

This FAQ addresses frequently asked questions relating to availability, certification, and key messages of Oracle Content Management Software Development Kit (Oracle CM SDK) 10g.

- 1.0 General Questions
- 2.0 Availability
- 3.0 Concepts and Architecture
- 4.0 Supported Protocols
- 5.0 Content-Based Searching
- 6.0 Administration and Management
- 7.0 Development
- 8.0 Further Information

## 1.0 General Questions

### 1.1 What is Oracle Content Management SDK?

Oracle Content Management Software Development Kit (Oracle CM SDK) is a platform for developing content-oriented applications. It provides a run-time environment and Java-based APIs for supporting the content management life cycle: Creation/Aggregation, Management, Publishing/Delivery, and Archiving content.

Oracle CM SDK provides the following content management capabilities:

- Security
- Versioning
- Folders
- Check-in/Check-out
- Workflow
- Search and Retrieval
- Extensible Metadata

Oracle CM SDK leverages Oracle Application Server and Oracle Database platforms to present documents and media as files and folders that users can access through familiar interfaces such as Windows, the Web (HTTP), FTP, SMB/NTFS, or as a portlet through OracleAS Portal. Companies can ensure that valuable content is secure and easily available from a central location.

### 1.2 Why would I want to use Oracle CM SDK?

The main value propositions for Oracle CM SDK are the following:

- **Cost savings through consolidation.** By moving content from dozens, hundreds, or thousands of file servers into a single Oracle CM SDK application instance, you can reduce the amount you

spend on hardware and software (including not just operating system licenses, but also required software like virus scanning and backup). You will also require fewer people to administer the single file server, so your IT staff can focus on other projects. The consolidation will also make it easier to manage and secure your content.

- **Enterprise collaboration.** For file server consolidation to work, you need features built into the file system that support and encourage enterprise-scale collaboration. Folder or document level security, categorization, versioning, and other features in Oracle CM SDK are important for this scale of collaboration. Without them, users could not easily secure, manage, search, edit, review, or share content, with tens or hundreds of thousands of users, millions of documents, and terabytes of data.
- **Content management.** Many of these features match the requirements for the sort of scalable content management solution (for example, document management or knowledge management) that many customers need. Therefore, Oracle CM SDK provides a cost-effective platform for custom-built solutions, or packaged applications.
- **Totally Customizable.** Oracle CM SDK provides all of the components to build custom, content-oriented, and enterprise-level applications to meet your specific requirements.

### 1.3 How will Oracle CM SDK change the way we do business?

The simple fact of having a single file repository for everyone will, without having to mandate change in your organization, quietly but forcefully change the way you do business. For example, users will have a standard way to secure and share their files, so no one has to guess the right way to manage their documents. Other important measures of productivity the number of lost files, duplicate copies of files, time spent searching for content, and so forth will improve.

The data center, too, will leave behind the world of an uncountable number of file servers, all with their own security, backup, hardware failure, software licensing, and networking issues. Instead, the IT department can focus its efforts on managing a single system. Rational IT planning around file servers now becomes a reality.

With Oracle CM SDK, you can provide the applications that really meet your needs and requirements. By developing your own Servers, Agents and Web-based user interface, you can manage your content according to the rules of your organization and the needs of your business.

### 1.4 Will our current productivity tools still work?

Yes. Oracle CM SDK provides standard protocols for accessing the file server from a PC, Macintosh, or UNIX client. Therefore, not only will users on PCs, for example, continue to access their files through Microsoft Windows Explorer without having to install any additional software but productivity applications like Microsoft Office will work just as they did before.



## 2.0 Availability

### 2.1 How is Oracle CM SDK licensed?

Oracle CM SDK is shipped with Oracle Application Server 10g. Oracle Application Server 10g is licensed either per processor or per named user. Licensing and pricing information can be found at <http://oraclestore.oracle.com/>.

## 2.2 Where can I download the Oracle CM SDK software?

Oracle CM SDK is available for download on the Oracle Technology Network Web site at <http://www.oracle.com/technology/products/ifs>.

