

CRYSTAL REPORTS® SERVER A FUNCTIONAL OVERVIEW



Crystal Reports® Server software offers user-friendly features and tools to simplify your work when you manage reports and dashboards. Crystal Reports Server harnesses the same platform as SAP® BusinessObjects™ Enterprise software to offer small businesses and mid-size companies a proven reporting and dashboard solution on a single server. It addresses the complete reporting process – from data access and report and dashboard design to report management and delivery, including content integration with portals and enterprise applications.

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Disclaimer

The availability of some functionality may vary depending on license type. For full details, please visit the licensing terms for Crystal Reports Server on our Web site.



FUNCTIONAL OVERVIEW

COMPLETE REPORTING AND DASHBOARD MANAGEMENT SOLUTION

Crystal Reports Server offers user-friendly and powerful features and tools to simplify your work when you manage reports.

Crystal Reports® Server software offers small businesses and midsize companies a proven reporting and dashboard solution on a single server. It addresses the complete reporting process – from data access and report and dashboard design to report management and delivery, including content integration with portals and enterprise applications. Crystal Reports Server is powered by the proven service-oriented architecture (SOA) of SAP® BusinessObjects™ Enterprise software, a specialized end-user tool that includes Crystal Reports software, Xcelsius® software, SAP BusinessObjects Web Intelligence® software, SAP BusinessObjects Voyager software, and SAP BusinessObjects Dashboard Builder software. SAP BusinessObjects Enterprise also includes data integration functionality from SAP BusinessObjects Data Integrator

software, which is designed using modern Web standards with an industry-standard communication framework to tie all components and services together.

FUNCTIONAL ARCHITECTURE

OPTIMIZED COMPONENTS, SERVICES, AND END-USER TOOLS

Crystal Reports Server is composed of separate yet interconnected components and services optimized for specific tasks (see Figure 1). These components and services include:

- User-interaction tier for end-user report and dashboard viewing and interaction
- Developer services, such as development kits and portal integration kits, to enable flexible integration with Web portals and applications
- Web-based management tools for administration and auditing of Crystal Reports Server services and objects
- Services for report publishing, security, and processing
- Data services for comprehensive and flexible data access

User-Interaction Tier

The end-user portal (see Figure 2) is a complete, production-ready Web portal that enables end users to access, view, and manage their Crystal Reports documents (.rpt) and Xcelsius dashboards (.swf). Consumers use the portal to readily find the documents they need. They can navigate using an integrated search facility as well as a folder navigation tree. They can also schedule their own Crystal Reports documents to refresh on a regular basis and manage their history list of previously scheduled reports. Users can customize their portal by saving multiple layouts of frequently viewed reports and can access SAP BusinessObjects Dashboard Builder to create and view personal and corporate dashboards.

