

IBM Host Access Toolkit Version 12.0



Getting Started

IBM Host Access Toolkit Version 12.0



Getting Started

Note

Before using this information and the product it supports, read the information in Appendix B, "Notices," on page 17.

Ninth Edition (February 2016)

This edition applies to the Host Access Toolkit component of Version 12.0 of IBM® Host On-Demand (program number 5724-I20) and to all subsequent releases and modifications until otherwise indicated in new editions.

© Copyright IBM Corporation 2000, 2016.

US Government Users Restricted Rights – Use, duplication or disclosure restricted by GSA ADP Schedule Contract with IBM Corp.

Contents

About this book	v	Introducing the Host Access Beans	11
Chapter 1. Introducing the Host Access Toolkit	1	Descriptions	12
Components of the Host Access Toolkit	1	Events	13
What's new in Host On-Demand Version 12.0	2	Accessibility Features	13
New functions in Host On-Demand Version 12.0	2	Introducing Host On-Demand J2EE Connector.	14
Where to go for more information	3	Appendix A. Installing the iSeries Toolbox for Java	15
Web sites	3	Appendix B. Notices	17
News groups	3	Trademarks	18
Chapter 2. Planning for the Host Access Toolkit	5		
Supported operating systems	5		
Disk space requirement.	5		
Supported browsers	5		
Java Support	5		
Chapter 3. Installing the Host Access Toolkit	7		
Chapter 4. Migrating from a previous version of the Host Access Toolkit	9		
Chapter 5. Introducing the Host Access Toolkit Application Programming Interfaces	11		
Introducing the Host Access Class Library	11		

About this book

This book provides general information about installing and using the Host Access Toolkit. This book is intended for use by programmers and system administrators.

This book is available in the following locations:

- Installed with the Host Access Toolkit (included with Host On-Demand)
- Stored on the Host On-Demand DVD-ROM
- Available on the web at http://www-01.ibm.com/support/knowledgecenter/SSS9FA_12.0.0/com.ibm.hod.doc/WebSphereHOD.htm

The MySupport feature enables you to personalize your support view and register to receive weekly e-mail notifications alerting you to new patches, downloads, and other timely technical support information for IBM products. To register for MySupport, follow the instructions in the Technote found at the following URL (this URL is written as two lines so that it will fit on the page):

<http://www.ibm.com/support/docview.wss?&uid=swg21168680>

Chapter 1. Introducing the Host Access Toolkit

The Host Access Toolkit consists of the following application programming interfaces (APIs):

- Host Access Class Library API
- Host Access Beans for Java™ API
- Host On-Demand Java 2 Enterprise Edition (J2EE) Connector API

Programmers can use these APIs to write:

- Custom applications that run with the IBM® Host On-Demand product (Host On-Demand); or
- Custom host-access applications that run standalone.

The Host Access Toolkit is available on the DVD-ROM that is shipped with the Host On-Demand product. This DVD-ROM contains all of the Host Access Toolkit programming API's and documentation necessary for writing Host Access Toolkit applets and applications.

Components of the Host Access Toolkit

The following APIs make up the Host Access Toolkit:

- The Host Access Class Library (HACL) provides a core set of classes and methods that allow the development of platform-independent applications that can access host information without the need for a graphical display. HACL represents an object-oriented abstraction of a host connection that includes reading and writing the host presentation space, enumerating the fields in the presentation space, reading the operator information area (OIA) for status information, transferring files, and performing asynchronous notification of significant events. For more information about HACL, see the following:
 - “Introducing the Host Access Class Library” on page 11
 - The *Host Access Class Library* reference
- The Host Access Beans provide emulator functions as a set of JavaBeans components that developers can use to rapidly develop custom applications that deliver the specific functions they want. For more information about Host Access Beans, see the following:
 - “Introducing the Host Access Beans” on page 11
 - The *Host Access Beans for Java* reference
- The Host On-Demand J2EE Connector is a Java programming interface that conforms to the J2EE Connector Specification, Version 1.0 from Sun Microsystems. Host On-Demand J2EE Connector provides a set of Resource Adapters which communicate to 3270, 5250, CICS, and VT hosts. Users can write applications or servlets by using the APIs provided by Host On-Demand J2EE Connector in WebSphere Integration Developer. These applications and servlets are then deployed to an application server that supports the J2EE Connector architecture, such as IBM Application Server. For more information on the J2EE Connector implementation in Host On-Demand, see the following:
 - “Introducing Host On-Demand J2EE Connector” on page 14
 - The *Host On-Demand J2EE Connector* reference