## 2.3 What other Oracle products is Oracle CM SDK integrated with?

Oracle CM SDK is integrated with other Oracle9i Database API products:

- Oracle Workflow for document approvals and routing
- Oracle Text for searching
- Oracle *interMedia* for rich media indexing and manipulation
- Oracle XDK for manipulating XML
- Oracle CM SDK is also integrated with other platform components, such as:
- Oracle Internet Directory and Oracle Application Server Single Sign-on
- Oracle Enterprise Manager Application Server Control for administration and management of all of your mid-tier processes and applications
- OracleAS Portal
- Oracle Ultra Search for federated search capabilities

## 2.4 What is the upgrade path between earlier versions of Oracle CM SDK and the latest version?

This is detailed in the [CM SDK Installation Guide](#) in Section 2 under Upgrade Requirements and Process Overview.



# 3.0 Concepts and Architecture

## 3.1 What are the components of Oracle CM SDK?

The components of an instance of Oracle CM SDK is called a *domain*. A domain consists of the following components:

- **Schema.** A set of database objects (e.g. tables, views) in the Oracle9i Database. All customer data (documents, custom forms, etc.) and metadata are stored in the Oracle CM SDK schema.
- **Repository.** A set of Java classes that manage the data in the schema.
- **Nodes.** There are two types of nodes in an Oracle CM SDK domain: regular nodes, and HTTP nodes. Regular nodes consist of Services, Servers, and the processes for managing these components. The HTTP node contains the protocol servers that rely on the HTTP protocol (for example, WebDAV) and runs in an Oracle Application Server OC4J instance. The regular node contains all other non-HTTP protocol servers and runs in a standard Java VM.
- **Services.** Connection pools, object caches, and user sessions are all managed by node services.
- **Servers.** There are two types of servers:
  - **Protocol Servers** handle communications between clients and the Oracle CM SDK repository, namely, HTTP/WebDAV, SMB/NTFS, FTP, NFS, AFP, IMAP4 and the proprietary Command-line Utilities Protocol (CUP). The protocol servers use the same Java API calls as offered to custom applications.

- **Agents** are servers that perform operations periodically or in response to events, such as operations performed by other servers. For example, some of the Oracle CM SDK out-of-the-box agents include the Content Garbage Collection Agent and the Quota Agent.
- **Java Content Management API.** A set of classes that developers can use to build custom applications. Customizations include creating custom classes, parsers, renderers, overrides, Web interfaces, and agents. Most classes in the Oracle CM SDK repository are exposed in the Java API as well; some, however, are not available for customer use.

### 3.2 What operating systems and platforms does Oracle CM SDK support?

Oracle CM SDK can run on the following operating system platforms:

- Sun SPARC Solaris
- Windows NT/2000
- Windows 2003\*
- Linux
- IBM AIX
- HP/UX
- HP Tru-64

\*10g (9.0.4) only

### 3.3 What Application Server Environments does Oracle CM SDK Support?

Oracle CM SDK was originally designed as a pure Java application and was shipped with the Oracle Database. From version 9.0.2 onwards, however, Oracle CM SDK has been shipped with Oracle Application Server. Regardless of how the system is run, appropriate Oracle Application Server licenses are required. Oracle CM SDK is only officially certified on Oracle Application Server. We don't currently support other application server environments. However, the domain controller and regular nodes (with protocol servers for FTP, SMB, NTFS, NFS, IMAP, SMTP, AFP, and CUP) run in standard Java VMs and therefore could coexist in an environment running another application server. The HTTP nodes (HTTP/WebDAV protocol servers) are servlet-based and run in an OC4J instance. They are tightly integrated with OC4J and are not capable of running in other JSP/Servlet environments (like Apache's Jakarta Tomcat).

Management of the Oracle CM SDK domain is through the Oracle Enterprise Manager Application Server Control. If you use Oracle CM SDK in other environments, you would not be able to use these management capabilities. Some management capabilities are available through the command line utilities.

The Oracle CM SDK API itself makes no assumptions on the presence of an application server, although some classes rely on the correct configuration of the Oracle Database for Oracle Advanced Queuing and Oracle Workflow.

The API could possibly be used by servlets running in other containers. There are however, some issues with the API classes running in application server environments. The classes of the Oracle CM SDK API are not EJB and haven't been designed with an EJB environment in mind. Many of the classes are not serializable, which means that they could not be used as arguments to methods that are distributed (remote methods). In general, we haven't really tested the API classes in a true EJB environment.

