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Report authoring with IBM Cognos Business Intelligence

Executive summary

The business value of reporting is simple: it not only communicates a company's performance, but helps the company understand it. With it, executives, managers and business users can take action on recent information. It creates a common context for decision-making in every department and at every level.

At its best, reporting is an integral part of performance management. However, IT departments and report authors can be challenged when they try to deliver these simple values to a wide variety of users with different needs and from a wide variety of different data sources. The past limitations of reporting technology, such as its traditional inability to address these requirements, once prevented the much discussed but seldom delivered "single view of the truth" that modern organizations like yours need.

Fortunately, because of new technologies, this is no longer the case. With IBM® Cognos® Business Intelligence authors can create reports that meet the needs of everyone in your organization. This paper explains how.



Overview

Professional report authors produce professional quality content for others to assimilate. They want to dig deeper into the data and build complex reports. Reporting solutions should meet these requirements with advanced report building and capabilities that enable enhancement, customization and management of professional reports.

With Cognos Business Intelligence, professional report authors can create reports with a full range of visuals and objects. These include visualizations, charts, cross tabs and lists, along with other components such as images, logos and live embedded applications that can be linked to the information.

Cognos Business Intelligence features a WYSIWYG capability that report authors can use for building, interacting with, sharing and analyzing results to follow a train of thought and generate a unique perspective of critical business information. A collaborative workflow enables them to create reports and distribute and share them with other business users—in different formats, languages and locations.

Cognos Business Intelligence extends the boundaries of traditional reporting, providing professional authors with powerful ways to view and communicate business performance and address the challenges of report authoring.

The challenges of report authoring

Report authors need to create reports that your business users can use to work with information the way they want to. Accessing relevant information quickly and easily is paramount, as is the confidence that the numbers you see are the same that others are seeing. The reports you receive should be presented in context so you can make informed decisions rather than lose time debating what action to take.

This can be a challenge for a number of reasons. For one, many companies use separate reporting tools for different capabilities and styles of reporting and each application can have its own underlying data structure. These different metadata structures and data architectures can make it difficult to ensure data consistency. Maintaining multiple reporting applications means higher costs in the long run.

In addition, vendor-specific security models limit scalability and network performance. Each reporting application has its own performance limits, which forces networks to work at the lowest common denominator. This means other enterprise components such as ERP systems, databases or application servers aren't being used to their full value and users need to move back and forth between applications to answer a single question. IT struggles with a constant backlog of requests for new and modified reports because most reporting solutions have an all-or-nothing approach to functionality, or because business users cannot update reports themselves.

And, finally, most report writing applications follow a rigid linear format that requires users to use archaic methods such as custom coding and duplication of files (one per language), *if-then-else* statements to modify the format per language, and overlay text strings with *if-then-else* formatting options to hide all but one overlay. Few solutions address issues such as prompt controls, formula language syntax, UNICODE or special word wrapping. If reports are needed in different languages, authors must produce a series of reports or translate them afterwards. Report writers typically display individual source data records, which might result in hundreds or thousands of records. Such a large amount of data is not easy for most people to use and it is very costly in terms of network bandwidth and application performance.

As a result of these challenges, report authors need a solution that can help them:

- Provide complete coverage for all types of reports.
- Access all enterprise data, regardless of the source.

How Cognos Business Intelligence software can help report authors

Cognos Business Intelligence embodies more than 30 years of experience working with the largest companies in the world. With Cognos Business Intelligence, report authors can develop any and all types of reports—from simple inventory lists to high-volume billings and high-impact business dashboards. It offers complete reporting from a single environment, provides advanced authoring abilities that match user needs and operates on a proven, web services architecture.

Reporting with objects

With Cognos Business Intelligence, professional report authors can create reports that contain any number of report objects—charts, cross tabs and lists, along with other components such as visualizations, images, logos and live embedded applications—that can be linked to the information. Report authors can arrange these objects by dragging and dropping them into the report authoring window. Report layout automatically adapts and rearranges as objects are added or removed. The flexibility of the task-based interface reduces the time required to author and modify a report.

Access to your data sources

With Cognos Business Intelligence, you can use multiple data queries to build reports. Each query can draw data from one or a combination of two or more of your data sources and be linked in context or left as independent. Cognos Business Intelligence provides access to heterogeneous data sources, whether relational or OLAP. For instance, a single report can be sourced from multiple relational warehouses and real-time XML data. Authors can create reporting applications in a development environment and deploy them in production databases. Database connections can be dynamically set at report runtime based on user prompting or session parameters. This data source flexibility gives your organization a comprehensive view of your business in your reports.

