Progress OpenEdge

# *What's New in OpenEdge® 10.1A*

**February 2006**

PROGRESS SOFTWARE

## Contents

# Introduction

OpenEdge 10 is the industrial-strength foundation for competitive business applications incorporating the latest technology required for building tomorrow's adaptive applications: new online database features for 24x7 availability, Web service-oriented architecture for integration readiness, more flexibility through .NET interoperability, and the most powerful business-processing available to support it all.

OpenEdge® 10.1A is focused on taking the innovations introduced in OpenEdge 10 and providing the tools developers need to simplify incorporating them into business applications. OpenEdge 10.1A is an enhancement release and replaces OpenEdge 10.0B, which will remain in the *Mature* lifecycle phase for nine (9) months after which time will automatically *Retired.*

This document presents a brief overview of the features and functionality that are part of the OpenEdge 10.1A release. For a complete list and additional information about enhancements and functionality available OpenEdge Release 10.1A, please refer to the Product Documentation: OpenEdge Getting Started: New and Revised Features

# Platforms

OpenEdge Release 10.1A provides continued support of all existing OpenEdge 10 operating systems as well as introducing new platform support and native 64Bit optimizations. For complete information on supported platforms, please refer to the Product Availability Guide at http://www.progress.com/products/lifecycle/index.ssp

- **New Platforms**
  Support for the Linux 64Bit operating system (x86 Intel AMD64 & EM64T).
  - The Linux 64Bit distributions supported are:
    - ✓ Red Hat Enterprise Linux 3.0 (AS/ES/WS editions)
    - ✓ Novell SUSE Enterprise Server 9
  - Support for JVM 1.4.2 (all platforms)

- **Native 64Bit optimization**
  Optimized 64Bit R-code provides increased Application performance over previous 32Bit and 64Bit OpenEdge 10 environments. R-code portability between 32Bit and 64Bit environments has been removed in favor over performance.
  - 32 Bit UNIX/Linux/DOS developments will need to leverage XCODE when deploying to 64Bit installations.
  - No Database conversion required when upgrading from a 32Bit environment
  - Existing 32Bit OpenEdge 10 Clients (running 32Bit optimized R-code) can connect to databases running under OpenEdge 10.1A 64Bit

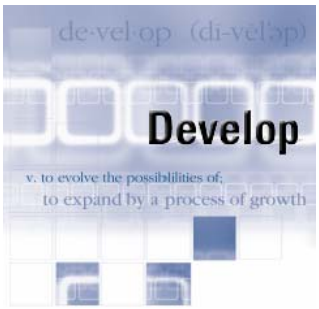
# Auditing

- OpenEdge Release 10.1A introduces a new core business service—auditing. Auditing services at the application and database level are delivered as configurable services out of the box, saving developers an enormous amount of effort, time, and risk. The auditing services extend the concept of security and audit integrity with mechanisms that ensure that the audit trails of transactions are themselves secure and tamper-proof. As with other core services, auditing combines language features, data management features, and an application controllable policy manager that allows users to precisely determine what data to audit, easily providing a way to integrate into their application and tune to meet their specific application needs.

This capability helps companies meet the regulatory compliance mandates of such legislation as Sarbanes Oxley and Basel II among others.

Auditing features allow you to do the following:

- Audit internal events such as schema changes, audit policy changes, database connections, authentication (login, logout), or archiving.
- Use a common auditing approach for OpenEdge ABL, SQL, and database utilities.
- Securely create and manage highly configurable audit policies that can be aggregated at run time and deployed.
- Support nonrepudiation of audit data by physically preventing updates and sealing audit data to prevent tampering both inside and outside an OpenEdge® RDBMS.
- Separate audit security to restrict who has access to the audit data records and who can archive, load, and remove them.
- Enable optional run-time checking of OpenEdge RDBMS table and field permissions.
- Tune auditing through audit policy, index deactivation, archiving, and the use of separate audit storage areas.
- Optionally group audit data by user-defined group events and/or user- defined application context.
- Query audit data through standard query mechanisms (for example, ProDataSets).




# Develop

## OpenEdge® Architect

OpenEdge Architect is a new product in OpenEdge Release 10.1A. It is an integrated development environment for ARAD (Architected Rapid Application Development). OpenEdge Architect built on Eclipse. The Eclipse platform is a framework for development tools. Eclipse is an open source project.

OpenEdge Architect includes a number of tools (developed by Progress and implemented as Eclipse plug-ins) that are designed specifically for developing OpenEdge applications.