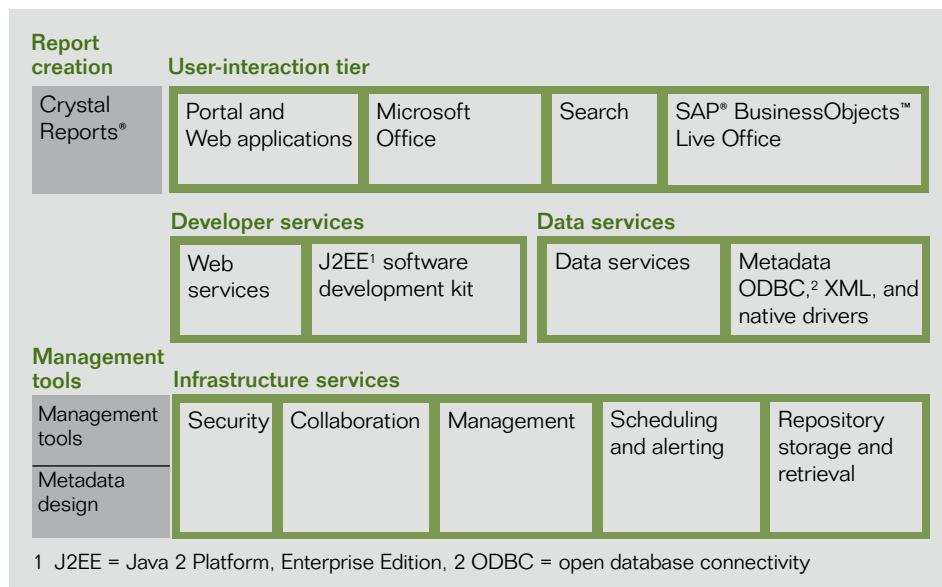


Figure 1: Crystal Reports Server Functional Architecture

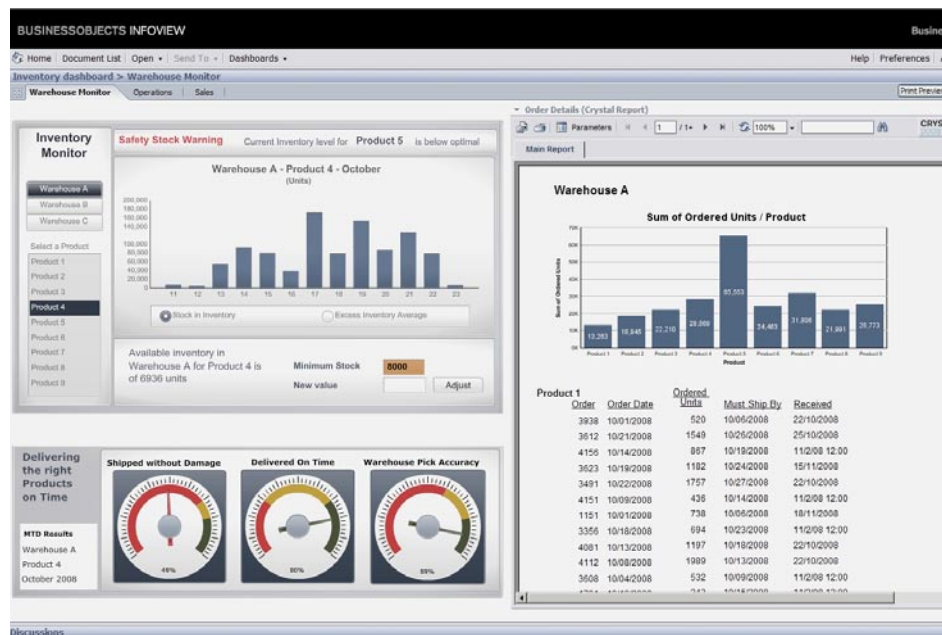


Figure 2: Reporting and Dashboard End-User Portal in Crystal Reports® Server

Report Viewers for Viewing, Printing, and Exporting

Within the end-user portal, you can select your preferred viewer from a choice of thin- and zero-client report viewers: dynamic HTML (DHTML), ActiveX viewer, and Java applet. These viewers provide end users with simple report-viewing and interaction functions, including report refreshing, printing, exporting, and searching. The portal and the report viewers are simple, straightforward, and designed to be used by your end users with minimal training. Crystal Reports Viewer software, a stand-alone .rpt file viewer, is available via free download for offline report viewing and interaction. Exporting is a common end-user requirement. Crystal Reports Server supports a variety of exporting formats, including Adobe PDF, Microsoft Excel, XML, and RTF. End users can choose to export a complete report or a specific page.

Microsoft Office with SAP BusinessObjects Live Office

SAP BusinessObjects Live Office software lets you embed refreshable, verified corporate data – managed by Crystal Reports Server – into your Microsoft Office documents. With SAP BusinessObjects Live Office, your Microsoft Office documents display data from the same trusted reports you manage in Crystal Reports Server. When everyone uses the same correct source of information, you don't spend time disputing the validity of the data. Instead, everyone focuses on making quicker, better-informed decisions. With SAP BusinessObjects Live Office, you can be confident the data you

access is timely, consistent, and accurate. From within Microsoft Office (see Figures 3 and 4), you can use SAP BusinessObjects Live Office to:

- Access live data refreshed from accurate reports
- Modify data filters and formulas as needed, while retaining all existing formatting and calculations
- Automatically refresh a single data item or all the data in your document

SAP BusinessObjects Live Office architecture uses Web services to eliminate firewall configuration issues and reduce the client-side footprint. It consists of a client-side component that integrates with Microsoft Word, Microsoft Excel, and Microsoft

PowerPoint. This client-side component uses Web services to communicate with Crystal Reports Server.

The Java Web component adapter, included in the server-side installation, communicates with the client. SAP BusinessObjects Live Office takes advantage of both the report security and data security that Crystal Reports Server provides. Users must log in to Crystal Reports Server through the SAP BusinessObjects Live Office client to ensure that they are authorized to see the list of reports presented. Data-level security is also applied when data is refreshed, which means that users see only the data they have the rights to view.

