store environment, providing a consistent, dependable design that eliminates the challenges of creating a proprietary architecture. IBM WebSphere Remote Server software includes the following components:

- *IBM WebSphere Application Server—Provides the foundation for a true Web-based environment for the store. J2EE platform-compliant, it enables you to create and integrate simple browser-based applications and business components within the store for use on thin-client devices.*
- *IBM WebSphere MQ advanced messaging services—Provide standard, assured-delivery messaging for all applications within the store.*
- *IBM DB2 information management software—Delivers an American National Standards Institute (ANSI) Structured Query Language (SQL) relational database to manage information within the store environment. IBM DB2 Information Integrator software synchronizes data between the store and the enterprise, and stores local data to support customer-focused store operations.*

<cursor>IBM

IBM WebSphere Remote Server System Management Accelerator for retail software enables you to offload IT management responsibilities from store personnel and consolidate them at the enterprise level.

• *IBM Tivoli management and monitoring software—Provides sophisticated systems management capabilities for the store environment. IBM Tivoli Enterprise Console® and IBM Tivoli Monitoring software can provide the status of devices and applications, and can help you proactively manage hardware and software storewide.*

The next layer in Store Integration Framework, IBM WebSphere Remote Server System Management Accelerator for retail software, provides remote installation support and systems management components for JMX instrumentation of any device or software solution. This enables you to offload IT management responsibilities from store personnel and consolidate them at the enterprise level, thus reducing costs and freeing resources to focus on more critical tasks. It is currently available for both Windows and Linux environments.

Additional extensions to Store Integration Framework include the following optional offerings and services:

• *RFID Extension—Delivers RFID filtering and management (IBM RFID add-on).*
• *Digital Media Extension—Enables the integration of content management engines with display technologies.*
• *Retail Data Extension—Supports transaction log (TLOG) handling to transform and move POS data to headquarters.*
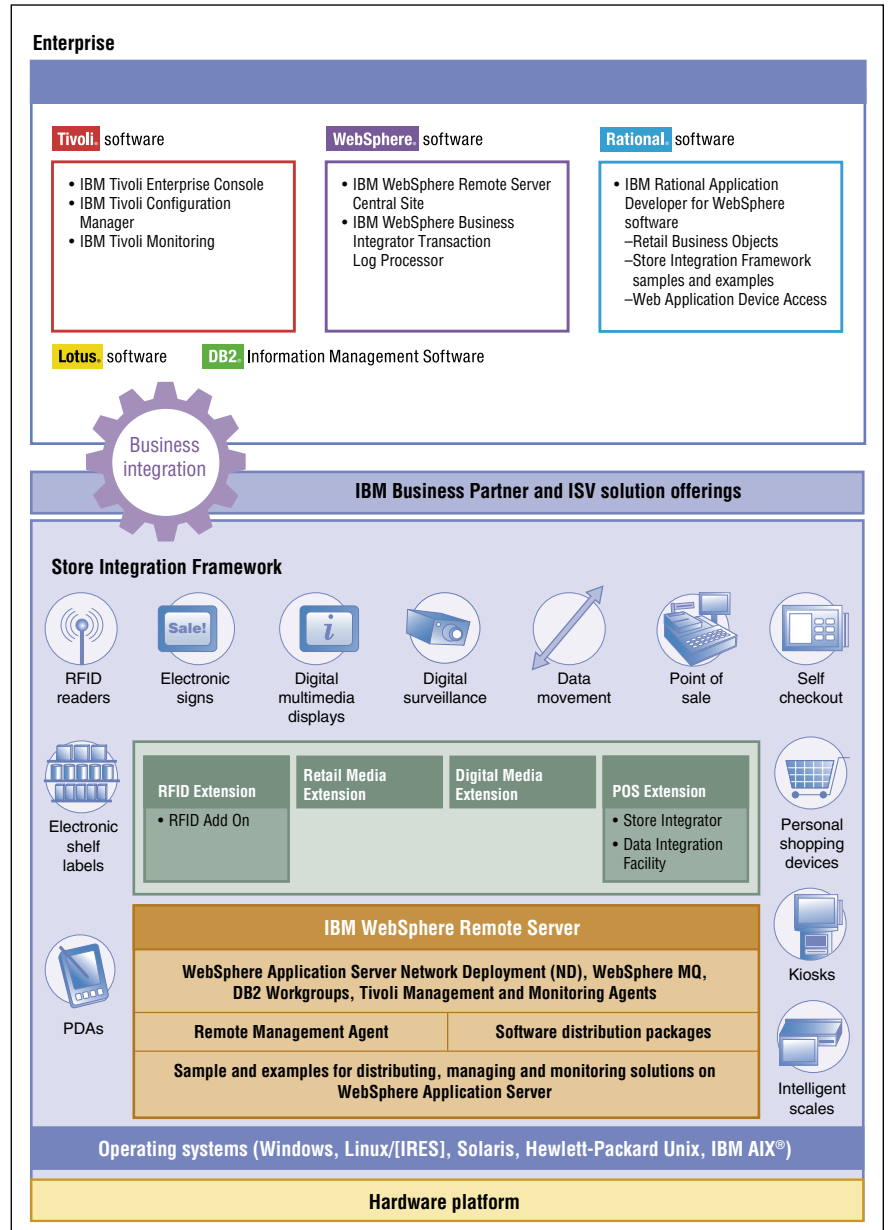
• *POS Extension—Gives other applications access to POS data and business
logic through either of the following tools:*
  – *IBM Store Integrator—Delivers an open, Java technology-based API that
    enables you to reuse existing business logic via numerous heterogeneous
    devices and various IBM Business Partner and ISV applications.*
  – *IBM Data Integration Facility—Unlocks access to information by provid-
    ing transfer and translation tools to support open standards. Data that's
    been translated into industry-standard formats can be integrated easily
    with existing store technology environments, facilitating real-time data
    exchange throughout the store.*

