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Spreadsheet Integration Criteria

Spreadsheet integration features to consider
when evaluating BI suites

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Spreadsheet Integration Criteria

Spreadsheet integration features to consider when evaluating a BI suite

Microsoft Excel is unofficially the leading BI tool. Business intelligence teams have tried to ignore it and sometimes disable it, because it can wreak havoc on the one thing a data warehouse is supposed to provide: a single version of truth. Yet users are passionate about spreadsheet integration, and it is the preferred interface for power users. The issue for BI teams and businesses, then, is how facilitate the integration while managing its use.

This report explores the various reasons why spreadsheet integration is important in evaluating a BI suite and the different approaches to achieving such integration. Excel add-ins allow MS Office users to update data live from a spreadsheet environment, whereas exporting data from the BI tool to a spreadsheet, while problematic, predominates.

Evaluation Methodology

BIScorecard evaluates vendor products with the view of a customer who wishes to buy a full BI suite or integrated toolset. Thus certain specialty products that do include spreadsheet integration such as XL Cubed or Actuate's e.spreadsheet products are not reviewed here. Products are evaluated according to major functional areas ranging from query and reporting to architecture and administration. Within each functional area, I score vendors on various features. This list of criteria is based on:

- Features that customers often look for in evaluations
- Unique capabilities identified while evaluating products
- Vendor marketing claims that are either a point of differentiation or confusion

To evaluate products, I rely on vendor briefings, customer feedback, and newsgroup postings. To ensure an objective, apples-to-apples comparison of products, I also evaluate the software hands-on. Because I seldom have the benefit of days or weeks of training (that I hope a typical customer would invest in), this does pose a challenge in evaluating more complex products. When a task is not apparent via the menus or online help, I rely on vendor documentation. Poor documentation for complex products can hurt a vendor's evaluation.

Each feature is assigned a score of 0 to 3:

Score	Explanation
3	Exceptional capabilities
2	Very good capabilities
1	Limited capabilities, difficult to do, or may require a work around
0	Minimal capabilities out of the box. The software may require customization or coding to accomplish.

Why Excel At All

As part of a report I co-authored (Enterprise Business Intelligence: Strategies and Technologies for Deploying BI on an Enterprise Scale, TDWI July 2005), one manufacturing company identified 850,000 Excel spreadsheets residing on corporate servers. Executives recently decided to mandate the use of standard BI technologies and processes because they never knew the true state of the business. "Managers became adept at hedging the numbers within Excel spreadsheets and executives got tired of all the hedges and just wanted the real numbers."

With Sarbanes-Oxley requirements, eliminating such chaos is increasingly critical. Fortunately, as you'll see in this evaluation, there are some criteria and tool capabilities that make both spreadsheet integration and one version of the truth possible. Despite the data integrity issues around spreadsheets, there are a number of compelling reasons why Excel integration continues to be so important to a BI tool selection:

Tool familiarity

Users have so little time to get the data and then to analyze it that it's often easiest to use a tool they are already familiar with.

Better charting

Excel charts and all the controls over scaling, axes, labels, have become a defacto standard against which BI tool vendors are often measured. If the BI tool doesn't provide robust charting capabilities, then it's clear that users will want to export the data to Excel to access its charting capabilities. Some BI vendors do provide superior charting capabilities than Excel, but for others vendors, Excel is the standard.

Better statistical functions

With the exception of Hyperion Intelligence and MicroStrategy, most of the BI vendors lack advanced functions such as standard deviation within the end user BI tool. When users need these functions, then here too they will export the data to Excel.

Disconnected briefing books

Excel's ability to have multiple worksheets stored in one workbook file makes it appealing for management briefing books. Managers can access all their data, perhaps populated from multiple data sources and queries in one file, offline. Few BI vendors can replicate this functionality natively. Dashboard capabilities are a robust alternative, but often require connectivity. Here, the manual processes to build Excel-based briefing books must be carefully evaluated against alternative solutions. A few vendors reviewed here offer spreadsheet add-ins that can help automate the process of building and refreshing Excel-based briefing books.

