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SQL Server 2005
Reporting Services
vs.
Crystal Reports XI
Developer Edition

SQL Server 2005 Reporting Services vs. Crystal Reports XI Developer Edition

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Introduction

During the course of building an application, it is often the case where the developers must implement reports into their application. Whether the sales department needs to track monthly, quarterly, and year-to-date sales figures, or the R&D department needs to chart the effects of a new drug on protein structures, it became imperative that custom and even retail applications include reports as a feature of the product. In the past, developers were limited to using one of only a handful of reporting solutions in their applications. One of the most commonly used reporting tools was Business Objects' Crystal Reports. Developers were now able to access and organize data into formatted reports for users of the application.

Over time, Crystal Reports became the de facto reporting solution for both client/server and web-based applications. The tool was effective at delivering quality reports when written by someone who was intimately familiar with the product. Unfortunately, most application developers were journeymen report writers at best. To these programmers, Crystal Reports tended to be unwieldy and the cause of great consternation when it came to building reports that would meet the needs of their user base. Report writing, considered a secondary skill of application development by many, was unwanted but considered necessary to make a project successful.

In 2003, Microsoft entered the reporting and business intelligence market with the release of SQL Server Reporting Services for SQL Server 2000. This tool was received with wide praise from the developer community for the ease with which programmers could create and implement reports into their applications. The only caveats were a valid SQL Server 2000 license and Visual Studio .NET 2003. Since most developers interested in using this product already had both of these products, it was naturally intuitive for them to begin incorporating these reports into their applications.

With the release of SQL Server 2005, codenamed Yukon, Microsoft enhances Reporting Services to function as an integral part of the server application. This article is intended to compare and contrast the capabilities and features of Crystal Reports with those of SQL Server Reporting Services for SQL Server 2005.

Assumptions

Several assumptions need to be explained before beginning the rest of this article. First, at the time of writing this article, SQL Server 2005 was in beta 2 release. Any software in the beta test cycle can have features changed or even removed before it is released. However, with

SQL Server 2005's anticipated commercial release set for Summer 2005, any drastic changes made to this product are not expected.

Second, the Developer version of Crystal Reports XI was selected because it is felt that most programmers would tend to use this version of the product especially when compared to the cost of purchasing the enterprise version of the Crystal Reports, more commonly known as Crystal Enterprise.

This brings up the third assumption, the cost of SQL Server itself. The cost of SQL Server 2005 is ancillary to this article. Most organizations either already have or are going to purchase some type of database server to store their critical business data. Of the products offered on the market, Microsoft SQL Server is one of the more cost-effective solutions available. The only impact the cost of SQL Server would have on a business is if there were no corporate SQL Server presence to begin with. Furthermore, depending on the number of licenses purchased, the costs associated with purchasing SQL Server and the cost of purchasing multiple licenses for Crystal Reports Developer would be negligible at best and perhaps even in Crystal Reports' favor.

Product Overviews

Before beginning the discussion of these two products, it is necessary to provide some background information to understand the types of environments necessary to operate these applications.

SQL Server Reporting Services

SQL Server Reporting Services comes bundled with SQL Server 2005 along with Analysis Services and Notification Services. There are several components that make up Reporting Services in SQL Server 2005. These components are:

