

IBM WebSphere Business Integration Collaborations for
Product Information Management, Version 1.1.0
IBM WebSphere Business Integration Collaborations for
Retail Message Manager, Version 4.4.0



Solution Overview

Note

Before using this information and the product it supports, read the information in "Notices" on page 15.

Eighth Edition (July 2004)

This edition applies to Version 4, Release 4, IBM WebSphere Business Integration Collaborations for Retail Message Manager, Version 4.4.0 (5724-H63) and IBM WebSphere Business Integration Collaboration for Product Information Management 1.1.0 (5724-H64)

This document contains proprietary information of IBM. It is provided under a license agreement and is protected by copyright law. The information contained in this publication does not include any product warranties, and any statements provided in this manual should not be interpreted as such.

Order publications through your IBM representative or the IBM branch office serving your locality or by calling 1-800-879-2755 in the United States or 1-800-IBM-4YOU in Canada.

When you send information to IBM, you grant IBM a nonexclusive right to use or distribute the information in any way it believes appropriate without incurring any obligation to you.

Contents

Chapter 1. Industry trends and challenges	1
--	----------

Chapter 2. Solution description.	3
---	----------

Chapter 3. Architecture	5
--------------------------------	----------

Types of integration	5
----------------------	---

Solution architecture.	6
------------------------	---

Chapter 4. Components	9
------------------------------	----------

Business objects	9
------------------	---

Collaboration templates	10
-------------------------	----

IBM WebSphere Business Integration Collaboration for Retail Message Manager	10
--	----

IBM WebSphere Business Integration Collaboration for Product Information Management	11
---	----

Connectors	13
------------	----

IBM WebSphere MQ Workflow	14
---------------------------	----

Data mapping templates	14
------------------------	----

Notices	15
----------------	-----------

Copyright license	17
-------------------	----

Programming interface information	17
-----------------------------------	----

Trademarks	17
------------	----

Chapter 1. Industry trends and challenges

The retail industry is facing many challenges in the competitive business environment of the new century. Evolving market forces, from a sluggish economy to increasingly intense competition, are leading retailers to revisit their business models.

Retail companies must focus on reducing costs and minimizing the time required to bring products to market. The need for integration software is growing quickly as companies require management of high volumes of transactions, while attempting to automate and optimize their businesses at the process level. Integration can enable automation of tedious, error-prone tasks, reducing labor and error-tracking costs. Integration across multiple sales channels can improve the customer experience and increase brand loyalty. However, retailers require process integration that is specific to their industry, and in order to implement this integration, different companies must be able to rely on standardized data.

Before retailers can effectively use product data in internal systems such as store operations, order management, warehouse management, logistics management, and merchandising, both supplier and retailer data must be updated and conform with an industry standard. But trading partners typically do not have a systematic feedback mechanism with each other to know when the product data in their respective computer systems is actually correct and synchronized.

The emergence of UCCnet, a third-party external exchange that provides product registry services enabling synchronized item and location data between trading partners, has brought new opportunities for manufacturers and retailers. UCCnet can facilitate both the exchange of standards-compliant data and end-to-end business process management. The Product Information Management for Retailers solution enables retailers to synchronize their product data both inside and outside of their enterprise.

Chapter 2. Solution description

The Product Information Management for Retailers solution addresses retailers' needs by helping them to:

- Maximize the results from their e-business initiatives as well as from investments in applications and systems.
- Accelerate their product-to-shelf times.
- Decrease costs by reducing or eliminating errors associated with manual re-keying of product data received from their suppliers.

Business integration based on IBM® e-business technology not only enables manufacturers, suppliers, and retailers to improve the quality of item data, but opens additional possibilities for enterprise collaboration and process optimization that can generate increased revenue, reduce costs, and provide competitive advantage.

To process inbound data, the solution utilizes modules called *collaboration templates*, which contain the business logic. Detailed information about these collaboration templates is included in the section "Collaboration templates" on page 10.

By utilizing a series of collaboration objects based on various collaboration templates, together with business objects, connectors, maps, and managed WebSphere® MQ Workflow (which automates retailers' item data review/approval processes), the following tasks can be successfully automated:

- Sending and receiving data to and from the UCCnet standard registry
- Validating that the data meets the retailers' standards, helping manage the item approval process
- Storing and retrieving the item data during the item review/approval process
- Publishing approved item data to other enterprise systems

Note: The term *connector* used throughout refers to the runtime portion of an IBM WebSphere Business Integration Adapter.