OpenEdge Architect includes:

- A project-based environment for organizing and managing files, for connecting to databases, and for quickly finding components.
- A cataloging tool for quickly finding code annotations, components, procedures, functions, attributes, methods, and code data elements.
- A database tool for managing and modifying schema, and for automatically generating scripts.
- A variety of role-based and fully customizable views and perspectives to display resources, data, error messages, and output from running code.
- A full-featured code editor designed for creating OpenEdge ABL code, and which enables drag and drop functionality from database schema to code.
- Tools for building Temp-Tables and ProDataSets, and for creating Procedures and Classes.
- An integrated debugger.
- An integrated help system that includes context-sensitive help and code-assist help.

## OpenEdge ABL

OpenEdge 10.1A introduces the rebranding of the Progress 4GL as OpenEdge ABL (Advanced Business Language). Starting with this release you will see materials with references to ABL. The rebranding of 4GL to ABL will be gradual.

## Object-Oriented Extensions

OpenEdge 10.1A includes support for classes in the OpenEdge ABL. This support includes significant extensions to the language that allow you to code application objects using an object-oriented development model. These new class-based objects can coexist in the same application and communicate with procedure-based objects (persistent

procedures), which Release 10.1A continues to support from previous releases of OpenEdge. In other words, there is no need to change any existing application code to add class-based objects to your application.

OpenEdge ABL classes support many of the standard features of a complete object-oriented programming language, such as inheritance, polymorphism, delegation, and interfaces. Other features, such as method overloading, will be available in a future release.

Programming with the object-oriented extensions promotes code reusability, maintainability and strong-typing increases the application robustness.

## Other Language Enhancements

Release 10.1A provides the following additional programming enhancements:

- Enhanced performance through RUN statement analysis.
- Passing temp-tables and ProDataSets as parameters by reference between two routines using the BY-REFERENCE keyword. When you use the BY-REFERENCE keyword, the called routine just refers to the temp-table in the calling routine.
- NUM-REFERENCES attribute for ProDataSets, temp-tables, and buffers. This attribute lets you check how many references still exist for an allocated ProDataSet, temp-table, or buffer.
- Batch-mode event support.
- Support for a shorthand syntax that makes it easier and less cumbersome to write dynamic references to tables or fields within a dynamic ProDataSet, query, temp-table, or buffer.
- Subtransactions containing changes to large object (LOB) fields can be undone without undoing the entire transaction.
- To provide support for a conditional compile of DataServer-specific code, the DBTYPE function is now one of the functions evaluated by the preprocessor.
- GUI improvement with support for the Windows XP look (rounded corners, non-3D appearance) for the following widgets:
    - Buttons with images
    - NO-FOCUS and FLAT-BUTTON buttons
    - Browses
    - Rectangles
    - Status area of windows

## XML

With OpenEdge 10.1A, Progress extends support for XML with three major new features:

- **Reading and writing temp-tables and ProDataSets to and from XML:** Temp-tables, temp-table buffers, and ProDataSets can now directly read and write relational XML data and schema. Data read into one of these objects can append, replace, or merge existing data. These objects can also have their data or schema written to XML files. These operations are accomplished with the following new methods on the objects:

    - READ-XML( ) method
    - READ-XMLSCHEMA( ) method
    - WRITE-XML( ) method
    - WRITE-XMLSCHEMA( ) method

- **SAX-Writer Object**: The SAX-writer object is an object that constructs XML documents or fragments in a forward stream. It is a companion object to the SAX-reader, which parses XML documents in a stream.

    - Allows OpenEdge ABL developers to stream XML, significantly reducing memory requirements
    - Supports the handling of very large XML documents

- **XML Schema Validation**: New attributes for the ABL XML handling objects (X-document, X-noderef, SAX-reader, and the new SAX-writer, as well as the methods for reading and writing temp-tables and ProDataSets to XML) all support the use of XML Schema files (.xsd) to perform XML Schema Validation.

In addition ProDataSets, Temp-Tables, Temp-Table buffers and Data Relation Object Handles have been enhanced to support the following

- Attributes:
    - ENCODING attribute
    - NAMESPACE-PREFIX attribute
    - NAMESPACE-URI attribute
    - NESTED attribute
    - XML-DATA-TYPE attribute
    - XML-NODE-TYPE attribute

- Methods:
    - ADD-RELATION( ) method
    - SAVE( ) method

Finally, the new **xsdto4gl** command line utility generates ABL definitions (.i) from an XML Schema definition file (xsd).