Other often cited reasons for Excel integration that I consider less valid or for which you really should fix other problems in the BI process:

Ability to “massage” the data:

“Massaging” the data includes resorting, filtering, creating formulas, and in some cases, fixing bad data. Fixing erroneous data should ideally be done earlier in the BI process. Resorting and filtering data is another situation entirely. Report consumers often will view a report and need just a slightly different view of that report. Many leading BI suite vendors allow for report consumers to perform such interactivity against a published report, without having to launch a full blown authoring tool. Cognos ReportNet 1.1, unfortunately, still lags in this capability. The degree of interactivity varies widely (see Reporting criteria), but one thing is clear: when the BI tool lacks this capability, users will export the data to Excel.

Reduced licensing costs

Companies have already incurred Excel licensing costs. If they can minimize the number of BI users by better leveraging Excel, then the theory goes that they can save on BI licensing costs. However, BI vendors are increasingly broadening the definition of “user”. A BI user is no longer an individual who logs into the BI tool, but rather, any user who receives output (including spreadsheets) from the BI tool. This is a nonissue for customers and vendors who have server-based licensing but a concern for customers who have named user licensing.

Office Add-Ins or Query Within Spreadsheet

Business Intelligence add-ins for Excel have been around for more than a decade. Yet they've met with variable success. One of the key barriers to adoption with an add-in is that it requires a local installation. Such an installation process simply can't compete with the faster deployment times of browser-based BI. As well, client-server communication with backend databases or the BI server was often slow via Excel.

Microsoft's Smart Client technology will be game-changing for the way BI vendors approach Excel integration (see <http://www.microsoft.com/office/previous/xp/webservices/smartclient.asp> for more information). Smart Client technology allows Excel to communicate with the BI Server via Web Services. The add-in can be installed and updated via a Web-browser. The only “downside” to Smart Client technology is that customers must be prepared for it as it requires Excel 2003 or Excel XP. Cognos Office Connection, a spreadsheet add-in due out August 2005, will be one of the first BI suite solutions to leverage Smart Client technology. If your company is on Excel 2000, some BI vendors support add-ins for Excel 2000 but clearly, then, you need an installation strategy.

An add-in, however, is not the only way of delivering information via a spreadsheet. Actuate and IBI offer alternative approaches.

More than Excel

With these add-ins, BI vendors also may support updating data not only from within a spreadsheet, but also, PowerPoint, Word, or Outlook. Business Objects and MicroStrategy currently provide this. Cognos, Hyperion, and Microsoft are not yet there.

Re-usability and data sources

Look for add-ins that re-use BI meta data such as business views and reports. With such re-usability, the security in the BI suite is also better leveraged. The ideal solution will allow you to query any BI content whether relational or OLAP. The reality is that many of the current add-ins only allow users to access a portion of the content available from the BI suite.

New Queries

Although an existing BI report is a good starting point, consider if users need the flexibility to author new queries within the Excel environment. If users know from the start that their end goal is to get the data into Excel, it is a tedious workflow to first switch back to the BI authoring environment to build a report and then access the BI add-in. This is currently a limitation in Cognos and MicroStrategy, yet a strength for Hyperion Essbase and SAS. Business Objects Live Office also only allows users to access published reports as a data source, but its older Business Query for Excel could access universes to allow users to create new queries.

Formatting

If the interface can import a live report, consider if it imports the formatting as well or if it only imports the raw data.

Tabular Data Sets and Pivot Tables

Across the industry, highly formatted documents do not always come into Excel that easily. This makes sense when you consider that a pixel-perfect document is often laid out in a page, whereas Excel is all about rows and columns. Often in this conversion process, a lot of extraneous cells may appear. Users of Crystal Reports and Actuate know this problem well. While the ability to import formatting is one criterion, it can sometimes get in the way of analyzing a tabular data set. A pixel-perfect report may look pretty on a page but may contain extraneous columns and rows, making it difficult to use Excel's Auto Filter or Subtotals.

So in many cases, users may want to export the data, but they don't want all that formatting: they want tabular sets that can be further analyzed via embedded Excel functionality.

If your BI report contains a cross-tab, it's ideal when this is presented as an Excel Pivot Table.