### **3.4 Does Oracle CM SDK support international character sets?**

Yes. Oracle CM SDK can store and, through Oracle Text, content-index files encoded in particular languages and character sets. It can also store metadata (filenames, dates, and so forth) in a variety of different languages and international formats. Oracle CM SDK supports both European (for example, ISO-8859-1 and ISO-8859-20) character sets, as well as multibyte character sets for languages like Chinese and Japanese (for example, Shift-JIS and UTF-8). Oracle CM SDK is translated into French, German, Italian, Spanish, Brazilian Portuguese, Korean, Simplified Chinese, Traditional Chinese, and Japanese.

### **3.5 How does Oracle CM SDK store files?**

Oracle CM SDK stores and retrieves files using standard Oracle OCI (thick) JDBC calls to read and write Binary Large Objects (BLOBs) in the Oracle Database. Thin JDBC is not currently supported due to performance problems, but support is expected in the future.

### **3.6 Can you store files outside of Oracle CM SDK?**

Yes, partially. Oracle CM SDK provides the ability to age content stored in the database to BFILES outside of the database. This allows BFILES to be kept on near-line storage (such as an optical disk jukebox), as long as the storage device looks exactly like a file system to the Oracle CM SDK Content Agent. When the document whose content is now a BFILE is written to, the content is read back into a BLOB in the database and the changes are made to the BLOB content in the database.

More information can be found in the [\*Oracle Content Management SDK Administration Guide\*](#).

### **3.7 Can Oracle CM SDK run on the middle tier?**

Yes, Oracle CM SDK is designed to run as middle-tier application server software supported by Oracle Application Server.

### **3.8 What is the recommended configuration for Oracle CM SDK?**

In a production environment, we recommend that you install and configure Oracle CM SDK in a multiple-machine configuration, in which the database runs on one machine and Oracle CM SDK runs on one or more separate middle-tier machines. To run Oracle Internet Directory for authentication of users, an additional machine is recommended. A single-machine installation is possible, *if* the machine meets all software and hardware requirements.

For more information, please read the [\*Oracle Content Management SDK Installation Guide\*](#).

### **3.9 How does Oracle CM SDK perform compared to networked file systems?**

When compared to networked file systems for file operations, the response times of a well-tuned Oracle CM SDK system are roughly twice as long (between the same and three times as long). This has been measured for SMB and HTTP using two industry-standard benchmarks, and through simple PUTs and GETs using FTP.

When compared to networked file systems for searching operations, Oracle CM SDK is many times faster, because it uses the indexing facility of Oracle Text for content-based searching.

### 3.10 What high availability features are available with Oracle CM SDK?

Oracle CM SDK allows system administrators to leverage the high availability features of both the Oracle9i database and Oracle Application Server. These include:

- Redundant middle tier instances
- Real Application Clusters (RAC)

### 3.11 How scalable is Oracle CM SDK?

Oracle has simulated 5,000 connected Oracle CM SDK users (20 simultaneous nonstop requests) retrieving documents through anonymous HTTP with sub-second response times on a well-tuned system using a \$20,000 Solaris machine.

Oracle has simulated 10,000 connected Oracle CM SDK users (60 simultaneous nonstop requests) using check out/check in, search, and folder opens through the Java API on a well-tuned system using a \$100,000 Solaris machine with sub-second response times.

Oracle has simulated 40 hours of work by 5000 connected users (20 simultaneous requests for a total of 4 million requests) without an increase in response time or memory usage.

Oracle CM SDK is also used in many production environments, including Oracle. As an example, the Oracle Files Online service used internally at Oracle has the following statistics: it currently stores around 17 million documents, with total space of 4TB, and has 60,000 registered users and 24,000 distinct users connecting in the last 20 days.

### 3.12 Can you publish Oracle CM SDK-based content outside of the firewall and still get good performance?

Yes. HTTP performance is very good, regardless of the presence of a firewall.

### 3.13 What options do I have for scaling Oracle CM SDK for more users and for larger data volumes?

To support more users, you may run as many middle-tier machines as you desire, all connecting to a single database machine. Each middle-tier machine may run one or more Oracle CM SDK protocol servers.



## 4.0 Supported Protocols

### 4.1 What Protocols are supported by Oracle CM SDK?

Protocol	Description
IMAP4	Internet Message Access Protocol. Used for receiving e-mail.
SMTP	Simple Mail Transfer Protocol. Used for sending e-mail.
AFP	AppleTalk Filing Protocol. Macintosh users can access files through the Finder.
NFS	Network File System. A mechanism for mounting remote file systems on UNIX and Linux platforms.