Because every store has unique needs, Store Integration Framework also
includes numerous individual extensions that can be added to the Remote
Retail Server and purchased separately.

***Store Integration Framework can
be used to connect the enterprise
to store processes.***

Store Integration Framework can also plug into the enterprise. It can be
used to connect the enterprise to store processes, and—with the help of IBM
WebSphere Business Integration software—it can integrate ISV applications
at the enterprise level, making valuable data available to store employees, for
example. Tivoli and WebSphere applications are also used to centrally manage
store environments from the enterprise.

Figure 6: Technology underlying Store Integration Framework

Enterprise

Tivoli. software
- IBM Tivoli Enterprise Console
- IBM Tivoli Configuration Manager
- IBM Tivoli Monitoring

WebSphere. software
- IBM WebSphere Remote Server Central Site
- IBM WebSphere Business Integrator Transaction Log Processor

Rational. software
- IBM Rational Application Developer for WebSphere software
  – Retail Business Objects
  – Store Integration Framework samples and examples
  – Web Application Device Access

Lotus. software   **DB2.** Information Management Software

Business integration

IBM Business Partner and ISV solution offerings

Store Integration Framework

RFID readers | Electronic signs | Digital multimedia displays | Digital surveillance | Data movement | Point of sale | Self checkout

Electronic shelf labels

RFID Extension
- RFID Add On

Retail Media Extension

Digital Media Extension

POS Extension
- Store Integrator
- Data Integration Facility

Personal shopping devices

IBM WebSphere Remote Server

WebSphere Application Server Network Deployment (ND), WebSphere MQ, DB2 Workgroups, Tivoli Management and Monitoring Agents

Remote Management Agent   **Software distribution packages**

Sample and examples for distributing, managing and monitoring solutions on WebSphere Application Server

PDAs

Kiosks

Intelligent scales

Operating systems (Windows, Linux/[IRES], Solaris, Hewlett-Packard Unix, IBM AIX®)

Hardware platform

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*Through centralized control and
distributed execution, IBM can
help you speed ROI, reduce TCO
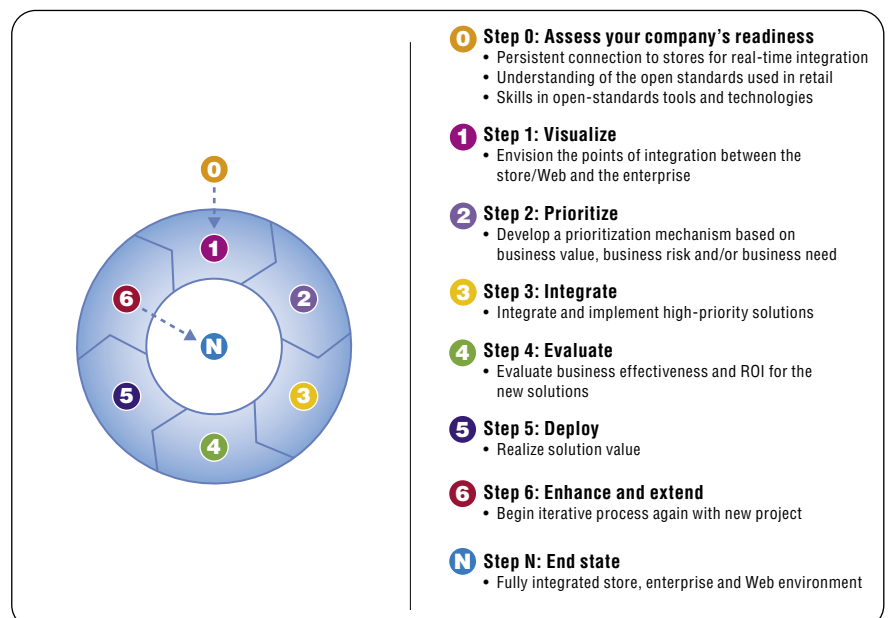and respond to changing business
needs today and in the future.*