Report Server

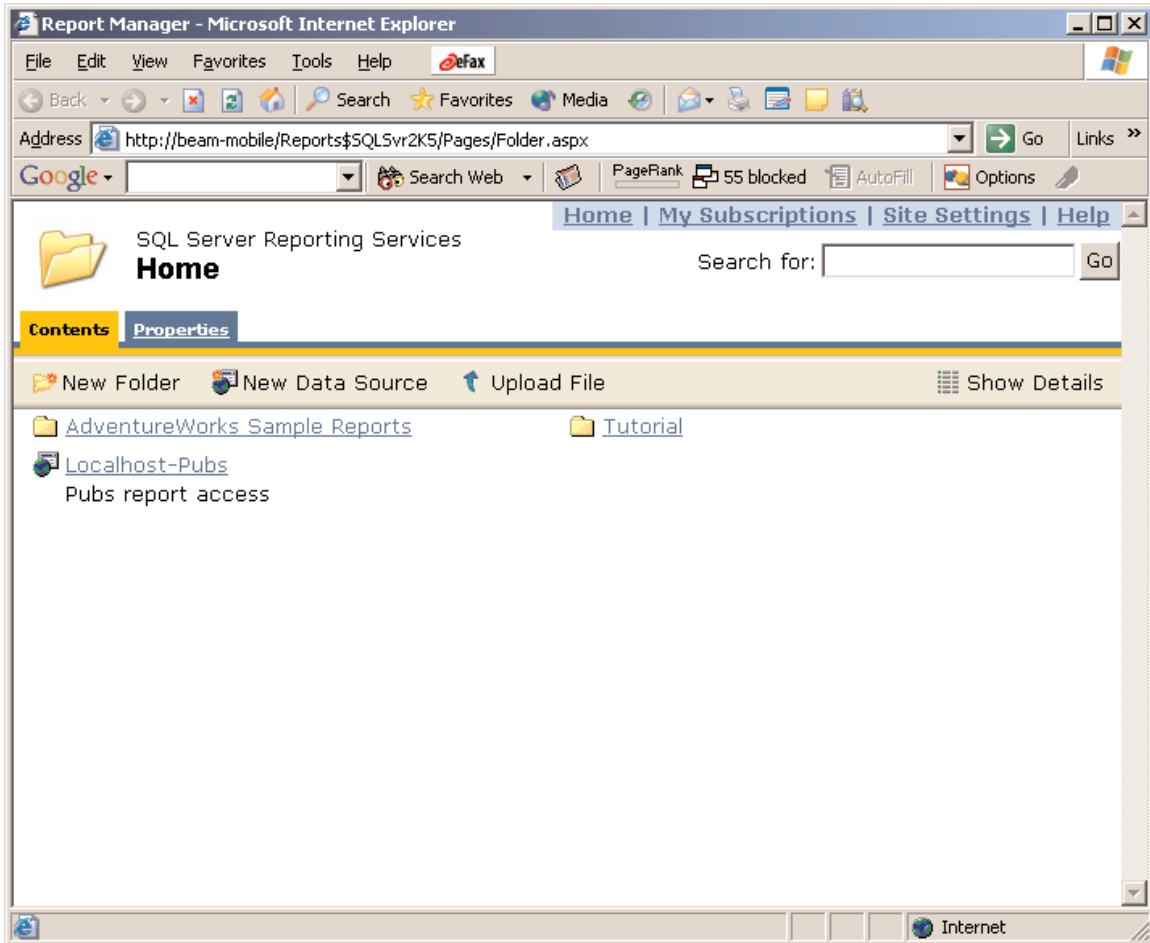
- Report Server comes in the form of a web service that runs on Internet Information Services (IIS) on a Windows server.

Report Server Database

- This database stores all of the necessary information for the Report Server web service to process and distribute reports.