Formulas

For what-if analysis, it's ideal when the add-in converts BI report-based formulas to Excel formulas. In this way, a user can change a detail data point and it's automatically reflected in the subtotals and other calculations. Currently, very few of the BI suite vendors provide this, even via export. IBI is one of the few. Microsoft Reporting Services does in certain circumstances.

Charting

If Excel is the benchmark for charting capabilities, when you import a BI report, the idea is to extend basic BI charts with more options in Excel. Some of the BI tools do not bring the charts in at all, others only provide an ugly chart in which it's perhaps best just to start over, and a few better products provide a really good copy that can be further enhanced. If the chart can be imported as an Excel Pivot Chart, this further facilitates analysis.

64,000 Row Limit

I have mixed feelings about this requirement: whenever a user wants to retrieve more than 64,000 rows of data, I can't help but wonder if they are creating a mini spreadmart. At the same time, this Excel limitation has to be handled by the BI tool. Some vendors will automatically create a new worksheet when the number of rows exceed this limit.

Save to Repository

Being able to refresh data directly from a spreadsheet is only the first step in ensuring one version of the truth. Ultimately, whatever context, formatting, formulas, charts, and so on that have been added in the spreadsheet should be resaved to the central BI repository so that it is secure and sharable. This continues to be a limitation with MicroStrategy.

Spreadsheet Export

Exporting the data from the BI environment to a spreadsheet is another means of allowing users to work with BI data in a spreadsheet. An export is ideal when it is a one-time analysis or when the BI vendor does not support accessing the full BI content from the add-in. As well, each vendor approaches the add-in license differently. For some, it's part of the BI suite, for others, it's an additional cost. An export, meanwhile, rarely incurs an additional cost.

Some of the same features you want in an add-in are also important for exporting. You will find significant differences, though, in add-in capabilities and export capabilities so be clear on what your ideal usage scenario is. For example, Microsoft's Pivot Table Services and Hyperion Essbase Spreadsheet Add-In are both ideal for accessing data in an OLAP database; however, when you consider these two vendor's approach to exporting relational data from their reporting tools, the capabilities are drastically different.

Scheduled export

As BI vendors increasingly improve their scheduling capabilities, many have added the ability to schedule an export to Excel.

Charting

I don't want to repeat each of the criterion from the earlier section but charting deserves repeating. While many of the add-ins or smart clients will import a BI-report based chart and allow you to extend it with Excel's charting capabilities, there is a greater disparity in capabilities when you are doing a one-time or scheduled export. Business Objects Web Intelligence and full client (not Crystal Reports) was one of the first to export a native Excel chart. Cognos ReportNet 1.1 later followed (Excel integration in ReportNet1.0 was weaker). Many products still export the chart as an image, arguable a useless capability.

Sample Product Evaluations

As part of the BIScorecard reports, evaluation criteria are discussed separately from specific vendor and product capabilities. Vendor reports contain detailed evaluations of the vendors and products across several BI functional areas and are available to subscribers or can be purchased individually. The following sections are samples from only a few of the vendors and products currently available. The BIScorecard spreadsheet provides a side-by-side comparison and allows subscribers to weight each criterion according to your company's unique needs.

Business Objects

Business Objects offers two approaches to spreadsheet integration. The first is via an add-in called Live Office and the second is via export.

Live Office is one of the products Business Objects acquired with the Crystal acquisition. Prior to this, Business Objects also offered an add-in called Business Query for Excel. This allowed Business Objects full client users to perform live queries directly from an Excel spreadsheet, accessing the universe. With the Live Office add-in, users can query Crystal Reports content and OLAP cubes, however, they cannot query Web Intelligence reports or universes. Moving forward, Business Objects has stated its intentions to enhance the Live Office add-in, better leveraging Smart Client technology and providing access to Web Intelligence reports.

The following table provides scores for each criterion related to spreadsheet and office integration. For a comparison with other vendors, refer to the BIScorecard spreadsheet or individual vendor evaluations.