What's new in Host On-Demand Version 12.0

New functions in Host On-Demand Version 12.0

The following functions and enhancements have been added to Host On-Demand Version 12:

Keystroke buffering

Keystroke buffering, also referred to as type-ahead support, enables you to enter keystrokes in an emulator session even when the input is inhibited. Keystrokes are buffered when the input is inhibited and processed later when the input-inhibited condition is removed.

Windows style text selection for cut, copy, and paste

In addition to selecting text within a rectangular box, you can now select text from within a contiguous line by line area for the cut, copy, and paste functions.

Limit the number of logon attempts using an incorrect password

As an administrator you can set the number of consecutive logon attempts caused by using an incorrect password before locking the user account. After the number of attempts you specify is reached, the next attempt locks the user account from making any further attempts.

Directory Utility graphic user interface

As an administrator you can use the Directory Utility to manage user, group, or session configuration information stored either in Host On-Demand or in an LDAP server. You can use a graphical user interface to access the Directory Utility.

Email address recognition enhancements

Host On-Demand now recognizes more email addresses as *hotspots*, including those with special characters in the local-part. Addresses using any of the ASCII characters shown below are treated as valid email addresses and highlighted as links. If the domain name is an IP address, then the IP address literal must be surrounded by square braces.

- Local-part
 - Lowercase and uppercase English letters (a-z, A-Z)
 - Digits (0 to 9)
 - Characters (! # \$ % & ' * + - / = ? ^ _ ` { | } ~)
- Domain
 - Lowercase and uppercase English letter (a-z, A-Z)
 - Digits (0 to 9)
 - Hyphen (-)
 -

Copy as image

In addition to selecting text within a rectangular box, you can now select text from within a contiguous line by line area for the cut, copy and paste functions.

TLS v1.1 and v1.2 support for Display, Printer, and HOD Redirector

Using Java Secure Socket Extension (JSSE) for secure connections enables TLS v1.1 and v1.2 security protocols for Display, Printer, and HOD Redirector. You can enable JSSE for Display and Printer sessions from connection properties panel and for redirector (Windows only) by adding `useJSSE=true` in `lib/redis.properties`.

Display customized session icons in offline mode

As an administrator you can ensure your customized session icons to display in the Client window in the offline mode (the web server of HOD is not available in this case).

Close button for tabbed sessions

Each session started in the Client window, as opposed to that started in a separate window, is tabbed for easy access. To close a session that is started in the Client window, you can click a Close button (X) on the session tab.

Nimbus GUI for Host On-Demand

The default Host On-Demand graphical user interface is based on the Nimbus Look and Feel provided by Java 1.6 and later. You can disable the Nimbus Look and Feel by using the `setHODNimbusGUI` HTML parameter or the `SETHODNIMBUSGUI` environment variable.

Where to go for more information

The publications, Web sites, and news groups listed in this section provide helpful information for using the Host Access Toolkit Java APIs.