Extensible visualizations

In addition to accessing and distributing the right data, effective reporting software must also present business information in a variety of formats that are easy to understand and explore. Cognos Business Intelligence provides rich visualization options that can be combined to create interactive reports for maximum visual impact. Authors can create dashboard reports that use geographic or spatial maps to present data in different forms such as cities, countries, building floor plans, seats in an airplane or parts of the human body. These can be combined with interactive charts such as gauges, horizontal progress charts and combination charts. Because charts are typically used to integrate different data, authors can build multiple queries into the same chart and individual portions of a chart.

In addition, Cognos Business Intelligence offers extensible visualizations so that report authors are not locked into only the defined set of visualizations that are included with their version of Cognos Business Intelligence. They can choose from a continually expanding set of visualizations, such as pie, line, gauge, radar, area, treemap, heatmap, network and text charts, that are easily downloaded into the library of the Cognos Business Intelligence administration console. Figure 1 illustrates some of the available visualizations. To acquire new visualizations, authors can visit the extensible visualization community on Analytics Zone for the most currently available visualizations. To see the visualizations currently available in the Analytics zone, visit <http://www.analyticszone.com/visualization>.



Figure 1: Samples of visualizations available from Analytics Zone.

Collaborative workflow

Between identifying the need for a report and delivering the finished product, users might want to share ideas, suggestions and modifications, and authoring experience and skills. Cognos Business Intelligence removes the limitations on collaborative report development that authors might experience with different reporting products and interfaces. A single architecture for viewing, querying, analyzing and authoring means different report authors can work with other users on any report. A business manager can author a simple ad hoc report and pass it to a professional report author for improvements such as pagination or additional objects and complex data query construction.

Multilingual distribution

Cognos Business Intelligence supports multiple languages from a single metadata layer that is ready to use. Report authors can define which report elements need to adapt to each recipient's working language, including the user interface and report content. These are automatically detected by Cognos Business Intelligence and displayed appropriately in supported languages.

Adaptive flow authoring for report delivery virtually anywhere

With adaptive flow authoring, instead of creating specifically targeted and rigid reports for small groups of users, report authors can create reports in a single authoring environment and deploy them for use virtually anywhere. Adaptive flow authoring arranges objects from top to bottom in reports. Just like a word processing document or web page, when an author creates a report with Cognos Business Intelligence, it is automatically resized for the layout that best suits each user. This includes a wide variety of potential output devices and displays ranging from a typical desktop monitor to notebook computers, smart phones and tablets such as the Apple iPad.

This sophisticated drag-and-drop report layout and formatting is controlled with tables and table cells. In a process similar to HTML authoring, report authors can nest tables inside tables. Users have the information that meets their needs and only the functions they need to modify the report. Adaptive flow accelerates report distribution, expands the potential user base for each report and makes modification of existing reports as easy as drag-and-drop.

Self-service reporting

With Cognos Business Intelligence, authors can create reports and parts of reports that business users can access from a unified workspace to answer key business questions. Cognos Business Intelligence provides an intuitive authoring experience, so business users can arrange information in a way that makes sense. Self-service capabilities enable them to develop queries on their own to meet a specific need, and they can take advantage of integrated results and analysis, and the ability to view multiple objects in the same workspace. And, with search-assisted authoring and extensive data exploration, it is easy to find, author and share any information you need—collaboratively and in the context of your workday.

Business users become more self-sufficient with self-service reporting because they can work in an environment that is easy to use and that supplies information that is easy to assimilate.

Cognos Active Report

IBM Cognos Active Report is a report output type that provides a highly interactive and easy-to-use dashboard-style report application that can be accessed from a personal computer or Apple iPad when the user is offline. Active reports are built for business users so they can explore their data and derive additional insight even when they are not connected to the company network or the Internet. This gives remote professionals access to their critical BI content regardless of their connectivity.

Report authors can use Cognos Business Intelligence scheduling and bursting capabilities to distribute Cognos Active Report output to a broad audience, and the offline use supports large-scale distribution without requiring additional software installation.

Authoring reports with Cognos Business Intelligence

Cognos Business Intelligence features a web-based report authoring environment that professional report authors and developers can use to build sophisticated, multiple-page, multiple-query reports from multiple data sources. With Cognos Business Intelligence, authors can create any report an organization requires, such as invoices, statements and weekly sales and inventory reports.

As mentioned previously, the reports can contain any number of objects, such as charts, crosstabs, lists, images, logos and live embedded applications that authors can link to other information.

Lists

Authors can use lists (Figure 2) to show detailed information from a database, such as product lists and customer lists. A list shows data in rows and columns. Each column shows all the values for a data item in the database or a calculation based on data items in the database.