Spreadsheet Integration		
Add-In		Live Office
Smart Client Technology		No
66	Excel 2000 support	Yes
67	Additional Office Support (PPT, Word)	2
68	Re-usability, breadth of data sources	1
69	New Queries	1
70	Formatting retained	0
71	Tabular data sets & Pivot Tables	1
72	Formulas	0
73	Charting	1
74	64K Row Limit	1
75	Save To Repository	2
Spreadsheet Export from Report		(WebI Export) (Crystal Export)
76	Scheduled spreadsheet	2 2
77	Export tabular data set	2 2
78	Export Chart	2 1
79	Export Formulas	0 0
80	Export Formatting	2 2

New Queries

From within Live Office, users query a Crystal Reports data source (or an OLAP cube). In querying such a report, the user can choose to access part of the formatted report or individual columns. Accessing the individual columns worked better than accessing the

formatted report parts. When accessing individual columns, users can further filter a result set, a powerful feature and competitive product strength.

Tabular Data/Pivot Table

For tabular data, it is best to access individual columns. Accessing a formatted table as a report part was problematic. In accessing individual columns, data is returned as a flat table, with no subtotals. It is not automatically converted to an Excel Pivot Table, something that continues to be strength in MicroStrategy Office.

Export Capabilities

As the scores in the preceding table illustrates, there is a difference in export capabilities depending upon which interface was used to build the report: BusinessObjects full client, Web Intelligence or Crystal Reports.

Web Intelligence documents can be exported to Excel with all the formatting preserved. Charts are exported as modifiable Excel charts. Formulas are not exported. The ability to export formatted reports was a long-awaited feature first introduced in version 6.0. However, with its introduction, users are finding they also want to be able to export the raw, unformatted query data. This is not possible in XI or in Web Intelligence 6.5 but remains a feature of the full client.

Meanwhile, Crystal Reports exports formatted documents but in the process, cells that looked tabular come across problematically. If the desired result is a tabular data set, then there is also an option to export the data only. Charts are exported as images only as is also the case when accessing a chart from Live Office. Although the quality of the image is good, I don't find this capability particularly useful unless it can be extended with Excel charting capabilities. Crystal Reports formulas are not exported. There is a toggle to convert summary formulas but in testing the XI product, this appeared to have no affect.

64,000 Row Limit

When Live Office accesses a report that is greater than 64,000 rows (an Excel limitation), users can first further filter the data set, an excellent capability that I have seen in few of the other add-ins. However, when the returned result is still greater than 64,000 rows, the user is warned that the result set will be truncated. I would rather see the result set continued in another worksheet. Oddly enough, when the report is exported from Crystal Reports, a second worksheet is automatically created.

MicroStrategy

MicroStrategy Office was first introduced in Q1 2004. Its ability to access data via other office applications such as Power Point and Word were a big innovation, but something I suspect is still driven more by marketing hype than customer demand. The product uses Web Services to communicate with the Intelligence server and requires the Microsoft .NET Framework.

There are a number of improvements in MicroStrategy Office 8, most significant are:

- the ability to install the application via a browser link. So even though MicroStrategy is not using Smart Client technology, the installation and maintenance of the add-in product is handled.
- better chart rendering
- support for Report Services documents; MicroStrategy Office 7.5 only supported grid/graph documents and not the highly formatted documents

With all these improvements, it would seem to me that every MicroStrategy customer would want this product, although it is yet again an additional license.

One of the biggest weaknesses is that these spreadsheets cannot be saved back to the central repository or portal environment. Thus, companies must ensure another way of managing this part of the BI content. Similar to some of the other Office Add-Ins, there is no ability to create new queries from within Office. I found it annoying that each Office tool re-prompted me to enter a user ID and password, even when I was already logged in via Web or Excel.

The following table provides scores for each criterion related to spreadsheet and office integration. For a comparison with other vendors, refer to the BIScorecard spreadsheet or individual vendor evaluations.

	Add-In	Office 8
	Smart Client Technology	No
66	Excel 2000 support	Yes
67	Additional Office Support (PPT, Word)	2
68	Re-usability, breadth of data sources	3
69	New Queries	0
70	Formatting retained	2
71	Tabular data sets & Pivot Tables	2
72	Formulas	0
73	Charting	2
74	64K Row Limit	2
75	Save To Repository	0
	Spreadsheet Export from Report	
76	Scheduled spreadsheet	1
77	Export tabular data set	2
78	Export Chart	1
79	Export Formulas	0
80	Export Formatting	2
	Weighted Spreadsheet Score	

Export Chart

How charts are exported depends if the chart was created in grid/graph mode or with Report Services. A chart exported from grid/graph mode is exported as a static picture file to Excel. However, charts created in Report Services and exported to Excel are exported as a native Excel chart. This allows users to further modify the chart using all the Excel chart capabilities. This is an improvement in MicroStrategy 8.