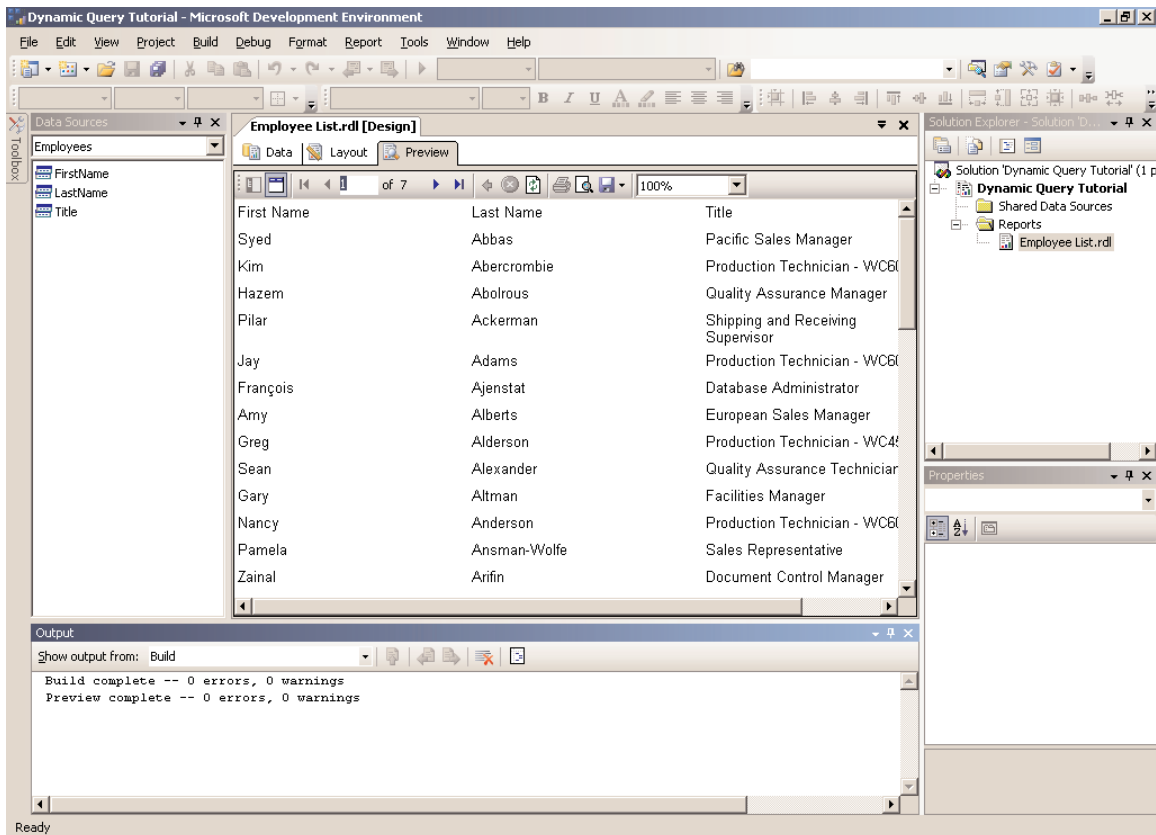
Report Manager

- A web-based tool to manage reports. With this tool, you can create new data sources, upload reports, configure report subscriptions, and administer security for reports. The following screenshot displays the main Report Manager screen.



Report Designer

- The Report Designer is an external development environment for designing and building reports. This development environment is called the Business Intelligence Development Studio. Along with Reporting Services Projects, this tool is also used for Analysis Services Projects and Data Transformation Service (DTS) Projects. The following screenshot displays the BI Development Studio. This application will look familiar to current .NET developers as it closely resembles the Visual Studio.NET IDE.



To install SQL Server 2005 and Reporting Services, your server must meet the following hardware and software requirements:

- Windows 2000 Family SP4 or later (Professional/Server/Advanced Server/Datacenter Server), or Windows 2003 Server Family (Standard/Enterprise/Datacenter Server/Embedded Edition/Web Edition/Small Business Server)
- Intel Pentium 600 MHz or later
- 256 MB RAM minimum
- Approximately 330 MB of hard drive space
 - About 250 MB for database server
 - 50 MB for Reporting Server
 - 30 MB for Report Designer
- Internet Explorer – for management console (MMC) and help
- Internet Information Services (IIS)

These requirements are minimum guidelines. Production servers should exceed these requirements especially with regards to number of CPUs and RAM.

To install the client applications necessary to design reports, your system must be Windows 2000 Professional SP3 or later.

In order to properly utilize Reporting Services, a valid license for SQL Server 2005 must be present. Currently, there are no plans to change the licensing structure for Reporting Services in SQL Server 2005. If you plan on running Reporting Services from the same server that hosts the Report Server Database, then you will incur no additional expenses. However, if you wish to run Report Server from a server other than the server hosting the Report Server Database, then you will need to acquire a new license for the server that will host Report Server.

Author's note: I am not in any way an expert on SQL Server licensing strategies. Please consult your authorized Microsoft vendor for licensing questions.

Crystal Reports XI Developer Edition

Crystal Reports XI Developer Edition, from Business Objects, is a stand-alone development environment for creating and deploying reports for client-server and web-based applications. This product also includes a five-user introductory offer for Crystal Reports XI Server, which offers additional features for report deployment, security, scheduling, and report component reusability.

To install Crystal Reports, your workstation must meet the following minimum requirements:

- Microsoft Windows 2000 SP4 or later
- Pentium II CPU
- 128 MB RAM (minimum)
- 350 MB hard disk space

Again, the previous requirements are only minimums and every effort should be made to surpass these requirements when using the applications in a production environment.

With regards to licensing, a license must be purchased for each report designer. No additional licensing fees are needed if your reporting needs fall within the following guidelines:

- Thick-client applications
 - Royalty-free deployment and redistribution of reports for thick-client applications.
- Intranet-based web applications
 - Unlimited internal deployment for reports developed using Crystal Reports .NET, Java, or COM report engine components.