FTP	File Transfer Protocol. A lightweight protocol that is good for mass transfer of files and directory structures. Extremely scalable when used with Oracle's internal instance of Oracle Files. Not a very secure protocol because it transmits passwords in the clear.
HTTP	Hypertext Transfer Protocol. A commonly-used, secure protocol that supports SSL (HTTPS), encrypted passwords, and proxy servers. Can be accessed via any browser (e.g. Microsoft Internet Explorer, Netscape Navigator). Although Oracle CM SDK does not provide an out-of-the-box web UI, a Web starter application is provided from 10g (9.0.4) onwards. Extremely scalable.
WebDAV	An extension of HTTP. This protocol is the basis for the Windows concept of Web Folders, a tool that allows you to access HTTP files via the Network Neighborhood in Windows Explorer.
SMB	Server Message Block. Most Windows programs can use SMB mapped drives directly. Very "chatty" protocol with inherent network and performance overhead costs. Implemented on UNIX through Oracle CM SDK Java code.
NTFS	NT File System. Same as SMB (see above), but for Windows platforms. Implemented on Windows through a "C" device driver which calls to the Oracle CM SDK Java code.
CUP	Command-line Utilities Protocol. Proprietary protocol that is useful for development tasks.

#### **4.2 Are files accessed through the protocols streamed?**

FTP, HTTP/WebDAV, and IMAP are streamed. SMB, NT file system (NTFS), NFS, and AFP are random access protocols and are not streamed.

#### **4.3 Are there any special clients required to run Oracle CM SDK?**

Oracle CM SDK is accessible from standard FTP, SMB, WebDAV, IMAP4, AFP and NFS clients without having to install client-side software. Most FTP clients work well with Oracle CM SDK.

Web clients can also be used to access Oracle CM SDK, but these have to be custom built. Oracle CM SDK 10g (9.0.4) provides a Web-based starter application.

#### **4.4 Does Oracle CM SDK support HTTPS?**

Yes. Oracle CM SDK does support HTTPS. You can configure your Web server to do so.

#### **4.5 Can my configuration include different Web servers listening for Web access?**

Yes. You can have different Web servers listening for Web access on different ports.

#### **4.6 Does Oracle CM SDK use SAMBA for SMB access?**

No, Oracle CM SDK does not use SAMBA for SMB access. For Solaris, Oracle CM SDK has its own SMB server written in Java. For Windows platforms, it provides a C device driver which is

called by the native Windows SMB server. The C device driver then calls the Oracle CM SDK Java API.

#### **4.7 Could I write my own protocol server?**

Yes. The Java API allows you to write your own protocol server.

#### **4.8 Is there a way to selectively start some of the Oracle CM SDK protocol servers?**

Yes. Using the Oracle Enterprise Manager Application Server Control, you can select which protocol servers will start by default, and start and stop other protocol servers at runtime.

#### **4.9 Can I use regular e-mail clients with Oracle CM SDK?**

Yes. Oracle CM SDK ships with IMAP4 and SMTP servers, so most standard Internet e-mail clients will work with it.



## **5.0 Content-Based Searching**

### **5.1 What Oracle Text options can I use with Oracle CM SDK?**

Oracle CM SDK integrates with Oracle Text to provide full text indexing and retrieval capabilities for documents stored in the Oracle CM SDK repository. Oracle CM SDK has a registry of document formats that can be configured by an administrator to determine if a document's content will be indexed. Out-of-the-box, the registry is configured to index documents in a wide range of formats. Once the document's content has been indexed, users are able to search for the documents based on words and phrases that appear in the documents. Users can combine words and phrases into more advanced searches with AND, OR, NOT, and NEAR operators. They can expand their searches to include words that sound like or are spelled like the search term, as well as expand searches to include related terms in a thesaurus configured by an administrator.

Oracle CM SDK also employs Oracle Text's linguistic analysis capabilities to allow users to search for documents based on subject matter, or "themes." Thematic searches allow users to search for documents that are about a specific topic (e.g. operating systems), even though the term "operating systems" never appears in the document's content.