Export Tabular Data / Pivot Table

MicroStrategy Office allows a user to export a report as an Excel Pivot Table and Excel Pivot Chart, some relatively unique capabilities that make the product exceptional as an analysis tool. MicroStrategy Office has a feature "Run Report Flattened" that allows a grid with subtotals to be brought in as a tabular data set so that users can analyze it via the Excel features. Auto Filter is turned on automatically. If found it disturbing, though, that when I inserted new columns or formulas, a data refresh overwrote them.

64,000 Row Limit

According to the vendor, there is the ability to handle reports that return 64,000 rows of data as a Pivot Table. This could not be fully evaluated as the large sample report created in Web never appeared in Office.

SAS

SAS Add-In for Microsoft Office takes a rather different approach to Office integration than some of the BI vendors. Most important is that users query individual tables or stored processes. They do not access Web Report Studio reports or Information Maps, although support for Information Maps is planned for a future release. Querying individual tables gives certain users a fair degree of flexibility, but it is also a big limitation in terms of what can be analyzed if a DBA has not provided a physical view (with joins) or a power user hasn't created a stored process.

SAS also does support refreshing data within Word, but the data must first be brought into Excel and then imported into Word. It does not currently support PowerPoint or Outlook.

Unique to SAS' add in is its analytic capabilities that go beyond those of Excel (and other BI vendor add-ins). There are numerous SAS Tasks that can be run against the source table, such as Graph (Pareto, Histogram), Time Series, Regression, and Random Sample. The analysis is run on the server and the results returned to Excel, making a 64,000 row limit a nonissue for such analysis. Further, the Add-In includes its own graphing capabilities as Active X controls. In some cases, users may indeed want to enhance a chart using the native Excel charting. In such a use case, SAS approach would be limiting. In other cases, though, the SAS charting has chart types and options that go beyond those of Excel, such as maps, zoom, and most importantly, charting a data set greater than 64K. In this way, the SAS Add-In will clearly be a strong selling point for existing SAS customers.

SAS also does support refreshing data within Word, but the data must first be brought into Excel and then imported into Word. It does not currently support PowerPoint or Outlook. The following table provides scores for the two different approaches to spreadsheet integration.

	Add-In	
	Smart Client Technology	No
66	Excel 2000 support	yes
67	Additional Office Support (PPT, Word)	1
68	Re-usability, breadth of data sources	1
69	New Queries	2
70	Formatting retained	2
71	Tabular data sets & Pivot Tables	1
72	Formulas	0
73	Charting	3
74	64K Row Limit	2
75	Save To Repository	0
	Spreadsheet Export from Report	
76	Scheduled spreadsheet	1
77	Export tabular data set	2
78	Export Chart	1
79	Export Formulas	0
80	Export Formatting	2

64,000 Row Limit

SAS handles the 64,000 row limit in an intelligent, unique way. First, users can filter a table so that less than 64K rows are returned. However, even when users need to analyze a larger result set, the Add-In will leverage the server. SAS adds a button to the toolbar to allow users to window through the result sets. Users can then use the Add-In capabilities to perform additional analysis, graphs, regressions, time series trending, and so on, on this larger result set.

Export abilities

When exporting a Web Report Studio report to Excel, users can choose to export the entire report or individual objects or tables. I like the option of exporting individual objects, particularly as Web Report Studio has a relatively unique ability to access multiple data sources / Information Maps within a report. However, exporting the entire report to an Excel spreadsheet is tedious even for a basic report. Each image is exported as a .gif file (not as a native Excel chart). The related contents are saved as a zip file that must first be extracted.

Scheduled Export

Web Report Studio scheduler does not allow an export to Excel and only supports PDF and HTML scheduled output. As a work around, power users can use Enterprise Guide to schedule a process that gets exported to Excel.