Product line	Quantity
Camping Equipment	27,301,149
Golf Equipment	5,113,701
Mountaineering Equipment	9,900,091
Outdoor Protection	12,014,445
Personal Accessories	34,907,705
Overall - Summary	89,237,091

Figure 2: A sample list.

Authors can specify whether to automatically add an overall aggregate summary in the list footer and a summary for any groups in the list by selecting **Automatic group and summary behavior** for lists. The default aggregation as specified in the enterprise data source is used.

Crosstabs

Report authors can use crosstab reports, also known as matrix reports, to show the relationships between three or more query items. Crosstab reports show data in rows and columns with information summarized at the intersection points. For example, the crosstab in Figure 3 shows the gross profit and revenue by product line for each year.

Profitability by Product Line

		2007		
		Gross profit	Revenue	Cost of Goods Sold
Personal Accessories	Glacier Deluxe	1,741,826.22	3,928,757.22	2,186,931
	Glacier GPS Extreme	5,639,265.95	12,034,715.22	6,395,449.27
	TX	8,306,303.35	18,172,476.50	9,886,172
	Pocket Gizmo	2,675,373.35	4,380,582	1,705,208.65
	Seeker 35	2,235,849.84	7,754,925.78	5,519,075.94
	Zone	9,434,315.06	28,021,707.95	18,587,392.89
	Mountain Man Deluxe	2,269,799.48	4,563,194.48	2,293,395
	Polar Extreme	347,639.66	701,512.16	353,872.50
	Ranger Vision	5,622,674.40	10,525,086.60	4,902,412.20

Figure 3: A sample list.

Crosstabs are dimensional objects that have row edges and column edges. When authors add data items to crosstabs, they create crosstab nodes and crosstab node members. These objects enable report authors to create crosstabs easily by dragging the data items to crosstabs.

Each edge of the crosstab object is composed of a set of crosstab nodes. Each crosstab node contains:

- One or more crosstab node members
- Zero or one nested crosstab node, which contains one or more crosstab node members or nested crosstab nodes

Crosstab nodes can be placed anywhere in the crosstab. For example, in the previous diagram, an author could drag *Order month* under *Average(Product line)* to create a row edge. To move nested items from one edge to another, authors should ensure that they select the crosstab node and not the crosstab node member.

Authors can also use the *Create Crosstab Nodes* option in the *Structure* menu to modify the drag-and-drop behavior in crosstabs. When the option is turned on and an author adds a data item to a crosstab, the item is created as a crosstab node. If the option is turned off, the item is created as a crosstab node member to an existing crosstab node.

Authors can change or create crosstab appearance by specifying formatting for rows, columns and fact cells in a crosstab or for the entire crosstab. When authors specify formatting for all rows, columns, fact cells or the crosstab, the formatting is automatically applied to any new items added.

Maps

Cognos Business Intelligence provides a set of maps that authors can use to represent tabular data in a spatial context. For example, on a map of the world, countries can be colored to represent the level of revenue.

Relational reporting

In relational reports, authors can summarize data by using headers and footers in lists, summary functions and in detail aggregation. The relational reporting style is recommended for relational data sources. Relational data is best represented by lists. Cognos Business Intelligence organizes this data by query items. Authors can focus data in relational reporting with summary or detail filters. Authors can also use Cognos Business Intelligence Query to work with relational data.

Authors can accomplish the following tasks in relational reporting:

- Add data
- Group data
- Summarize data
- Focus data with filters
- Sort data
- Add queries
- Use calculations

Dimensional reporting

In dimensional reporting, authors summarize data by using member summaries and in set aggregation. The dimensional reporting style is recommended for dimensionally modeled relational (DMR) and OLAP data sources. Dimensional data is best represented by crosstabs, maps and charts. Cognos Business Intelligence shows this data in dimensions, hierarchies, levels and members. Authors can focus data in dimensional reporting by adding only the relevant members to the edge of a crosstab or to the context filter. They can also enable drilling up and drilling down in dimensional reports.

Authors can accomplish the following tasks in dimensional reporting:

- Add data
- Summarize data
- Focus data with filters
- Sort data
- Add queries
- Use calculations
- Enable drilling up and down

They may also use Cognos Business Intelligence analysis capabilities and IBM Cognos Workspace Advanced to work with dimensional data.

Adding prompts to filter data

With Cognos Business Intelligence, authors can add prompts to a report to create interactivity for users. Prompts act as questions that help users customize the information in a report to suit their own needs. For example, authors can create a prompt so that users can select a product type. Only products belonging to the selected product type are retrieved and shown in the report.