The result is a highly efficient solution that can jump-start integration into the UCCnet registry, reduce operational costs and errors, increase sales by providing the accurate, timely data needed for educated business decisions, and increase market share by accelerating product-to-retail shelf cycles.

Chapter 3. Architecture

WebSphere Business Integration for Retail Distribution solutions provide a scalable framework that allows businesses to interconnect multiple disparate processing entities (such as applications, systems, and human resources) within an enterprise context. The solutions connect data and processing entities in a way that fully leverages existing applications and integrates them with new applications. The resulting efficiencies in total system integration provide increased return on investment and business value to the enterprise.

The Product Information Management for Retailers solution is based upon WebSphere technology, which provides pre-built integration components, including collaboration templates, an integration hub, maps, connectors, and business objects, enabling swift integration of disparate applications. The integration hub is a scalable, reliable, and secure environment for business integration, providing the following benefits:

- A centralized, common view of enterprise-wide data and processes
- A comprehensive set of technical services
- A logical, distributed hub-and-spoke architecture
- Data and messaging format independence

For a detailed description of the integration hub, refer to the following:

- Technical Introduction to IBM WebSphere InterChange Server
- Implementation Guide for WebSphere InterChange Server

Types of integration

WebSphere business integration systems facilitate two main types of integration:

- Information Connectivity and Integration
- Process Integration

Information Connectivity and Integration (ICI) is the coupling of heterogeneous application information and data. Connectivity between applications is a fundamental starting point for Information Integration solutions. As connectivity configurations and topologies grow in complexity, additional considerations involve the management of information and data delivery from one application to another (for example, routing rules and data transformation). ICI provides routing and data integration functionality. It routes its information between endpoints, leaving decisions on what actions to take next to the senders and receivers. ICI focuses on *where* data is located and handles data normalization.

Process Integration (PI) is the implementation of internal and external business processes in a way that fully utilizes IT systems to add efficiency and flexibility within an enterprise. Process Integration includes functions required for traditional business process management solutions. Typically, PI solutions begin with a focus on processes internal to the enterprise and evolve to include processes that fully integrate external partners. This external integration requires functions that support business-to-business interaction management. PI focuses on *what* data is needed and *how* that data is used.

Solution architecture

With the Product Information Management for Retailers solution, internal and external collaborative processes are linked throughout the operations of an enterprise. It provides the platform, connectors, and tools to integrate applications, data models, and process workflows, creating a more efficient, uniform, and responsive business environment, both within the enterprise and between the enterprise and its trading partners. The architecture is based on layers of functionality listed below in order from top-most layer to bottom-most layer:

Solution Studio layer

This top-most layer contains tools such as the System Manager, Business Object Designer, Process Designer, Map Designer, and Relationship Designer.

Industry Libraries layer

This layer contains the IBM WebSphere Business Integration Collaborations for Product Information Management and IBM WebSphere Business Integration Collaborations for Retail Message Manager.

Runtime Solutions layer

Controlled within this layer are B2B integration, user experience integration, process choreography, application and information integration, and the interaction of logical components in any particular solution deployment (through the integration hub).

Common Solution and Integration Services layer

Controlled within this layer are the directory, security, messaging, audit log, exception, process management, portal, and gateway.

WebSphere Platform layer

This layer holds WebSphere Application Server, WebSphere MQ, the database, and WebSphere MQ Workflow.

Infrastructure layer

This layer's information is hosted in data centers (network, operating system, hardware).

The Solution Studio provides a common build environment for applications and solutions. The artifacts that make up the Product Information Management for Retailers solution within the Industry Libraries layer consist of collaboration templates, IBM WebSphere application adapters, message sets, and business objects. The collaboration templates are built on Runtime Solutions layer components, including the integration hub, in any particular solution deployment. In this architecture, the ICI layer (contained within Common Solution and Integration Services) provides the connection between the business process definitions, located within the Runtime Solutions layer, and the WebSphere platform and existing infrastructure, which hold the business functions operating on legacy systems.

ICI executes the state transitions, required by Process Integration (contained within the Runtime Solutions layer) to traverse the business processes that drive the integration architecture, in a way that allows these business processes to be reused. The primary goal of ICI is to provide loose coupling of the business functions to the business process so that either or both can be independently enhanced over time.