*Store Integration Framework
provides a flexible migration path,
tailored to your business needs and
existing technology investments.*

Getting started: the IBM transformation roadmap

You need to respond dynamically to changes—in the market and in partner and customer demands. To this end, IBM provides structure along with flexibility. Through centralized operational control and distributed execution, our solutions offer the ability to meet changing needs today and in the future. We can help you deploy faster and provide you with a short- or long-term migration path that makes sense for your business. And we help you do it quickly—and continually.

We not only understand the complexity of your market, we know your existing technologies and those at the leading edge of retail innovation. We have applied our industry, technology and business expertise to optimize our solution for retail. Because we understand how the retail business works at a process level, we can help you merge technology with retail operations to speed your ROI and reduce your TCO.

Figure 7: Implementation roadmap for IBM Store Integration Framework

0 Step 0: Assess your company's readiness
• Persistent connection to stores for real-time integration
• Understanding of the open standards used in retail
• Skills in open-standards tools and technologies

1 Step 1: Visualize
• Envision the points of integration between the store/Web and the enterprise

2 Step 2: Prioritize
• Develop a prioritization mechanism based on business value, business risk and/or business need

3 Step 3: Integrate
• Integrate and implement high-priority solutions

4 Step 4: Evaluate
• Evaluate business effectiveness and ROI for the new solutions

5 Step 5: Deploy
• Realize solution value

6 Step 6: Enhance and extend
• Begin iterative process again with new project

N Step N: End state
• Fully integrated store, enterprise and Web environment

With Store Integration Framework, you get an all-encompassing infrastructure solution and a flexible migration path, tailored to your business needs and existing technology investments. It provides:

- *Common runtime services to enable new applications.*
- *Management agents and infrastructure to manage operations, applications and devices.*
- *Adapters, components and process services to facilitate integration.*

You can begin revolutionizing your store environments using any layer of Store Integration Framework.

Because it is standards based, you can begin revolutionizing your store environments using any layer of Store Integration Framework, and test and deploy innovative solutions rapidly. And you can more easily sustain growth based on demand because the infrastructure easily grows with your business. IBM can support you at every stage of the journey, from planning and development through final rollout. We can help you get started with Store Integration Framework in the areas where you will see the greatest payback—based on your current environment—and then evolve and expand. For example, you could start with any of the following steps:

IBM can help you determine the areas where Store Integration Framework will provide the greatest payback, based on your current environment.

- *POS integration—Apply IBM's POS integration APIs or the POS integration components to enable new POS applications or to enable new devices to access POS logic.*
- *Web enablement of stores—Implement Web-based applications in your stores with the help of the IBM WebSphere Remote Deployment software stack to create a new shopping experience, empower employees and/or streamline store operations. These applications can run on the same J2EE technology-based software on the enterprise side.*
- *Enterprise integration—Use Store Integration Framework utilities to move data and content to and from stores, to manage store applications and devices, or to enable portal-based applications on in-store devices (for example, a POS terminal equipped with a browser, personal digital assistant [PDA] and Internet Protocol [IP] phone).*

IBM is also developing an ecosystem of strategic alliances with leading retail-focused application providers. They are leveraging Store Integration Framework to build, integrate and deploy their solutions, which span virtually every aspect of the store environment.

Conclusion

Speed, choice and value. Responsiveness reigns in the high-demand retail world, because it allows you to generate a competitive advantage. You must act faster, choose more strategically and generate greater return on your investments than your competitors do. To this end, you need an infrastructure that enables you to sense change — and to respond by rapidly adopting the right solution at the optimal point in your value chain. Store Integration Framework delivers a resilient, flexible operational infrastructure that allows you to optimize speed, choice and value throughout your enterprise. And with a proven industry track record, IBM provides a single source for end-to-end retail solutions. We're ready to get started when you are.

For more information

To learn more about the IBM On Demand Operating Environment for retail and IBM Store Integration Framework, please visit:

ibm.com/industries/retail

For retailers

To learn more about integrating new store solutions using IBM Store Integration Framework, please contact Meenagi Venkat, director of technical sales - Retail Emerging Business Opportunity, at meenaji@us.ibm.com, or call 1 732 926-2537.

For IBM Business Partners and independent software vendors

To find out more about leveraging IBM Store Integration Framework to deliver solutions faster for your retail clients, please contact Edward Bottini, partnership manager - Retail Emerging Business Opportunity, at ebottini@us.ibm.com, or call 1 714 438-6335.