You can directly link to most of the resources referenced below; however, if you are viewing the PDF version of this book, you must do so using the browser plugin capability of the Adobe Acrobat Reader

Web sites

Developers using the Host Access Toolkit APIs can make use of a number of Web resources, including the following:

- The Host On-Demand Web site: <http://www.software.ibm.com/network/hostondemand/>
- The Sun Microsystems home page for accessing and downloading various Java APIs and tools: <http://java.sun.com/products/>
- The Sun Microsystems J2EE connector Web site: <http://java.sun.com/j2ee/connector/>
- The IBM Web site *Java Technology Zone*: <http://www.ibm.com/developerworks/java/>
- The IBM Web site *IBM Developer Kits*: <http://www.ibm.com/developerworks/java/jdk/?dwzone=java>

News groups

The following news groups require access to a Usenet newsgroup server and a client news reader:

- `ibm.software.hostondemand`
- `ibm.software.pcomm`

Chapter 2. Planning for the Host Access Toolkit



For the most up-to-date version of the requirements, see the README file and the Host On-Demand Web site.

- “Supported operating systems”
- “Disk space requirement”
- “Supported browsers”
- “Java Support”

Supported operating systems

The Host Access Toolkit DVD-ROM provides an installation utility for the following operating systems:

- Windows 8, 8.1, and 10 (32-bit and 64-bit)
- Windows 2012R2, 2012 and 2008R2 server

Applications or applets developed using the Host Access Toolkit can be ported to other operating systems that support Java; however, installation of the toolkit is not supported on those other systems. The necessary toolkit jar files needed to run your application or applet can be packaged with your application or applet and copied to those other systems according to the terms of your licensing agreement.

This toolkit supports all the operating systems supported by Host On-Demand. For a list of the operating systems supported by Host On-Demand (both for the Host On-Demand server and for the Host On-Demand client), see *Planning, Installing, and Configuring Host On-Demand* in the Host On-Demand documentation.

Disk space requirement

A typical installation of the Host Access Toolkit requires 200 MB of disk space.

Supported browsers

The Host Access Toolkit supports the following browsers:

- Firefox 1.5, 2.0 and 3.0
- Microsoft Internet Explorer 6.0 and 7.0
- Safari 1.0, 2.0 and 3.2.2

Java Support

Only Java jars are shipped with Host Access Toolkit. The Java Compiler that uses the jars shipped with this product to compile applications requires a minimum level of IBM Java 1.6.

Chapter 3. Installing the Host Access Toolkit

The basic steps for installing the Host Access Toolkit on a Windows system are as follows:

1. Insert the DVD-ROM into your DVD-ROM drive. On the DVD-ROM interface program, click **Install Host Access Toolkit** and on the right hand panel, click **Launch Host Access Toolkit Install**.
2. Follow the directions in the installation windows.
3. If you wish, click **View Documentation**, **Visit Our Web site**, or **Explore This DVD** to learn more about the Host Access Toolkit.

Chapter 4. Migrating from a previous version of the Host Access Toolkit

The Host Access Toolkit is installed separately from Host On-Demand, and without regard for the version of Host On-Demand that is installed.

Host Access Beans for Java and Host Access Class Library applications and applets that are written using a previous version of the Host Access Toolkit will work with Host Access Toolkit Version 12.0, provided that these applications and applets were compiled with IBM Java 1.6 or later. The reason for this is the fact that all the new Host Access Beans for Java (jars) come with IBM JDK 1.6 compilation level.

If the Host Access Class Library applications and applets were compiled on a JDK less than 1.6, these application/applets will need to be recompiled with a JDK compiler later than or equal to IBM JDK 1.6.

Chapter 5. Introducing the Host Access Toolkit Application Programming Interfaces

The following sections describe each application programming interface (API) in the Host Access Toolkit:

- “Introducing the Host Access Class Library”
- “Introducing the Host Access Beans”
- “Introducing Host On-Demand J2EE Connector” on page 14

Introducing the Host Access Class Library

The Host Access Class Library (HACL) for Java provides a set of classes and methods that allow the development of platform independent applications that can access host information at the data stream level. HACL implements the core host access function in a complete class model that is independent of any graphical display and requires only a Java-enabled browser or comparable Java environment to operate. The class library represents an object-oriented abstraction of a host connection that includes reading and writing the host presentation space, enumerating the fields in the presentation space, reading the operator information area (OIA) for status information, transferring files, host printing, and performing asynchronous notification of significant events.