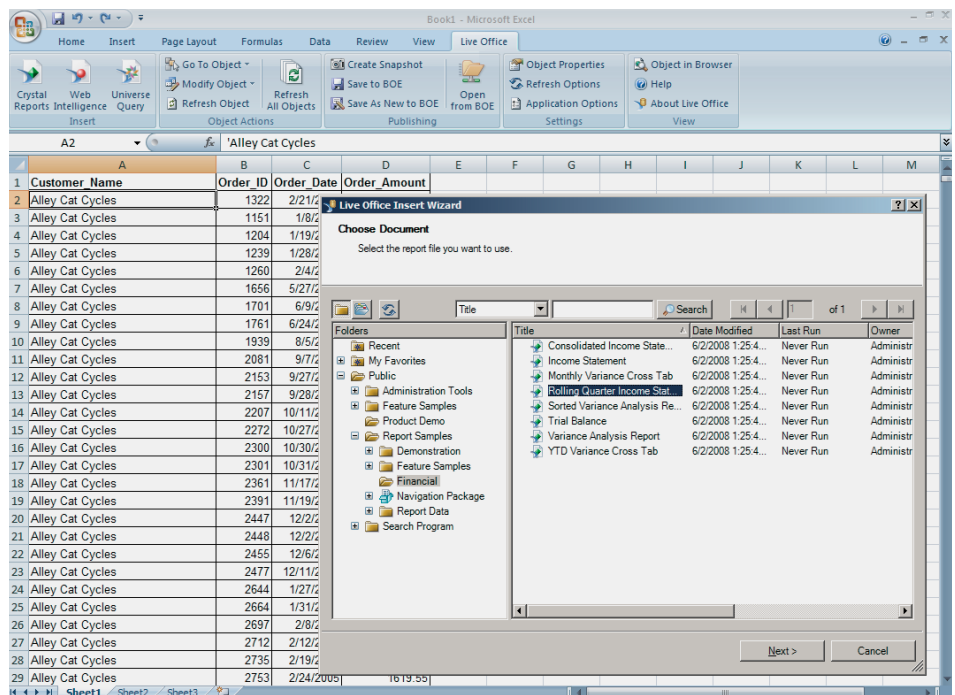


Figure 3: Filtering Crystal Reports® Data Within Microsoft Excel

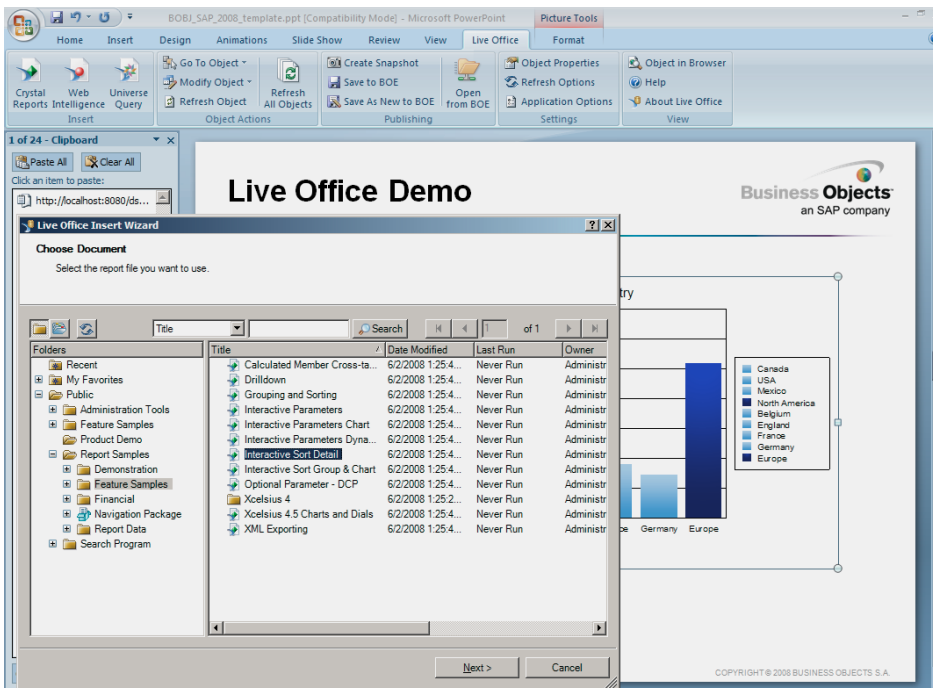


Figure 4: Navigating Crystal Reports® Server Content Within Microsoft PowerPoint

Web and Application Developer Services

Crystal Reports Server includes comprehensive software development kits (SDKs) and portal integration kits to enable flexible integration with existing Web environments.

Developer Interfaces

Crystal Reports Server comprises a powerful set of reporting services that are exposed through an extensive set of SDKs. All end-user interfaces are built on top of these SDKs, which means that developers can access all aspects of the software. The SDK object model encapsulates all the calls needed to:

- Extract content listings
- Control content processing and delivery
- View and interact with content
- Administer the software

All the sample applications included with Crystal Reports Server use this well-documented object model.

Services for Microsoft .NET and J2EE

Crystal Reports Server provides tight integration with Java and Microsoft-based platforms via native Java, Microsoft .NET, and Web services SDKs. These kits include robust reporting components, sample applications, and documentation. Developers can install these components on Web application

servers, including Microsoft IIS, BEA WebLogic, IBM WebSphere, Apache, Oracle10g application server, or Sun ONE. The SDKs provide a high-level application programming interface (API) so that you can use the development language you prefer to control every aspect of Crystal Reports Server. The components process requests from users in the user-interaction tier and then communicate these requests to the appropriate service in the infrastructure tier. The developer services include support for report viewing and logic to interpret and direct Web requests to the appropriate Crystal Reports Server service.

Crystal Reports Server uses a Java SDK or a Microsoft .NET SDK to run the software with a third-party application server, which acts as the gateway between the Web server and the rest of Crystal Reports Server. The application server is responsible for processing requests from your browser, sending certain requests to the Web component adapter, and using the SDK to interpret components in JavaServer Pages (JSP files) or in Active Server Pages (.aspx files).

Web Services

Crystal Reports Server includes a comprehensive Web services SDK that allows developers to integrate documents directly into applications using industry-standard technology. It consists of a series of Web-based functions that use Microsoft .NET or Java 2 Platform, Enterprise Edition (J2EE) platforms.

You can use robust security options for user, group, object, and folder levels to give the right people access to the right information at the right time.

You can use robust security options for user, group, object, and folder levels to give the right people access to the right information at the right time. Web services make it easier and faster to integrate Crystal Reports Server and SAP applications with Web-based applications and facilitate the deployment of Crystal Reports Server and SAP BusinessObjects Enterprise with customized applications. Web services are available for document display and refresh and to provide drill-down functionality to end users. For developers, the Web services provider is deployed on the server side with Crystal Reports Server or SAP BusinessObjects Enterprise. For developers, the API enables the creation of customized Web sites, applications, or Web services that access the services in Crystal Reports Server.

Portal Integration Kits

Crystal Reports Server supports integration into industry-leading portal server environments by delivering components with similar functionality to the end-user portal. Prebuilt portal integration kits for Microsoft Sharepoint, IBM, and Oracle portals are available for use with Crystal Reports Server. These portal integration kits use portal standards, such as JSR 168 and Web Parts.

Management Tools

To support decentralized management functions, Crystal Reports Server includes a Web portal for tasks such as password management, report scheduling, and user-access control. You can customize and automate management tasks using the Crystal Reports Server SDKs.

Central Management Console

For total system control from a single Web interface, you require a powerful yet easy-to-use administration environment to help you manage a broad set of end-user interaction requirements, as well as security and access rights. Crystal Reports Server includes a central management console – a 100% Web-based environment for centralized

system management, deployment, and configuration. The console (see Figure 5) provides flexible, powerful, and granular control of the environment for tasks that include user-role setup, security access, server administration, password management, and so on. It enables administrators to readily access and configure the software while controlling the overall access rights, applications, and end-user viewing experience. IT management and administration personnel benefit from the central repository for all Crystal Reports, Xcelsius dashboards, folders, and user profiles, as well as from access to security entitlement databases for user, role, and document security.