## ProDataSets

The following statement, handles, attributes, methods and events have been added to ProDataSets:

- Statement: DEFINE DATA-SOURCE statement
- Handles:
    - Buffer object handle
    - Data-source object handle
    - ProDataSet object handle
    - Query object handle
    - Temp-table object handle
- Attributes:
    - ATTACHED-PAIRLIST attribute
    - DATA-SOURCE-COMPLETE-MAP attribute
    - FILL-MODE attribute (new REPLACE mode option)
    - FILL-WHERE-STRING attribute
    - KEYS attribute
    - NEXT-ROWID attribute
    - NUM-REFERENCES attribute
    - QUERY attribute
    - RESTART-ROWID attribute

- Methods:
    - APPLY-CALLBACK( ) method
    - ATTACH-DATA-SOURCE( ) method
    - COPY-DATASET method
    - COPY-TEMP-TABLE method
    - FILL() method
    - GET-CALLBACK-PROC-CONTEXT( ) method
    - GET-CALLBACK-PROC-NAME( ) method
    - GET-CHANGES( ) method
    - MERGE-CHANGES( ) method
    - MERGE-ROW-CHANGES( ) method
    - SAVE-ROW-CHANGES( ) method
    - SET-CALLBACK-PROCEDURE( ) method

    - READ-XML( ) method
    - READ-XMLSCHEMA( ) method
    - WRITE-XML( ) method
    - WRITE-XMLSCHEMA( ) method
- Events:
    - ROW-UPDATE event

The following attributes provide information about specifying the amount of schema information to marshal for temporary table parameters (as independent temporary tables or members of a ProDataSet object):

- MIN-SCHEMA-MARSHAL attribute
- NO-SCHEMA-MARSHAL attribute
- SCHEMA-MARSHAL attribute

Finally, 10.1A introduces the ADM2 dataview class to support binding SmartObject user interfaces to ProDataSets instead of to SmartDataObjects (SDOs) or SmartBusinessObjects (SBOs). This technique simplifies the task of implementing a Presentation Layer according to OpenEdge Reference Architecture design principles. You can have a user interface based on current SmartObjects while transitioning to ProDataSet-based Business Entities for supplying your application's data access and business logic.

## Open Client

OpenEdge 10.1A enhancements to Open Clients include a new OpenAPI for accessing application components on the OpenEdge Application Server without the need for static proxies and new mechanisms for passing ProDataSet and temp-table parameters. The OpenAPI can be used by .NET Open Clients as well as Java Open Clients.

- **.NET Open Client:** 10.1A includes additional properties to support the mappings between OpenEdge ABL ProDataSets and ADO.NET DataSets, and between OpenEdge ABL temp-tables and ADO.NET DataTables.

- **Java Open Client:** 10.1A introduces support for the Java Service Data Objects (Java SDO, JSR 235) interface that allows a Java Open Clients to pass OpenEdge ABL ProDataSets as parameters. This implementation provides a comprehensive mapping to ProDataSets, including such standard Java SDO features as:
    - Relationship support

- Data introspection
- Change tracking
- XML serialization

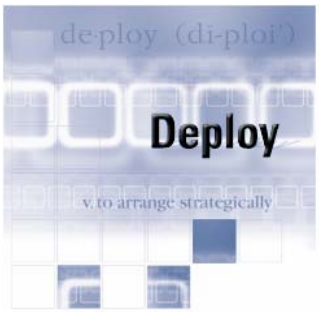
Extensions in the OpenEdge implementation also support:

- Additional Java data types to better map some 4GL data types
- Relationship support that maps more closely to data-relations in a ProDataSet
- Data introspection support that maps more closely to a ProDataSet metaschema
- Change tracking support that allows for mapping a changes-only ProDataSet parameter

## Diagnostics

The LOG-MANAGER handle has been enhanced with the following new methods

- WRITE-MESSAGE () method – Allows application developers to write their own application messages
- CLOSE-LOG () method
- CLEAR-LOG () method




# Deploy:

## OpenEdge RDBMS

Release 10.1A includes the following enhancements to the OpenEdge® RDBMS.