To achieve this goal, ICI must provide message routing and transformation services against a granular set of messages in the particular message model utilized

between PI and ICI. This approach ensures that the interactions that leverage the coupling of the functions and the navigation are a normalized implementation of the message vocabulary, and as such, are independent of the systems providing the functions. By taking this approach, systems can be integrated without needing to be continually adjusted as other aspects of the topology are changed. This approach also simplifies the architecture because it positions all process choreography within the PI layer, so that it reflects all aspects of the business process.

Process integration requirements involving only automated processing are addressed using IBM integration technology in the form of layered collaboration templates, which are discussed in detail in the section “Collaboration templates” on page 10.

Chapter 4. Components

The Product Information Management for Retailers solution is composed of business objects, collaboration objects, connectors, maps, and managed workflow. These basic components work together to enable a demand-side trading partner to receive item data from a supply-side trading partner through a global data registry such as UCCnet, and to process the data for completeness, approval, and eventual update to back-end systems. The solution also delivers appropriate responses to the registry.

Note: The following sections outline the basic Product Information Management for Retailers solution components at a high-level. For descriptions of hardware and software prerequisites, as well as detailed product component configuration, see Installation.

Business objects

Business objects are logically equivalent to messages. Each contains a transaction type (for example, Create or Update) and associated data, and is communicated across various interfaces to multiple processing entities in a solution (that is, collaboration objects or managed workflow). Multiple business objects are used to transform data from one format to another and to trigger processing events as the business processes progress. The Product Information Management for Retailers solution includes the following business objects which hold item data and attributes:

Business object	Usage
UCCnetDTD_envelope	UCCnet DTD XML definition type and iSoft connectivity
UCCnetTPIDTD_envelope	UCCnet DTD XML definition type and TPI connectivity
UCCnetJMSDTD_envelope	UCCnet DTD XML definition type and WebSphere Business Integration Connect is used with Java™ Message Service
UCCnetXSD_envelope	UCCnet XSD XML definition type and iSoft connectivity
UCCnetTPIXSD_envelope	UCCnet XSD XML definition type and TPI connectivity
UCCnetJMSXSD_envelope	UCCnet XSD XML definition type and WebSphere Business Integration Connect is used with Java™ Message Service.
UCCnetGBO_envelope	A form of the UCCnetXSD_envelope business object with certain predefined attribute values.
Retail_Item	Includes item data and attributes in the format required for processing by the individual retailer (including retailer-specific extended item attributes).
Retail_Price	Holds price and price bracket data in the format based on UCCnet message response.

Business object	Usage
Retail_Audit	Provide internal audit data information for better manageability.
Retail_Error	Provide internal error information for better manageability.

Various other business objects are used for temporary data storage during processing.

Collaboration templates

Automated machine-to-machine processing is performed by objects based on *collaboration templates*. Objects based on these templates manage the flow and the execution of business process and integration logic within the solution. Collaboration objects run on an integration hub, are bound to connectors or other collaboration objects, and subscribe to specific events triggered by business objects.

In the Product Information Management for Retailers solution, several objects built on collaboration templates are used to exchange data with UCCnet, manage requests for additional supplier information, validate the contents of the data, route the data through a review or approval process, temporarily store data during review/approval processing, and synchronize the validated data with other applications throughout the enterprise.

The solution is made up of two artifacts, each of which contains one or more collaboration templates at the application/information integration level:

- “IBM WebSphere Business Integration Collaboration for Retail Message Manager”
- “IBM WebSphere Business Integration Collaboration for Product Information Management” on page 11

The following sections describe the uses of the collaboration templates included in the Product Information Management for Retailers solution.

IBM WebSphere Business Integration Collaboration for Retail Message Manager

Collaboration objects created from these collaboration templates handle the dialogs that communicate with UCCnet, providing a streamlined process for receiving XML data from the UCCnet standard product registry, for initiating processing of this data, and for sending responses back to UCCnet. The collaboration templates include the following:

UCCnetMessageReceive collaboration template

A collaboration object based on the UCCnetMessageReceive collaboration template handles and filters incoming messages. An incoming XML document is in the form of a UCCnet worklist. This worklist contains multiple messages to be processed. Due to the need to properly respond to each message, as well as to ensure that no data loss occurs, a UCCnetMessageReceive collaboration object parses this worklist into the individual messages and enables persistence of each message in a message store. A UCCnetMessageReceive collaboration object allows customizations based on individual customer situations to be added before the item data contained in the message is transformed into a Retail_Item business object.