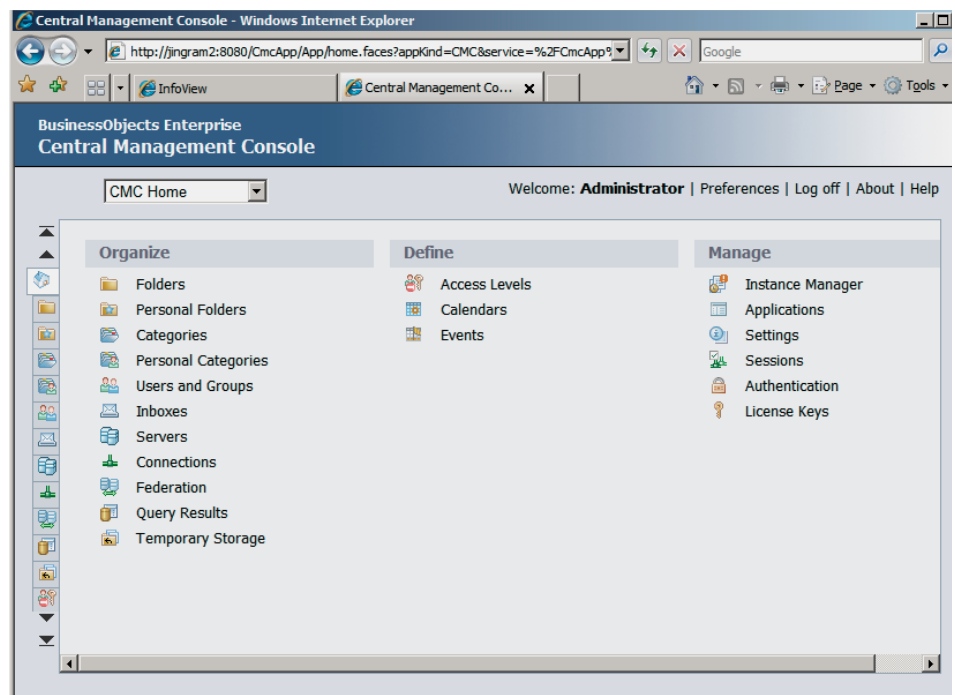


Figure 5: Central Management Console

Central Configuration Manager

A central configuration manager is designed exclusively for the server management and configuration of the Crystal Reports Server services. This tool allows you to start, stop, enable, and disable servers; you can also view and configure advanced server settings.

Infrastructure Services

Based on the proven SOA of SAP BusinessObjects Enterprise, Crystal Reports Server represents the services where actual data processing, document processing, and end-user access take place. The server is segmented into a series of specialized services for different tasks and is linked by a highly optimized communication framework. For Crystal Reports Server, these services all run on a single server.

The communication framework handles the movement of information between the services and SDKs and provides end-user information access, delivery, and interaction. You can access individual services via the provided Java, Microsoft .NET, and Web services SDKs, so there is no need to directly access or configure the communication framework. The server enables end users to view and interact with information inside and outside the firewall. It allows interactive report viewing, discussion threads for collaborative decision making, and integrated scheduling and distribution of Crystal Reports documents based on events, business calendars, or intervals.

Security

Crystal Reports Server can secure access to reports and dashboards, the folders in which they are stored, and

the actual data that is visible within the reports. Building on a hierarchical object-level security model, Crystal Reports Server supports security rights at both the folder and object level and supports full inheritance at the user and group level (see Figure 6). Similarly, the product supports aggregation through a flexible group-user membership model. Data-level security is provided by an innovative view-time security feature, which secures report

group, the user is added automatically to that same group within the Crystal Reports Server software. When Microsoft operating systems, Active Directory, and Microsoft SQL Server are used, Crystal Reports Server enables single sign-on through to the database for your end users.

In addition, an integrated Crystal Reports Server security function is available for those customers who do

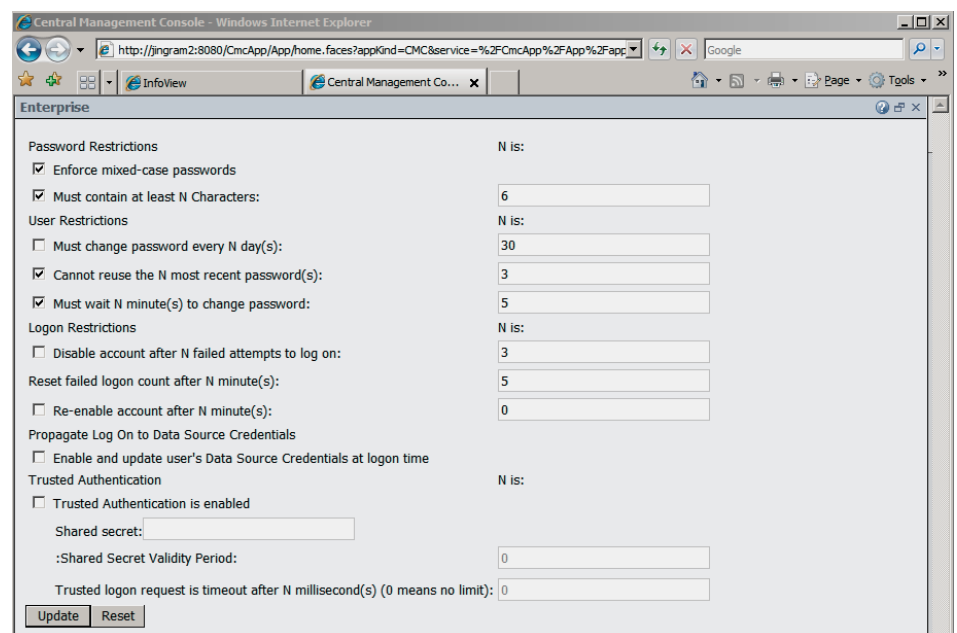


Figure 6: Central Management Console Authentication Window

data even for scheduled reports. You can integrate with many third-party security-entitlement database protocols – such as lightweight directory access protocol (LDAP), Kerberos, eTrust Site-Minder, and Active Directory through Microsoft Windows NT – and use the information to control user-access rights. The Crystal Reports Server security function maps to these security databases directly. For example, when a user is added to an LDAP

not currently use an entitlement database. The function also supports the ability to use more than one entitlement database in the same implementation. This is particularly important in cases where organizations need to combine different audiences. For example, a system might maintain that internal users access the environment using a Microsoft NT authentication database, while business-partner security information is stored in an LDAP database.