- **Auditing support**
  As part of the OpenEdge core business services strategy, this release includes auditing to provide an efficient and scalable mechanism to produce an audit trail of access to an application's operations and data. New database utilities in support of auditing include:

- **Utilities enhancements for increased performance and online availability**
  The utility enhancements improve system availability by either removing the need to take the database offline to perform maintenance, or by increasing the performance of the utility, thus reducing the amount of time a database must be offline.
  - Performance of utilities such as Binary Dump & Load, Index Rebuild, and Prostrct is enhanced
  - Prostrct Validate Structure File – A new prostrct command to validate a structure file will read each line in the indicated structure file and identify any syntax errors, displaying the line number and the error detected followed by the line itself.
  - Prostrct Statistics Online – The Prostrct Statistics utility may now be run against an open database.

- **Self-Sustaining Database Features**
  The goal of the self-sustaining features in the 10.1a release is to continue simplifying the job of maintaining an OpenEdge database by improving automation of DBA operations.
  - **After-image file management**
    The AI Management Utility provides customer's with a tool that incorporates a best-practice approach to managing after-image extents that is tightly integrated into the RDBMS. This utility can be run from a command line or shell script - it should also be capable of being started or stopped via Progress Explorer.
  - **Log file format**
    For Release 10.1A the format of database log file entries has been enhanced to include more information, including process-id, thread-id, and time information.
  - **Truncate Logfile Online**
    This enhancement allows OpenEdge customers to truncate their database log files while the database is online.
  - **Add Database File Extents Online**
    This enhancement provides the ability to add new data areas to a running database.
  - **Add New Inactive Index Online**
    This enhancement provides the ability to modify a table by adding a new field and to add a new inactive index on an existing table.
  - **Saving key database events**

The database is enhanced to optionally enable the logging of key events within the database. Key events, which were previously exclusively recorded in the database log file, are retrieved from the log file and stored within the database. Saving key events in the database prevents the loss of information when a database log file is truncated.

- **JTA-compliant transactions for OpenEdge SQL**
  The OpenEdge Storage Engine now supports the Java Transaction API (JTA). The specification allows applications to perform distributed transactions, that is, transactions that access and update data on two or more networked computer resources.

- **Type 4 JDBC Driver**
  Applications continue to move to class loaders due to increased security demands as well as the Java security model. OpenEdge has remained ahead of the curve by providing customers with a Type 4 (pure java) driver.

- **DBTool by Percentage**
  The dbtool utility has been enhanced to allow the DBA to set a % above the largest value, therefore allowing some "headroom" for overflow conditions from the 4gl application. This will help minimize DB downtime.

## OpenEdge DataServers

OpenEdge Release 10.1A includes the following enhancements in support of Microsoft SQL Server, Oracle and ODBC compliant DataSources:

- **Automated Temp Table population via a SQL results set.** Defined as part of the RUN STORED-PROCEDURE statement, the LOAD-REULT-INTO phrase enables an RDBMS stored procedure or *send-sql-statement* to be executed against a foreign data source for which the result sets that are derived can be loaded directly into one or more Progress static and/or dynamic temp-tables. Capabilities for native OpenEdge ROWID support have also been provided.
- **Oracle RDBMS optimizer enhancements:** Either the Oracle 'shadow column' or the Oracle 'Function based Index' methodologies for emulating case insensitivity under Oracle can be selected by the DataServer developer providing better alignment with the Oracle RULES and COST based optimizers.
- **The latest DataDirect 5.1 ODBC drivers:** Improved DB2 support (i5OS v5r3)
- **Improved OpenEdge Advanced Business Language (ABL) support:** To provide support for a conditional compile of DataServer-specific code, the DBTYPE function is now one of the functions that the preprocessor evaluates.

## OpenEdge SQL

Release 10.1A includes several enhancements to the OpenEdge SQL functionality:

- Support for Auditing Core Business Service (see Auditing section)
- Improve join order performance with 3 or more tables
- Update JDBC driver to Type 4
- ODBC Driver with Unicode support
- Support for the Java Transaction API (JTA)
- Additional online schema changes:
- ALTER TABLE ADD COLUMN
- CREATE VIEW

- CREATE PROCEDURE
- CREATE TRIGGER
- Support ARRAY and VARRAY data types
- Removal of SQL_WIDTH limitation with some string functions
- Add generation of XML from SQL
- Elimination of conditions causing a "panic" scenario

## Installation

Release 10.1A includes the following enhancements to the installation processes:

- **New medium for OpenEdge distribution and installation:** In Release 10.1A, Progress Software Corporation supports a new DVD-based option to distribute OpenEdge installation software. In addition to the existing CD-based option and the Electronic Software Download (ESD) option available from the Progress Download Center at http://www.progress.com/esd.

  The single OpenEdge installation software DVD contains all supported Windows and UNIX platform images from which Release 10.1A products can be installed.