It also prevents duplicate items from being processed by enabling persistence of an item identifier to an identifier store.

UCCnetMessageSend collaboration template

A collaboration object based on the UCCnetMessageSend collaboration template handles outgoing messages. It accepts a Retail_Item business object and, based on the value of a status attribute in the business object, responds appropriately to UCCnet.

IdentifierStore collaboration template

A collaboration object based on the IdentifierStore collaboration template serializes a UCCnetGBO_identifier business object. In the context of the solution, an IdentifierStore collaboration object is called by UCCnetMessageReceive and UCCnetMessageSend collaboration objects to store or delete the item's unique identifier in or from the identifier store. Retrieve and Update actions are also supported. Having the item's unique identifier stored prevents the solution from processing duplicate items received from UCCnet. To simplify solution configuration, this collaboration template is built from the DataStore collaboration template and is preconfigured to accept and serialize a specific business object into XML and store it in a database table.

MessageStore collaboration template

A collaboration object based on the MessageStore collaboration template serializes a UCCnetGBO_storable business object. In the context of the solution, a MessageStore collaboration object is called by the UCCnetMessageReceive, and UCCnetMessageSend collaboration objects to store, retrieve, or delete the message header information in or from the message store. The Update action is also supported. Having the message header information stored enables the message to be used in return messages. To simplify solution configuration, this collaboration template is built from the DataStore collaboration template and is preconfigured to accept and serialize a specific business object into XML and store it in a database table.

UCCnet_requestWorklist collaboration template

A collaboration object based on the UCCnet_requestWorklist collaboration template sends query commands to UCCnet via the AS2 channel connector. These requests obtain the notifications in the retailer's worklist which result from previous item sync UCCnet messages and responses from trading partner suppliers. A UCCnet_requestWorklist collaboration object is triggered when it receives a UCCnetGBO_envelope business object from the JTextRWLConnector. The JTextRWLConnector sends this triggering business object after it polls an input file folder and discovers an XML message that contains a UCCnet worklist query command.

IBM WebSphere Business Integration Collaboration for Product Information Management

Collaboration objects created from these collaboration templates validate the item data, help manage the item approval process, manage the processes used to temporarily store, update, retrieve, and delete data during the review and approval processes, and allow e-mail notifications to be sent for various processing results and error conditions. The collaboration templates include the following:

ItemValidation collaboration template

A collaboration object based on the ItemValidation collaboration template validates the item data to ensure it is correct, complete, and of the proper format. It accepts or rejects a business object based on customized business

policy rules, evaluates an accepted business object based on a customized list of required attribute data, and directs the business object to the appropriate processing port based on the results of the evaluation. If the data does not pass the validation processes, the collaboration object can automatically enable notification to an appropriate user, stating that additional information is needed to continue with the approval process. It can also be configured to log the processed business object and to enable persistence of the business object to a local item store.

ItemCollector collaboration template

A collaboration object based on the ItemCollector collaboration template builds a complete business object by merging partial business objects containing updated information obtained from other collaboration objects or connectors, such as review/approval information from WebSphere MQ Workflow, with a complete copy of the business object retrieved from a local item store. An ItemCollector collaboration object copies the updated attribute values from the partial objects into the retrieved one through the use of configuration properties.

Process_Reviewed_Item collaboration template

A collaboration object based on the Process_Reviewed_Item collaboration template synchronizes a business object to back-end applications based on the status of the object following the review/approval process. It also sends the business object to a port to notify the source application of the status of the processed business object. It can also be configured to log the processing business object, to enable notification to an appropriate user of the status of business object processing, and to enable saving a business object in or deleting a business object from a persistent item store.

ItemDispatcher collaboration template

A collaboration object based on the ItemDispatcher collaboration template is used to control how approval requests generated by an ItemValidation collaboration object are sent to a WebSphere MQ Workflow process. If a Retail_Item business object that requires approval contains a cascaded GLN, the ItemDispatcher collaboration object breaks up the request for approval into multiple smaller messages, each containing one or more of the individual GLNs. How the collaboration object handles any particular GLN is determined by a user-defined configuration file. Items without a cascaded GLN are passed through the collaboration object without processing.