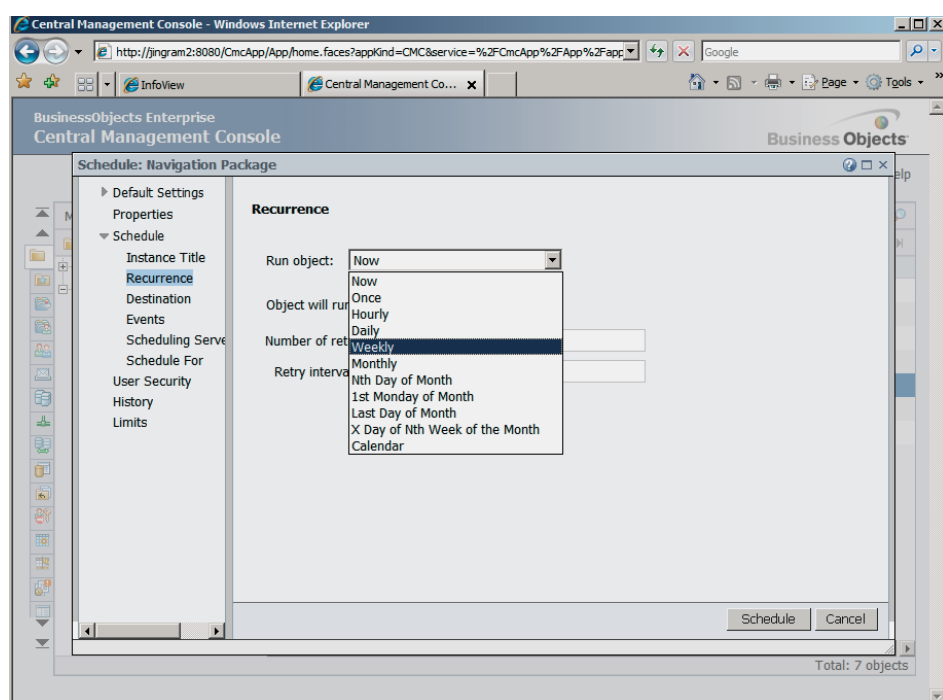


Figure 7: Central Management Console Scheduling Window

System Management

The central management server is a key service responsible for maintaining a database of information about Crystal Reports Server. Data in the central management server includes information on users and groups, security levels, and reports. This information is used to enforce access rights to Crystal Reports Server and the types of tasks users can perform. The central management server also manages access to the report repository and auditing databases.

Repository, Storage, and Retrieval

Crystal Reports Server stores reports in a central repository database. Although this repository database stores specific information about the objects published to it – including users, security, groups, folders, and parameters – it does not actually store

physical copies of the reports. It contains pointers to the physical reports, thereby making report retrieval faster. The repository database is maintained by using the provided MySQL database or a Microsoft SQL Server, Oracle database, or IBM DB2 database. The database structure can be created automatically during setup of Crystal Reports Server or configured on a different database.

Auditing

Crystal Reports Server records significant events in an auditing database, allowing administrators to report against these events and answer questions about user and system activity.

Scheduling and Alerting

The report job server provides scheduling functions for Crystal Reports. There are many options available,

including scheduling based on a specified time, a recurring schedule, or a business calendar. Reports can also be scheduled to output in different formats such as Crystal Reports, Microsoft Excel, Adobe PDF, Microsoft Word, and text – allowing further user interaction. And you can schedule reports to different destinations, including e-mail, printer, or file server. You can also combine report scheduling with user role-based security, allowing IT and end users to deliver the right information to the people or groups that need it. The scheduler in Crystal Reports Server (see Figure 7) enables you to schedule reports for automatic distribution to external locations, such as file transfer protocol (FTP) servers, e-mail distribution lists, printers, and file servers. When used in conjunction with security, a single report can be run once and distributed with personalized data for specific individuals or groups.

Publishing

Publishing lets you make documents publicly available for mass consumption (see Figure 8). Users can create a publication by defining source documents, selecting recipients, tailoring the information that user groups will see, and scheduling the publication to multiple destinations and in multiple delivery formats. Your users can also subscribe to or unsubscribe from publications. You can extend data-driven report delivery beyond your Crystal Reports Server deployment by distributing personalized content to dynamic recipients. These recipients are outside the Crystal Reports Server system. Using a custom data provider, such as a database, LDAP, or active directory, you can define these external recipients and distribute publications to both internal and external recipients simultaneously.