- **Shared network install utility (Netsetup) enhancement:** Release 10.1A supports a change to the Netsetup installation to allow the use of Uniform Naming Conventions (UNC) pathnames.

- **Enhancements to the OpenEdge silent (batch) installation:** In Release 10.1A, Windows and UNIX platforms have incorporated various enhancements into their respective OpenEdge silent installation implementations. For example, in addition to the existing option to perform a Complete installation, users can now choose to perform a Custom OpenEdge installation. These enhancements allow for a fully embeddable OpenEdge installation within the Partners's application installation procedures.

- **Enhanced interactive installation process:** In Release 10.1A, the online, interactive installation process has been redesigned to help users more easily and quickly perform a successful OpenEdge installation. Enhancements include:
  - Addition of two Attention dialog box prompts that allow users to bypass making choices related to either WebSpeed and/or the Adapter for Sonic ESB
  - Inclusion of a new Domain Name field, and the change of the SonicESB Container Installation Location field to read Sonic ESB Home Directory field
  - Online Help available from the dialog-boxes of installation process

- **Enhanced License Update Utility:** The License Update Utility has been enhanced to streamline the process of updating an existing product license. In addition to applying user-count increases or updating the termination dates of evaluation licenses, users can now enter a different serial number (and associated, new control numbers) to update an existing license file as well as. This greatly benefits PSDN Members when renewing their product subscriptions. This feature is available on all supported Windows and UNIX platforms.

- **Streamlined and automated configuration when installing OpenEdge Adapter for SonicMQ and OpenEdge Adapter for Sonic ESB:** When installing any of these adapteres, the installation files are updated and created for you, provided that you have the SonicMQ Domain Manager running. Additionally, the installation process automatically creates a new Sonic ESB container for hosting your OpenEdge services. This Sonic ESB container is available in the Sonic ESB environment.

- **Enhanced installation-related documentation deliverables:** Several changes have been made to the documentation deliverables related to the installation process to help users to better prepare for and more easily perform the OpenEdge installation. For example a new OpenEdge Installation Checklist document to go through and gather all the information needed to perform the installation.


# Integrate:

## Web Services

OpenEdge 10.1A adds the following new features in support of OpenEdge ABL clients calling Web services:

- **Support for passing complex data parameters as ProDataSets or temp-tables.**
  If the WSDL Analyzer determines that a ProDataSet or temp-table definition can map a complex data parameter passed by a Web service operation, the Analyzer documents this information. You can then define and pass the parameter directly as the specified ProDataSet or temp-table to the corresponding Web service procedure or user-defined function. The WSDL Analyzer provides similar support for mapping ProDataSets and temp-tables to SOAP message header entries and SOAP fault detail, by specifying an appropriate 4GL object that you can use (when possible) to import and export the corresponding SOAP message data.

- **Support for unwrapping wrapped document literal (Wrapped Doc/Lit).**
  This Microsoft convention of the Document/Literal SOAP format passes all input parameters in a single complex data element and passes all output parameters in a single complex data element. With Release 10.1A, the WSDL Analyzer documents these complex data parameters in unwrapped form, showing 4GL procedure and user-defined function signatures with individual 4GL data types for each input parameter and each output parameter that is wrapped in a single complex data element. This allows you to directly access these parameters from the 4GL instead of having to parse the XML for each complex data element. This 10.1A support also allows you to access the complex data elements in wrapped form, essentially overloading the signatures of all procedures and user-defined functions that map a Wrapped Doc/Lit Web service.

- **Support for Universal Naming Convention (UNC) pathnames to access WSDL files and SOAP resources within WSDL files.**

## OpenEdge Adapter for SonicMQ

Release 10.1A includes several enhancements to the OpenEdge® Adapter for SonicMQ®.

- **Improved Installation**
  The SonicMQ client is now supplied on the installation kit and silently installed, eliminating the manual install and configuration process that was required in the past. Optionally a default Sonic ESB container for running OpenEdge services is created, or a script generated with the container name and configuration data for later storage in the SonicMQ Management Broker.

- **New OpenEdge Adapter for SonicMQ architecture**
  Release 10.1A includes two new adapter models for 4GL applications to access SonicMQ functionality:

  - **ClientConnect** — When an application requires messaging, ClientConnect can be used to automatically start and manage the server process that converts 4GL requests into the JMS required by SonicMQ, and the reverse JMS to 4GL. This is an alternative to the existing BrokerConnect capability, which required the user to start and manage the 4GL-JMS server process manually. With ClientConnect, there is one conversion process per client process.