If reports are intended for resale as third-party applications, then a license of Crystal Reports XI Developer Edition must be purchased for each company that is sold the product. This version of Crystal Reports is not intended for reports that are visible over the Internet. You must purchase the Server edition of Crystal Reports along with any additional licenses for viewing reports over the web. Please contact Business Objects, or your authorized Crystal Reports vendor, for more information about the licensing structure for Crystal Reports.

Author's note: Again, I am not an expert on Business Objects' licensing and pricing strategies for Crystal Reports. Please direct all questions to your authorized Crystal Reports vendor.

Feature Comparison

The following section illustrates the features present in each reporting application. Some features are present in SQL Server 2005 Reporting Services, but are only available in Crystal Reports Server Edition. These features are noted in the tables below. While extensive, this list is not all-encompassing with regards to each application.

Architecture

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Platform:	Microsoft Windows (All Components) (Java Reporting Component) <ul style="list-style-type: none">• Linux Red Hat Enterprise 3• Solaris 8 or later• AIX 5.1 or later• HP-UX 11i v1	Microsoft Windows Only
Client Tools:	Report Designer (CR)	Business Intelligence Development Studio
Server Tools:	Available in Crystal Reports Server Edition	Report Manager (IE)
Report Processing:	Integrated with IIS	Report Server
Clustering:	Available in Crystal Reports Server	SQL Server 2005 can be clustered
Load Balancing:	Available in Crystal Reports Server through the Job Server	Can be installed in a server farm, but will incur additional costs for SQL Server licenses
Web Server Support:	IIS Apache/Tomcat (Java connectivity)	IIS
Caching:	Available in Crystal Reports Server through the Cache Server	Available for Report History Snapshots

Security

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Authentication:	Integrated Security Via IIS and Windows (CR Only)	Integrated Security Via IIS and Windows to connect to Report Server
Object Security:	Object security available in Crystal Reports Server Edition	Windows based security on report objects

Report Distribution

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Time Scheduling:	One time and Recurring through Crystal Reports Server Edition	One time and Recurring schedules
Report Delivery:	Available in Crystal Reports Server Edition. (MAPI, SMTP, FTP, file)	SMTP email as a link to Report Server or as an exported attachment; File share delivery

Report Viewers

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Thick-client Application Viewer:	Custom embedded control	Custom embedded control
Web Viewer:	ActiveX Control Java Viewer HTML/DHTML	HTML 4.0 for IE 5.5 or higher HTML 3.2 for IE 5.1 or lower, or Netscape/Mozilla browsers
Export Capabilities:	Available	Available

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Export Formats:	<ul style="list-style-type: none"> • HTML 3.2/4.0 • PDF • Excel • XML • Word • RTF • Report Definition • CSV • Text Files (TAB and comma delimited) • ODBC 	<ul style="list-style-type: none"> • HTML with Office Web Components • PDF • Excel • XML file with report data • Web archive • TIFF file • CSV (comma delimited) • Custom Rendering via .NET assemblies
Local Printing:	Available	Available

Database Connectivity

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Available Data Sources:	<p>Native Connectivity to the following:</p> <ul style="list-style-type: none"> • Access (DAO) • ACT! • ADO.NET (XML) • COM Connectivity • Database Files (Excel, Paradox, Btrieve, XML, Access files, etc.) • Exchange 5.5 Message Tracking Log • Exchange Message Tracking Log • Field Definition Files • File System Data (Text Files) • Java Beans Connectivity • JDBC • Legacy Exchange • Mailbox Admin • IIS/Proxy Log Files • NT Archived Event Log • NT Current Event Log • ODBC (RDO) • OLEDB (RDO) • Outlook • Outlook/Exchange • Public Folders • xBase • XML 	<p>Data processing extensions through ADO.NET</p> <ul style="list-style-type: none"> • SQL Server 2005 • SQL Server 2000 • SQL Server 7.0 • SQL Server 2005 Analysis Services • SQL Server 2000 Analysis Services • Oracle (must have Oracle client installed on Report Server) • ODBC Data Sources • OLEDB Data Sources • Extendible to access additional data sources (i.e. Event Logs, Exchange, etc.) <p>NOTE: Other Data Sources may require a separate driver or utility to be installed on the Report Server</p>

IDE Integration

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Report Development:	Crystal Reports Designer	Report Designer in Business Intelligence Development Studio
Visual Studio.NET Integration:	Available	Not Available
SDK Support:	.NET, COM, Java, Crystal Reports API	.NET Support via Web Services
Client Only Support:	Available, all reports can be accessed locally on a client machine with no external connectivity needed	Requires connectivity to Report Server via SOAP or HTTP to process and render the report