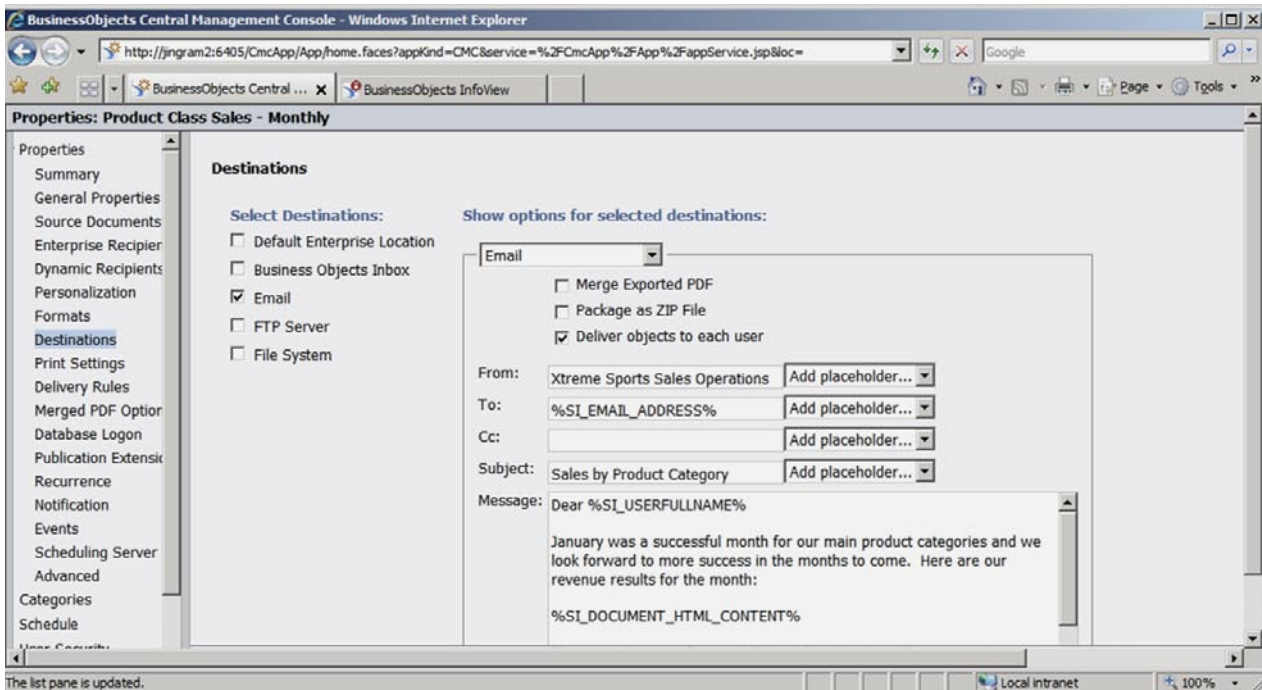


Figure 8: Publishing to a List of Dynamic Recipients

Processing and Caching

Crystal Reports Server supports efficient report processing through the page server. The page server is primarily responsible for responding to page requests by processing reports and generating them as needed. Only the requested page is returned, not the entire report. This greatly enhances performance and reduces unnecessary network traffic for large reports.

Crystal Reports Server also supports active data sharing. Active data sharing means that in situations where different reports access the same data, the documents can “share” the data, and the requested report can be rendered without an additional database hit, even though the other report itself may be different. This results in significant performance improvement across the entire system, including hardware,

applications, and database. A major benefit of active data sharing is that as the load and usage increase, more data is cached, and the system runs more efficiently. The cache server in Crystal Reports Server is responsible for handling all report-viewing requests. The cache server checks whether or not it can fulfill a request with a cached report page. If it cannot, it asks the page server to generate the page.

Collaboration

Threaded discussions – a fully integrated feature of the end-user portal – enable users to create and maintain comments on any Crystal Reports document accessible in Crystal Reports Server. All threaded-discussion information is managed and stored in the repository. Discussion threads can also be made public or private.

Adding Reports to Crystal Reports Server

Crystal Reports Server is designed to support batch publishing of Crystal Reports documents to the document repository on the Web. Using a desktop publishing wizard (see Figure 9), your administrators and end users can publish multiple reports to Crystal Reports Server. The wizard also lets you configure report processing schedules, security, parameters, and database logons.

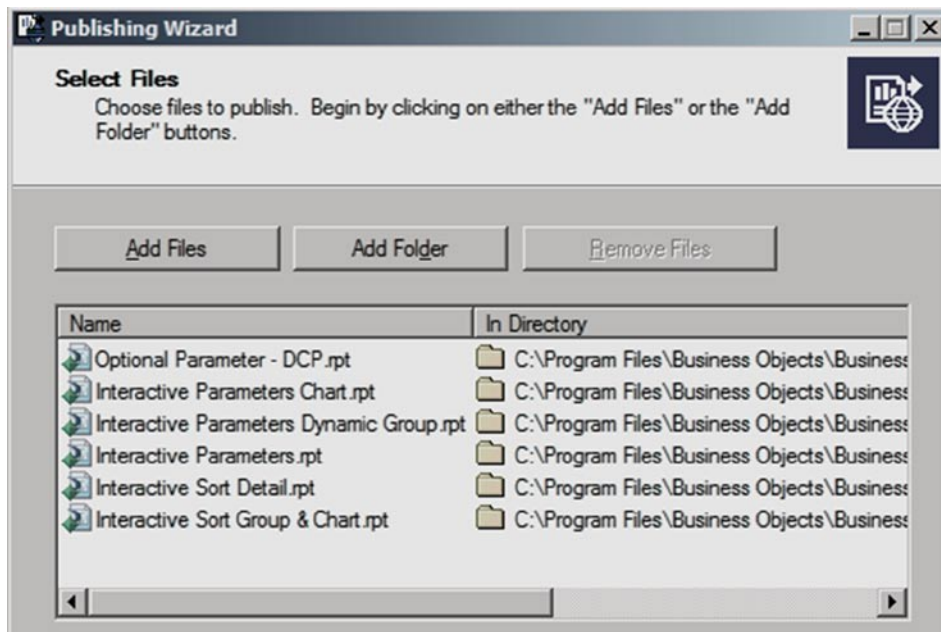


Figure 9: The Publishing Wizard

Report and Dashboard Creation

Crystal Reports Server lets you view, share, and manage the reports designed in Crystal Reports and also dashboards designed in Xcelsius software. Crystal Reports is a powerful tool built to address diverse data formatting and presentation requirements. For novice report designers, Crystal Reports includes intuitive wizards, templates, and experts to simplify common reporting tasks. For more advanced users, Crystal Reports includes fine-grained control over most features – including formulas, conditional formatting, and object positioning – to address specific customization requirements. It also includes the powerful editable preview feature, which allows report design-