Prompts are composed of three interrelated components: parameters, prompt controls and parameter values. Parameters are based on parameterized filters and form the questions to ask users. Prompt controls provide the user interface where the questions are asked. Parameter values provide the answers to the questions.

There are several ways to create prompts. Authors can:

- Use the Build Prompt Page tool
- Build their own prompt and prompt page
- Create a parameter to produce a prompt
- Insert prompts directly into the report page

In dimensional reporting, authors can also define prompts using context filters.

Working with external data

With Cognos Business Intelligence, authors can supplement enterprise data with their own external or personal data files to create reports that contain data that is not part of the Cognos Business Intelligence enterprise data. For example, an analyst might receive a spreadsheet with what-if data about opening new branches of a retail store. The analyst is being asked to analyze the impact of these possible new branches on existing sales volumes. A report author can link this scenario data with the company's enterprise data and create a professional report.

Authors can import their own data files and start reporting right away. It is imported, the external data file is protected by the same Cognos security as the internal enterprise data so that it is possible to report on the personal data in a secure and private environment.

Authors can use the following types of files:

- Microsoft Excel (.xls) software files
- Tab-delimited text (.txt) files
- Comma-separated (.csv) files
- XML (*.xml) files

Using conditions

Authors can define conditions to control what users see when they run a report. Conditions can apply to specific items in a report. For example, authors can define a conditional style to highlight exceptional data, such as product revenue that exceeds your target. Conditions can also apply at the report layout level. Conditional layouts are useful for delivering reports to a multilingual audience. For example, text items, such as titles and cover pages, can appear in the same language as the data in the report.

Authors can use conditions to:

- Highlight data using conditional styles.
- Highlight data using style variables.
- Specify which objects are rendered when a report is run.

Bursting reports

With Cognos Business Intelligence, authors can burst a report to distribute its contents to various recipients. Bursting is the process of running a report once and then dividing the results for recipients who each view a subset of the data. For example, salespeople in different regions each need a report showing the sales target for their country. A report author can use burst reports to send each salesperson only the information they need. Authors can specify the distribution of reports by email or to a saved folder for viewing in other Cognos software.

Formatting data in reports

Authors can use the format data feature to make information easier to read. For example, it is possible to show all date values in an order year, month and day. If authors do not set data format properties with this feature, data is formatted according to the properties set in the model and if the properties were not set in the model, data is formatted according to the International Components for Unicode (ICU) formats. Special cells, such as overflow or underflow, errors or not applicable values, appear with two dash (--) characters unless they are overridden.

Authors can also format data based on a condition or specify the format for a particular object.

Drill-through access

Drill-through access helps authors build business intelligence applications that are bigger than a single report. Drill-through applications are a network of linked reports that users can navigate, retaining their context and focus, to explore and analyze information. For example, you can select a product in a sales report and move to an inventory report about that product.

Drill-through access works by defining the target report or object and then using information from the source report to filter the target. Cognos Business Intelligence can match data from the source to metadata in the target report or authors can define parameters in the target for greater control.

Working with multiple pages

Report authors can divide a report into multiple pages and add navigation elements to make it easier to use. Working with multiple pages includes:

- Adding a page to a report
- Creating page breaks and page sets
- Joining nested page sets
- Adding bookmarks
- Creating a table of contents
- Inserting page numbers
- Controlling page breaks and page numbering
- Creating page layers

Conclusion

Report authors need a solution that can help them provide complete coverage for all types of reports and access all enterprise data, regardless of the source. Cognos Business Intelligence extends the boundaries of traditional reporting, providing professional authors with unprecedented ways to view and communicate business performance and address the challenges of report authoring. With Cognos Business Intelligence, report authors can develop any and all types of reports. It offers complete report authoring from a single environment, provides advanced authoring abilities that match user needs and operates on a proven, web services architecture.

In short, report authors can use Cognos Business Intelligence to create reports that meet the needs of everyone in their organization.

About IBM Business Analytics

IBM Business Analytics software delivers data-driven insights that help organizations work smarter and outperform their peers. This comprehensive portfolio includes solutions for business intelligence, predictive analytics and decision management, performance management, and risk management.

Business Analytics solutions enable companies to identify and visualize trends and patterns in areas, such as customer analytics, that can have a profound effect on business performance. They can compare scenarios, anticipate potential threats and opportunities, better plan, budget and forecast resources, balance risks against expected returns and work to meet regulatory requirements. By making analytics widely available, organizations can align tactical and strategic decision-making to achieve business goals. For further information please visit ibm.com/business-analytics

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