DataStore collaboration template

A collaboration object based on the DataStore collaboration template persists the incoming business object in XML format, while allowing for retrieval, updating, and deletion through either auto-generated keys or user-specified keys based on business object attributes. This collaboration template must be configured to accommodate a specific business object. To simplify solution configuration, collaboration templates built from the DataStore collaboration template are supplied, which store item identifiers, messages, and items themselves. These templates are preconfigured to accept and serialize specific business objects into XML and store them in database tables.

ItemStore collaboration template

A collaboration object based on the ItemStore collaboration template serializes a Retail_Item business object. In the context of the solution, an ItemStore collaboration object is called by ItemValidation, Process_Reviewed_Item, ItemDispatcher, and ItemCollector collaboration

objects to store, retrieve, update, or delete the Retail_Item in or from an item store. Having the Retail_Item stored enables the business object to be persisted for use by other parts of the solution while long-running review/approval processes complete. To simplify solution configuration, this collaboration template is built from the DataStore collaboration template and is preconfigured to accept and serialize a specific business object into XML and store it in a database table.

Role_Email collaboration template

A collaboration object based on the Role_Email collaboration template is used to extract the e-mail message text, subject text, and recipient or list of recipients from configurable attributes in a triggering business object, and use those attribute values as input to the sendEmail API. The attributes of the business object can contain the actual message text, subject text, or address(es), or point to filenames that contain those values. Use of filenames to hold values allows e-mail message text, subject text, and recipients to be shared among multiple collaboration objects. For instance, by enclosing the actual attribute value identifying an e-mail address within a filename, an e-mail message can be sent to a Role, which corresponds to the filename. The actual e-mail address contained in the file can be easily changed as ownership of the Role changes, without needing to make any changes to the collaboration objects requesting the e-mail.

Connectors

Connectors are the portions of IBM WebSphere Business Integration Adapters that provide the interfaces between collaboration objects and applications. Connectors monitor applications for events and alert subscribing collaboration objects. They provide the interfaces over which business objects are communicated and over which application specific functionality is integrated into the overall solution. The Product Information Management for Retailers solution requires the connectors that are part of the following IBM WebSphere Business Integration Adapters:

- IBM WebSphere Business Integration Adapter for Trading Partner Interchange (TPI), which provides connectivity between the TPI EDI Gateway and the other components of the Product Information Management for Retailers solution.
- IBM WebSphere Business Integration Adapter for iSoft, which provides connectivity between the iSoft Peer-to-Peer Agent and the other components of the Product Information Management for Retailers solution.
- IBM WebSphere Business Integration Adapter for JDBC, which provides connectivity between objects based on the collaboration templates included in the Product Information Management for Retailers solution and the data persisted in the MessageStore, IdentifierStore, and ItemStore database tables during processing.
- IBM WebSphere Business Integration Adapter for E-mail, which facilitates sending email notifications throughout the business process, such as error notifications and those requesting additional data from suppliers.
- IBM WebSphere Business Integration Adapter for WebSphere MQ Workflow, which facilitates the transfer of data from the integration hub to the WebSphere MQ Workflow review/approval process as required.
- IBM WebSphere Business Integration Adapter for JText, which can be used to transfer data to the demand-side trading partner's master catalog, product information management systems, or legacy systems.
- IBM WebSphere Business Integration Adapter for JMS, which provides connectivity between WebSphere Business Integration Connect and the other components of the Product Information Management for Retailers solution.

IBM WebSphere MQ Workflow

The *IBM WebSphere MQ Workflow* is used to manage the long-running review/approval processing. This Product Information Management for Retailers solution can be enhanced to accommodate human interactions within it by interacting with a user interface engine, such as WebSphere Portal Server. The Product Information Management for Retailers solution requires WebSphere MQ Workflow process templates for the review/approval process. The WebSphere MQ Workflow process templates can be used as models for creating a customized process. These must have the capability to change the status of the item to Accepted, Approved, or Rejected (based on business process requirements), and are often implemented with a user interface (such as an implementation of WebSphere Portal Server). Reviews/approvals of multiple cascaded GLNs can be accomplished within a single process template. Due to the potentially complex nature of the item data, the only item data currently passed to the review/approval process is that necessary for retrieval of the item from the item store. Since this review/approval process can be highly customized, the customized code must have the necessary item information to perform a proper retrieval of the needed item data.