ers to edit a report template with data retrieved from the database. Dynamic cascading prompts enable end users to select parameter values from a dynamic list populated at runtime from a data source. As a result, end users are presented with options that are always valid.

Simple and straightforward end-user portal and report viewers provide end users with immediate access to information with minimal training.

A simple and straightforward portal provides end users with immediate access to information with minimal training. A parameter panel (see Figure 10) means that parameter values can be set without refreshing data. Report consumers can view the parameters displayed in the panel, change them, and have the new values applied directly to the saved data in the report. Sort and filter features are another solution to reduce the report count as well as IT and development support costs.

Importing Shockwave Flash (SWF) files generated by Xcelsius software into your report provides what-if scenario models and helps you visualize the potential outcome of business decisions. (Please note that the Xcelsius design tool is not included in Crystal Reports Server.) Crystal Reports Server also lets you view, share, and manage the SWF files generated by Xcelsius. Xcelsius lets you create comprehensive and interactive dashboards from multiple live-data sources. Prebuilt templates and analytics allow you to create professional-looking dashboards in just a short while, and no coding is required. Your users can create personal dashboards, perform what-if analy-

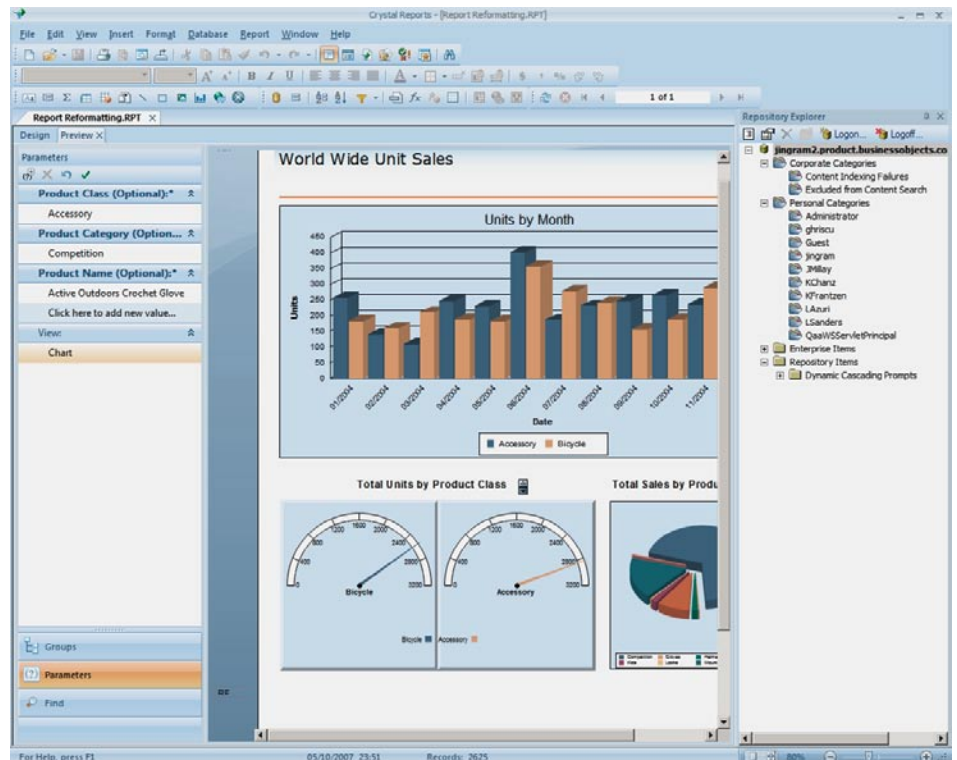


Figure 10: Report with Shockwave Flash File, Parameter Panel, and Repository Explorer

sis, and experience interactive visualizations with corporate dashboards that you provide.

You can use Xcelsius to create dynamic charts and graphs, data presentations, visual what-if scenarios, and budget plans. The software helps you develop executive summaries and forecast models. You can also work with ROI calculators, various financial models, and scorecards. The software helps you build operational dashboards, departmental dashboards, key performance indicator dashboards, and dashboards based on Microsoft Excel or a live-data source.

(Please note that Crystal Reports 2008 and Xcelsius Engage 2008 software licenses are not included in Crystal Reports Server 2008.)

The Crystal Reports Server repository provides a secure, central location to store common report elements, including custom functions, SQL commands, dynamic cascading prompts, and bit-maps. You can share these elements across multiple reports and update them from a single location. Repository objects are managed in the infrastructure tier for secure object sharing and updating.