With HACL, application developers can write Java applets that manipulate data from the data stream presentation space (such as 3270, 5250, and Virtual Terminal) without requiring the users to have the applets residing on their machines. The presentation space represents a virtual terminal screen that contains both data and associated attributes presented by host applications. HACL Java applets can open a session to the host, wait for incoming host data, get specific strings from the imaginary screen, get associated attributes of the strings, set new string values, send data stream function keys back to the host, and wait for the next host response. After an interaction is complete, the applet can switch to other tasks or simply close the session. The entire operation can be done without ever showing host screens.

Host On-Demand's HACL implementation provides the following additional benefits:

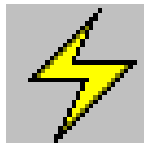
- It is platform independent.
- It is downloadable and executable on client workstations using standard Web and Java technology. This provides significant maintenance and resource savings.

Introducing the Host Access Beans

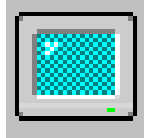
The Host Access Beans for Java provide emulator functions as a set of JavaBeans components. JavaBeans components have configurable properties, use events to communicate, and can be manipulated in visual development environments. (See the Sun JavaBeans API Specification for more information). The Host Access Beans can be used by developers to rapidly develop custom applications that deliver the specific functions they want to include in their host access applications.

Descriptions

Each bean description below is preceded by the icon used to represent the bean in most visual development environments.



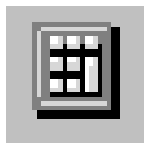
Session - This non-visual bean provides methods and properties for setting up and establishing communications with the host system. The Session bean fires events that allow listeners to be notified of presentation space, operator information area (OIA), and communication changes.



Screen - This visual bean provides the graphical interface for displaying the host data from a Session bean. The Screen bean listens to presentation space, OIA, and GUI events fired by the Session bean and interprets the events to display the main text area and the operator information area. It fires keystroke events to registered listeners, and also provides the clipboard cut, copy, and paste functions.



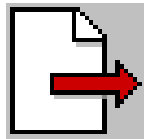
Terminal - This visual bean combines the Session and Screen beans to provide a composite bean that encompasses both the communication with the host and the graphical interface for displaying the host data.



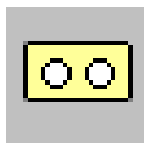
KeyPad - This visual bean provides a simple grid of buttons which invoke various host functions.



KeyRemap - This visual bean provides keyboard remap capability. Using KeyRemap, keystrokes can be mapped to alternate characters or directly to host functions.

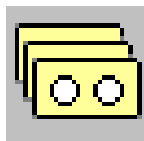


FileTransfer - This visual bean provides a toolbar interface for transferring files to and from a host.



Macro - This non-visual bean records and plays a single macro. Macro employs advanced screen recognition technology to reliably navigate host applications in any environment. Macro also provides the ability to prompt for user input and extract the following information from the screen during playback:

- text
- color
- field positions and their attributes
- extended character attributes
- DBCS attributes for each character and field attribute
- grid



MacroManager - This visual bean provides a toolbar interface for managing multiple macros. The MacroManager bean allows you to record, play, load, delete and edit multiple macros.



Color Remap - This visual bean provides a simple interface for modifying the colors displayed by the Screen or Terminal beans.



HostPrintSession - This non-visual bean extends the Session bean and provides a simple interface for creating and customizing 3270 and 5250 printer sessions.