Developers can also use Oracle CM SDK to summarize documents from various points of view. The Oracle CM SDK Java API allows developers to call Oracle Text to generate "gists" based on documents stored in the repository.

### **5.2 Do I need to run Oracle Text with Oracle CM SDK?**

No. If you decide to run Oracle CM SDK without Oracle Text, however, content-based searches will return zero results.

### **5.3 What is the overhead for running Oracle Text for content searching?**

The overhead for running Oracle Text for content indexing and retrieval depends on a variety of factors, including the number of documents, the size of the documents, and their format. It is important that you allow for enough memory and disk space to accommodate this overhead. Refer to the Oracle9i documentation set for Oracle Text performance tuning guidelines.

Most of the overhead for using Oracle Text occurs when new documents are being indexed. In general, you should allow an extra CPU to index binary documents, such as Microsoft Office documents. Users will not be able to search for the documents based on their content until after the indexing process has been completed.

#### **5.4 Does Oracle CM SDK support *interMedia* to index audio, video, and image files?**

Yes. Oracle CM SDK provides an agent that leverages *interMedia* features to automatically extract metadata from audio, video, and image files. Certain types of metadata, such as titles, or the closed-caption information for a movie, will be indexed by Oracle Text.



## **6.0 Administration and Management**

### **6.1 How can I bulk load files into Oracle CM SDK?**

The two most common methods used to bulk load files into Oracle CM SDK are to use an FTP connection, or to drag-and-drop the files in the Windows environment. For FTP, use any FTP client to log in to the FTP service port used by your Oracle CM SDK instance (set as 21 by default during installation) to transfer your files. In the Windows environment (SMB or Web Folders), log in as an administrator (to work with multiple user directories) or as a specific user, then drag and drop the folders and files from the source drive to the Oracle CM SDK directory you choose.

### **6.2 What migration utilities can I use with Oracle CM SDK?**

For most data migration, you can use any of the protocols provided with Oracle CM SDK (FTP, SMB, etc.) to transfer files from existing systems into Oracle CM SDK. There is currently no e-mail migration utility: e-mail accounts are created by default for all users you add to the system, but there is no utility to migrate existing messages into Oracle CM SDK. (Individual users can migrate their messages using the copy command in the IMAP client, however.)

### **6.3 What administrative tools are available with Oracle CM SDK?**

There are several tools used to administer and manage an Oracle CM SDK installation.

#### ***Oracle CM SDK Manager***

The Oracle CM SDK Manager allows you to:

- Administer users, groups, mount points, printers, queues and access control lists
- Manage the repository
- Manage Metadata Objects

### *Oracle CM SDK Object Inspector*

The Oracle CM SDK Object Inspector is a Java application used to help manage the objects in an Oracle CM SDK repository. With it, you can:

- Display the folder hierarchy and apply an ACL to an object
- Display the properties, categories, and relationships of selected objects
- Search for objects using attributes, relationships, and categories associated with an object

### *Oracle Enterprise Manager Application Server Control*

This administration tool comes as part of Oracle Application Server and allows you to:

- Start and stop components of Oracle CM SDK
- Modify Oracle CM SDK configuration for the domain, nodes, services and servers
- View domain performance and statistics

Also provided are command line utilities with UNIX-like command syntax that many administrators will find familiar. The command line utilities allow for batch processing and scripting of administrative tasks.

For more information, see the specific appendices for the Web interface and [command line utilities](#) in the *Oracle CM SDK Administration Guide*.

## **6.4 How do I start the CM SDK domain?**

You start the CM SDK domain using the Oracle Enterprise Manager Application Server Control, which lets you start, monitor, and stop all of the protocol servers and agents associated with one or more Oracle CM SDK instances.

## **6.5 How do I perform bulk backup and recovery with Oracle CM SDK?**

All data is stored inside the database, which allows you to rely on the usual backup and recovery mechanism used for all Oracle data.

For more information on using Oracle's backup and recovery mechanism, see the *Oracle9i Backup and Recovery Concepts*. This guide explains what to do for the different possible scenarios, what software is required, and what to set up. There is no way of restoring a single document from a backup. This capability will be implemented in a future release.

Oracle recommends that you save a copy of your initial software installation as a backup so that you can easily restore the files in case of a disk crash or other failure. To save the software, you should make a backup on tape or CD-ROM. This only needs to be done once, after completing the Oracle CM SDK installation.