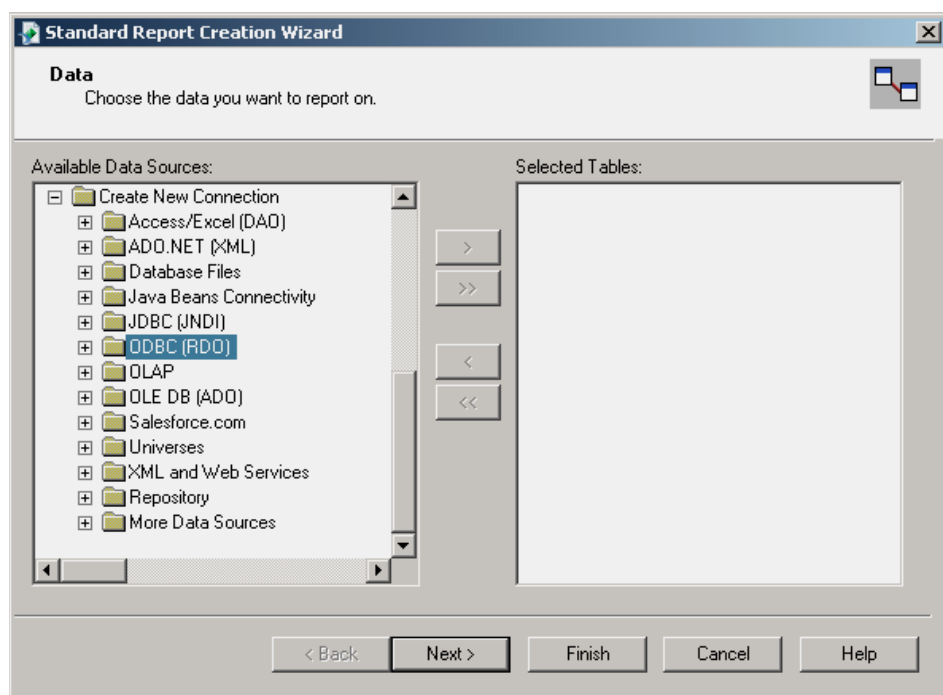


Figure 11: Comprehensive Data Source Access in Crystal Reports®

Data Services

The Crystal Reports report designer provides a variety of flexible data-connectivity options. For example, you can extend report creation tasks to report designers who may have limited knowledge of the underlying data source, taking advantage of the semantic metalayer that masks the complexities associated with data access.

Data Drivers and Connectivity

Crystal Reports includes more than 35 data drivers for direct connectivity to relational, XML, online analytical processing (OLAP), and in-memory data (see Figure 10). Report authors can

choose from native, open database connectivity (ODBC), object linking and embedding database (OLE DB), and Java database connectivity (JDBC) to databases, files, logs, enterprise applications, or program elements. Report authors can also choose to write their own SQL commands. Data from multiple sources can be joined and synchronized for use in one report.

Metadata

An abstraction layer over complicated data sources simplifies data connectivity. This accelerates report design by making it easier to access data. In addition to this abstraction layer, a powerful data-security feature called view-time

Gain peace of mind with a solution ready for migration at any time to more comprehensive business intelligence solutions such as SAP BusinessObjects Edge solutions and SAP BusinessObjects Enterprise software.

security is also provided. This feature means that end users see only the data they have the rights to see, even when the report is scheduled.

Gain peace of mind with a solution ready for migration at any time to more comprehensive software such as SAP BusinessObjects business intelligence solutions.

CONCLUSION

A COMPLETE REPORT AND DASHBOARD MANAGEMENT SOLUTION

Crystal Reports Server is a complete reporting and dashboard management solution that helps small businesses and midsize companies create, manage, and securely deliver reports and visualizations. It is built using the proven and trusted SAP BusinessObjects Enterprise software, providing a powerful service-oriented architecture.

Available for deployment on either a Microsoft Windows or Linux operating system, Crystal Reports Server is a complete reporting and dashboard management solution that helps small businesses and midsize companies create, manage, and securely deliver reports and visualizations. It is built using the proven and trusted SAP BusinessObjects Enterprise software, providing a powerful service-oriented architecture. Plus, it includes SAP BusinessObjects Live Office for integration with Microsoft Office. An integration kit for Microsoft Sharepoint Services is also included. Regardless of the reporting challenges your organization faces today, you can benefit from using Crystal Reports Server to address the complete reporting process and convert your data into valuable information – wherever your users choose to work.

For More Information

To learn more about Crystal Reports Server and how it can meet the reporting and dashboard needs of your company, call your SAP representative or visit us on the Web at www.sap.com/sapbusinessobjects.

Summary

Powered by the same platform as SAP® BusinessObjects™ Enterprise software, Crystal Reports® Server software is a complete report and dashboard management solution that meets the needs of small businesses and midsize companies. The software enables organizations to securely open, view, interact with, and share interactive reports and dashboards over the Web, in e-mail, and in Microsoft Office documents.

Business Challenges

- Improve decision making with reliable, trusted data accessible to all authorized users
- Eliminate the use of homegrown server applications, data integrators, and user interfaces that are expensive to develop and maintain and are hard to use
- Control access to sensitive business data and prevent unauthorized use of reports

Key Features

- **Interactive reports and dashboards for all users** – Answer business questions quicker with interactive business performance dashboards and on-report parameter panels, sorting buttons, and embedded what-if scenarios
- **Report integration** – Embed refreshable corporate data into Microsoft Office documents and save them on corporate portals
- **Report management and delivery** – Simplify IT administration work with an intuitive Web portal
- **Data-driven publishing** – Deliver personalized reports to anyone, anywhere, cost-effectively
- **Secure access to information** – Secure reports at user, group, object, and folder levels

Business Benefits

- **Enable business users to access and explore report and dashboard data interactively**, without any dependencies on IT
- **Reduce the cost and effort of securing, managing, and sharing information** with a prebuilt reporting server solution
- **Enhance confidence and reliance on corporate data** that is timely, consistent, and accurate
- **Gain administrative control** with a powerful, user-friendly environment available from a single Web interface

For More Information

Call your SAP representative, or visit us on the Web at www.sap.com/sapbusinessobjects.

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