Report Construction

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Recommended Development Tool:	Report Designer available as stand-alone or integrated with Visual Studio.NET 2003	Report Designer in Business Intelligence Development Environment
Wizards:	Available	Available

Report Types

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Drill Down Reports:	Available, supports n depth levels	Available, supports n depth levels
Subreports:	Available, only 1 subreport per main report.	Available, supports n depth levels of sub-reports
Cross-Tab reports:	Available	Available
OLAP Reports:	Available	Available
Multi-Column Reports:	Available, in Details section of reports	Available, in Details section of reports
Field Labels:	Standard and user-defined	User-defined only

Sorting and Grouping

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Hierarchical Groups:	Available	Available
Top-N, Bottom-N, Top %, Bottom %:	Available	Available
Group Sorting:	Available	Available
Top-N, Bottom-N, Top %, Bottom % Sorting:	Available	Available
Specialized Sorts:	Available, can position items regardless of their existing position in the sorted result set	Not Available, but same results can be achieved through a stored procedure

Formatting

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Fixed and Conditional Formatting:	Available, but not on all object types	Available on all object types
Field Format:	Yes	Yes
Group Format:	Yes	Yes
Section Format:	Yes	Yes
Conditional Page Breaks:	Yes	No

Report Objects

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Graphics:	Yes, has support for upwards of 80 types of graphic files	Yes (BMP, JPG, GIF, PNG, JPE) Can be stored embedded in report, as part of the report project, in a database, or fetched via URL
Maps:	Yes, incorporates mapping into reports	Not Available
Cross-Tab Tables:	Available	Available, called a Matrix
OLAP Grids:	Available	Available, through the Matrix object
Subreports:	Available, 1 level only	Available, more than 1 level available
Formulas:	Available, integrated with the report	Called Expressions. Available through custom assemblies written in .NET. Reports have access to static methods globally and instance methods through the Code object
Summary Fields:	Available	Available

Feature	Business Objects Crystal Reports XI Developer Edition	Microsoft SQL Server 2005 Reporting Services
Report Parameters:	Available, allows custom parameters to be designed into the report to reflect different results sets for display in the report	Available, allows custom parameters to be designed into the report to reflect different results sets for display in the report
Cascading Parameters:	Available, allows a parameter from one list to affect the type and/or number of parameters in another list	Available, allows a parameter from one list to affect the type and/or number of parameters in another list
Pictures, Lines, Figures:	Available, but cannot be formatted	Available, the Rectangle control can act as a container for other controls
Custom or User-Defined Functions:	Available, through ActiveX DLL	Available, through .NET assemblies
Hyperlinks:	Available	Mimicked through field properties. Can set Jump to Points for field to go to a specific URL, similar to a Hyperlink
Lists:	Not Available	Available
Grids/Tables:	Not Available	Available
Shared Data Sources:	Available	Available

Conclusion

Both products are very similar when creating and formatting reports. The advantage goes to Crystal Reports if one needs to access mapping data within the reports. However, when it comes to overall flexibility in the reports, SQL Server 2005 Reporting Services takes the advantage, as it is fully extendible through the use of .NET assemblies.

When compared to the Developer edition of Crystal Reports, SQL Server 2005 Reporting Services offers much more functionality with regards to hosting reports, report security, and distributing reports. When Crystal Reports is coupled with the Server edition, this gap narrows to the point where the differences are negligible. In this regard, the main benefit for using, or staying with, Crystal Reports is if you have no SQL Server presence in your environment, or if you use other development languages, such as Java in your environment.

For those environments that are planning on implementing SQL Server 2005, it makes economic sense to take advantage of Reporting Services, especially if Reporting Services is running from the same server as the one licensed for SQL Server. With its extendibility and its ability to extract and format data from multiple data sources, SQL Server 2005 Reporting Services provides an excellent platform for creating and delivering reports to users of your applications.

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About the Author

Brett Tomson is a Senior Consultant for Beam Consulting, Inc., an IT services provider specializing in delivering solutions based on Microsoft .NET and SQL Server technologies. His portfolio includes architecting and designing web and Windows-based applications and database solutions for companies ranging from small business to multinational corporations in a variety of industries. He has written a book and several articles on .NET and SQL Server technologies. He teaches a wide range of technologies involving Microsoft SQL Server, Web, XML, and Microsoft .NET.