  - **ServerConnect** — The 4GL-JMS conversion can also be handled on the OpenEdge Server running AppServer or WebSpeed. ServerConnect runs a single 4GL-JMS conversion process per ubroker process, allowing multiple server process requests to be handled by a single conversion process.

- **Unified domain support (JMS 1.1)**
  Prior to OpenEdge Release 10.1, developers were required to create messaging sessions for either Point-To-Point (PTP) or Publish/Subscribe (Pub/Sub), and each had its own set of calls. With JMS 1.1 the messaging session types have been unified so developers can now utilize PTP and/or Pub/Sub domains in a single session using standard/common calls.

- **Client persistence**
  Clients can continue to send messages regardless of the status of the SonicMQ Broker. If the SonicMQ Broker is not available, messages are stored locally and sent when the SonicMQ Broker becomes available. Client persistence is only available to 4GL clients using the new ClientConnect or ServerConnect functionality.

- **Fault-tolerant connections**
  When the SonicMQ Broker or network fails, the client resumes when the broker or its backup is available. Fault tolerance is only available to 4GL clients who use the new ClientConnect or ServerConnect functionality, and can be used in conjunction with client persistence.

- **Temporary queue or topic**
  A temporary queue or topic allows the SonicMQ Broker to hold application messages during the messaging session. A temporary queue or topic can be used in 4GL client code or can be used by 4GL code running in an AppServer.

- **Server-based message selectors**
  SonicMQ messages can be filtered by the SonicMQ Broker so that only messages meeting specific criteria will be received, potentially reducing message traffic and increasing performance.

- **Serialized connection objects**
  A serialized connection object contains all of the information required by a client to connect to a Sonic Broker.
  The Sonic Management Console allows an administrator to create serialized connection objects and save them as files. These can be pushed to clients, so that the client does not have to hard code the Broker connection (url, user, password) information, allowing for greater flexibility in the run time environment.

- **Enhanced XML support**
  OpenEdge Release 10.1A includes additional support for the SonicMQ message type of XMLMessage. The 4GL client can send more types of data as XMLMessages including Temp-Tables, ProDataSets, SAX-READER, SAX- WRITER and X-DOCUMENT.


# Manage:

## OpenEdge® Replication

OpenEdge® [formerly Fathom®] Replication includes the following new features in OpenEdge Release 10.1A:

- The ability to replicate from the secondary machine back to the primary machine.

- An automated process for moving target database activity back to the source database once the source database again becomes available after a failure. This process is known as *Failback.*

- The ability to enable a Fathom Replication source database while the database is online, provided that after-imaging (AI) is already active for the database.

- Transition processing enhancements that include the ability to:
  - Transition a target database to a normal or a source database.
  - Transition a source database to a target database.
  - Restore a database with implied transition by including the new -REPL Transition argument. If a newly restored database is a source database, it is transitioned to a target database, or visa versa.
  - Perform transition operations on a source or target database whether the database is online or offline.

## Business Intelligence: Crystal Reports XI

Crystal Reports XI®—a proven, world standard solution—helps you design, manage, and deliver reports via the web and embedded in enterprise applications. It can provide you with a solid starting point for your business intelligence (BI) strategy by helping you securely deliver the most requested pieces of information—as highly-formatted reports—to end users both inside and outside your organization.

We encourage you to take this opportunity to explore the powerful Crystal products from Business Objects in your development environment. See for yourself how Crystal products provide extreme insight into your information and how these products expedite report development. The OpenEdge 10.1A package includes evaluation copies of the new Crystal Reports XI Professional and Crystal Reports XI Server.

New to Crystal Reports XI are improved productivity features allowing you and your end users to experience high quality viewing, printing, and exporting with less effort. The following themes are an overview of what's new in Crystal Reports XI:

- Powerful data access and report design

- Enhanced productivity and maintenance
- Report management and delivery

This release also includes a new edition, Crystal Reports Server, designed for departmental enterprise reporting. Crystal Reports Server is a complete turn-key reporting package that includes everything your customers need to easily and securely design, manage, and share Crystal Reports over the web.

Reporting is a continuous process—from accessing and transforming data into formatted reports, to delivering and managing them over the web, to integrating reports into applications and portals. As a powerful standard designed to address all stages of the reporting process, Crystal Reports allows you to:

- Access and present any data the way you want
- Deliver the right reports to end users at the right time
- Integrate reporting with applications and portals

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