## **6.6 Can I use LDAP with Oracle CM SDK?**

Yes. Oracle CM SDK supports the Oracle Internet Directory functionality of Oracle9i, which provides an LDAP interface.

## **6.7 How does Oracle CM SDK enforce security?**

Oracle CM SDK enforces security through the use of Access Control Lists (ACLs). ACLs are collections of Access Control Entries (ACEs) that are used to grant or revoke specific permissions to individual users or groups. ACEs use *permission bundles* to assign the necessary parameters to allow a user or group member to locate, read, edit, or delete files and folders. When a user logs in to the system through any protocol, the user must provide a name and password. Once validated, the user is allowed access to a document or folder based on the ACL assigned to that document or folder.



## 7.0 Development

### 7.1 How can I programmatically connect to Oracle CM SDK?

The Oracle CM SDK Java API provides a developer with the necessary classes to access content managed by Oracle CM SDK.

### 7.2 What skills do I need to develop an Oracle CM SDK application?

The most simple development tasks can be undertaken by anyone who has a basic understanding of how to create an XML file. However, for most practical purposes, a basic knowledge of HTML and Java programming is required.

### 7.3 What do I need to parse and render formats other than XML?

To parse and render formats other than XML, you must develop a custom parser and renderer. Parsers are Java classes that extract data from a document as it is uploaded to Oracle CM SDK. Renderers are classes that deliver data from Oracle CM SDK in a format suitable for the application and protocol used to access the information.

Parsing and rendering is currently only available through the Command-line Utilities Protocol (CUP).

### 7.4 Does Oracle CM SDK have a PL/SQL interface?

Oracle CM SDK does not have a PL/SQL interface. You can, however, use read-only SQL views to access Oracle CM SDK information. Additionally, developers can access the same database transaction that Oracle CM SDK uses when committing changes to the relational data store. This feature is critical if you want to do any relational database work at the same time that a file system operation occurs. For example, if you want to perform a PL/SQL call in OracleAS Portal when you insert new files in Oracle CM SDK, you can use the Oracle CM SDK transaction context for this combined operation.

### 7.5 Is there a COM or .NET interface to Oracle CM SDK?

There are no COM or .NET interfaces to Oracle CM SDK.

### 7.6 What sample applications are available for Oracle CM SDK?

Oracle CM SDK ships with an extensive set of samples that demonstrate the capabilities of the Java API. You'll find these examples in the `$IFS_HOME/samplecode` directory.

## 7.7 How sophisticated is the Oracle CM SDK versioning model?

Oracle CM SDK provides a very sophisticated versioning model that is capable of supporting a wide range of authoring processes.

Oracle CM SDK provides the option of having clients and protocols manage versions in a serial fashion. All changes to the document are tracked in a version series. An author can check out a document to prevent other users from making changes to the document while it is being modified. Once the changes are complete, the author can check the document back in or cancel the check out.



## 8.0 Further Information

### 8.1 Where can I get more information on Oracle CM SDK?

Oracle Content Management SDK [documentation on OTN](#)

Before installing Oracle CM SDK, please read the Oracle CM SDK [deployment configuration and requirements](#) which can be found in the [Oracle Content Management SDK Installation and Configuration Guide](#)



### ORACLE FUSION MIDDLEWARE

Oracle Application Server 10g: Oracle Content Management SDK FAQ

August 2005

Author: Simon Azriel

Contributing Authors:

Oracle Corporation  
World Headquarters  
500 Oracle Parkway  
Redwood Shores, CA 94065  
U.S.A.

Worldwide Inquiries:  
Phone: +1.650.506.7000  
Fax: +1.650.506.7200  
oracle.com

Copyright © 2005, Oracle. All rights reserved.

This document is provided for information purposes only and the contents hereof are subject to change without notice.

This document is not warranted to be error-free, nor subject to any other warranties or conditions, whether expressed orally or implied in law, including implied warranties and conditions of merchantability or fitness for a particular purpose. We specifically disclaim any liability with respect to this document and no contractual obligations are formed either directly or indirectly by this document. This document may not be reproduced or transmitted in any form or by any means, electronic or mechanical, for any purpose, without our prior written permission. Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.

Oracle, JD Edwards, PeopleSoft, and Retek are registered trademarks of Oracle Corporation and/or its affiliates. Other names may be trademarks of their respective owners.