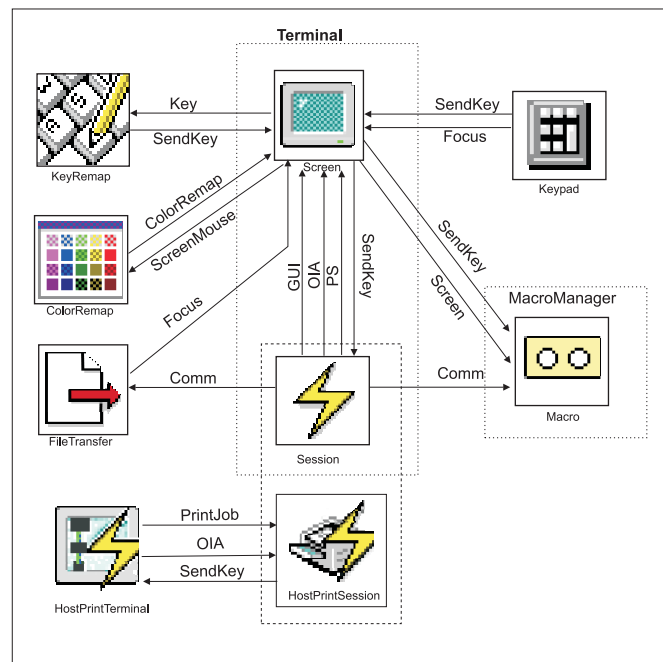
HostPrintTerminal - This visual bean includes the HostPrintSession bean and provides an interface for creating and customizing a 3270 or a 5250 printer session. At run-time, the HostPrintTerminal bean visually displays information about the status of print jobs and the connection with the host.



Converter - The Converter bean performs a codepage-to-codepage conversion. For the Arabic and Hebrew languages, Converter performs certain BIDI-specific transformations, including logical-to-visual transformations, visual-to-logical transformations, and Lam-Alef processing (Arabic only).

Events

The following diagram shows the major events that are passed between each of the Host Access Beans and the composition of the Terminal bean.



The HostPrintSession bean is actually an extension to the Session bean; however, it is shown separately in the diagram to indicate the events that HostPrintTerminal listens for.

Accessibility Features

Host On-Demand offers accessibility features to help users who have physical disabilities (such as restricted mobility, limited or no vision, or limited or no hearing) use host sessions successfully. Features include keyboard equivalents for all actions (mouseless operation), support for display system settings for size, font, and color for user interface controls, and descriptive text for selected graphics.

The following visual Host Access Beans for Java have accessibility features built into their graphical user interfaces:

- Screen
- Terminal

- KeyPad
- KeyRemap
- FileTransfer
- MacroManager
- HostPrintTerminal

To use these accessibility features, you must have the Java plug-in installed. Note that some beans (such as the FileTransfer bean) do not fully support all accessibility features.

Introducing Host On-Demand J2EE Connector

Host On-Demand J2EE Connector is based on version 1.0 of the Sun J2EE Connector Architecture Specification. Before the J2EE Connector architecture was introduced, there was no standard architecture for integrating heterogeneous Enterprise Information Systems (EIS). Host On-Demand users had to use Host Access Class Library (HACL) to access hosts; other vendors provide specific architectures for this purpose. J2EE Connector architecture provides a standard set of Application Programming Interfaces (APIs) allowing developers to quickly connect and integrate their applications with virtually any backend EIS, and to any application servers conforming to the J2EE Connector architecture.

The Host On-Demand J2EE Connector provides access to 3270, 5250, Customer Information and Control System (CICS), and Virtual Terminal (VT) hosts from the Internet. The Host On-Demand J2EE Connector is a Java programming interface which conforms to the J2EE Connector Specification version 1.0 from Sun Microsystems, and the Common Client Interface (CCI) infrastructure. This interface is intended for use with these products to develop applications in a consistent manner with other connectors.

An application or servlet uses the Host On-Demand J2EE Connector classes for host access over TCP/IP using standard telnet protocols: TN3270, TN5250, CICS or VT emulation. For 3270 and 5250 hosts, a telnet server gateway (such as IBM's Communications Server family of products) is used to translate the incoming telnet stream into an SNA datastream. Host On-Demand supports encryption of the datastream for telnet servers which support Secure Sockets Layer (SSL).