Data mapping templates

The Product Information Management for Retailers solution includes *data mapping templates* which can be used to transform data between business objects as necessary. See the Installation Guide in PDF format or in HTML format for a list of maps included with the solution.

Notices

IBM may not offer the products, services, or features discussed in this document in all countries. Consult your local IBM representative for information on the products and services currently available in your area. Any reference to an IBM product, program, or service is not intended to state or imply that only that IBM product, program, or service may be used. Any functionally equivalent product, program, or service that does not infringe any IBM intellectual property right may be used instead. However, it is the user's responsibility to evaluate and verify the operation of any non-IBM product, program, or service.

IBM may have patents or pending patent applications covering subject matter described in this document. The furnishing of this document does not give you any license to these patents. You can send license inquiries, in writing, to: IBM Director of Licensing IBM Corporation North Castle Drive Armonk, NY 10504-1785 U.S.A.

The following paragraph does not apply to the United Kingdom or any other country where such provisions are inconsistent with local law:

INTERNATIONAL BUSINESS MACHINES CORPORATION PROVIDES THIS PUBLICATION "AS IS" WITHOUT WARRANTY OF ANY KIND, EITHER EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF NON-INFRINGEMENT, MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. Some states do not allow disclaimer of express or implied warranties in certain transactions, therefore, this statement may not apply to you.

This information could include technical inaccuracies or typographical errors. Changes are periodically made to the information herein; these changes will be incorporated in new editions of the publication. IBM may make improvements and/or changes in the product(s) and/or program(s) described in this publication at any time without notice.

Any references in this information to non-IBM Web sites are provided for convenience only and do not in any manner serve as an endorsement of those Web sites. The materials at those Web sites are not part of the materials for this IBM product and use of those Web sites is at your own risk.

IBM may use or distribute any of the information you supply in any way it believes appropriate without incurring any obligation to you.

Licensees of this program who wish to have information about it for the purpose of enabling: (i) the exchange of information between independently created programs and other programs (including this one) and (ii) the mutual use of the information which has been exchanged, should contact: IBM Burlingame Laboratory Director IBM Burlingame Laboratory 577 Airport Blvd., Suite 800 Burlingame, CA 94010 U.S.A

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not necessarily tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information may contain examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples may include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

Such information may be available, subject to appropriate terms and conditions, including in some cases, payment of a fee.

The licensed program described in this document and all licensed material available for it are provided by IBM under terms of the IBM Customer Agreement, IBM International Program License Agreement, or any equivalent agreement between us.

Any performance data contained herein was determined in a controlled environment. Therefore, the results obtained in other operating environments may vary significantly. Some measurements may have been made on development-level systems and there is no guarantee that these measurements will be the same on generally available systems. Furthermore, some measurement may have been estimated through extrapolation. Actual results may vary. Users of this document should verify the applicable data for their specific environment.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not necessarily tested those products and cannot confirm the accuracy of performance, compatibility or any other claims related to non-IBM products. Questions on the capabilities of non-IBM products should be addressed to the suppliers of those products.

This information may contain examples of data and reports used in daily business operations. To illustrate them as completely as possible, the examples may include the names of individuals, companies, brands, and products. All of these names are fictitious and any similarity to the names and addresses used by an actual business enterprise is entirely coincidental.

All statements regarding IBM's future direction or intent are subject to change or withdrawal without notice, and represent goals and objectives only.

Copyright license

This information may contain sample application programs in source language, which illustrates programming techniques on various operating platforms. You may copy, modify, and distribute these sample programs in any form without payment to IBM, for the purposes of developing, using, marketing or distributing application programs conforming to the application programming interface for the operating platform for which the sample programs are written. These examples have not been thoroughly tested under all conditions. IBM, therefore, cannot guarantee or imply reliability, serviceability, or function of these programs.

Programming interface information

Programming interface information, if provided, is intended to help you create application software using this program.

General-use programming interfaces allow you to write application software that obtain the services of this program's tools.

However, this information may also contain diagnosis, modification, and tuning information. Diagnosis, modification and tuning information is provided to help you debug your application software.

Warning: Do not use this diagnosis, modification, and tuning information as a programming interface because it is subject to change.

Trademarks

The following terms are trademarks or registered trademarks of International Business Machines Corporation in the United States, other countries, or both:

IBM
WebSphere

Other company, product, or service names may be trademarks or service marks of others.



Printed in USA