The Host On-Demand J2EE Connector provides a set of Resource Adapters which communicate to 3270, 5250, CICS, and VT hosts. These Resource Adapters (.RAR files) are deployed to a conforming application server; users then write applications or servlets using the application programming interfaces (APIs) provided by Host On-Demand J2EE Connector in WebSphere Integration Developer. WebSphere Integration Developer and its tools are used to write and test user applications and servlets. These applications and servlets are then deployed to an application server that supports the J2EE Connector architecture, such as WebSphere Application Server.

J2EE Connector is just one of the programming environments that Host Access Toolkit users can use to develop customized applications, applets, and servlets. In other environments, where the customer needs the complete functionality of Host On-Demand, the HACL and JavaBeans interface should be used.

For more information on the J2EE Connector architecture, see the Sun J2EE Connector Architecture Web site at <http://java.sun.com/j2ee/connector/>.

Appendix A. Installing the iSeries Toolbox for Java

The iSeries Toolbox for Java is shipped on the Host Access Toolkit DVD-ROM. It consists of a set of Java classes that enable you to write client/server applications and applets that work with data residing on your iSeries system. You can also run these applications on the i5/OS and OS/400 Java Virtual Machine (JVM).

The Toolbox uses iSeries servers as access points to the system. Each server runs as a separate job on the iSeries, and each job sends and receives datastreams on a socket connection.

The access classes provide low-level access to the following iSeries resources:

- Databases via a JDBC driver or record-level access
- Integrated File System
- Programs
- Commands
- Data queues
- Print
- Digital certificates
- Jobs
- Message queues
- Users and groups
- User spaces

Graphical programming interfaces are available for:

- Databases (both JDBC and record-level access)
- Command call
- Data queues
- Integrated
- File system
- Jobs
- Message queues
- Print
- Program call
- Users and groups

The following files are located on the Host Access Toolkit CD, **not** the i5/OS (formerly OS/400) CD:

- jt400_all.zip contains jt400.zip, jt400.jar, utilities files, and help and message files
- jt400_doc_en.zip contains the Programmer's Guide in English
- jt400_doc_ja.zip contains the Programmer's Guide in Japanese
- jt400_doc_ko.zip contains the Programmer's Guide in Korean
- jt400_doc_zh.zip contains the Programmer's Guide in Simplified Chinese (PRC)
- jt400_doc_es.zip contains the Programmer's Guide in Spanish
- jt400_doc_zh_TW.zip contains the Programmer's Guide in Traditional Chinese.

To install the iSeries Toolbox for Java on your workstation, unzip the appropriate files. For example, if you want to install the code and the English version of the Programmers Guide, unzip jt400_all.zip and jt400_doc_en.zip .



You must use a utility that supports long filenames.

For additional information on the toolbox, see <http://www.as400.ibm.com/toolbox>.

Appendix B. Notices

This information was developed for products and services offered in the U.S.A. IBM may not offer the products, services, or features discussed in this document in other 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.

For license inquiries regarding double-byte (DBCS) information, contact the IBM Intellectual Property Department in your country or send inquiries, in writing, to:

IBM World Trade Asia Corporation
Licensing
2-31 Roppongi 3-chome, Minato-ku
Tokyo 106, Japan

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 the program(s) described in this publication at any time without notice.

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 the program(s) described in this publication at any time without notice.

Licenses 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 Corporation
Department T01
Building B062
P.O. Box 12195
Research Triangle Park, NC 27709-2195
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 information 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.

Information concerning non-IBM products was obtained from the suppliers of those products, their published announcements or other publicly available sources. IBM has not 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.

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.

If you are viewing this information softcopy, the photographs and color illustrations may not appear.

Trademarks

The following terms are trademarks of the IBM Corporation in the United States or other countries or both:

- IBM

Lotus[®] and Domino[®] are trademarks or registered trademarks of Lotus Development Corporation in the United States, or other countries, or both.

Java, JavaBeans JDK and all Java-based trademarks and logos are trademarks or registered trademarks of Oracle Corporation in the United States, other countries, or both.

Microsoft, Windows, and the Windows logo are registered trademarks of Microsoft Corporation in the United States, other countries, or both.

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



Printed in USA

SC31-6354-08

