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# Dundas Dashboard and the Microsoft Business Intelligence Stack

Refinement, Good Chemistry, and Greater Reach

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## Executive Summary

The Microsoft Business Intelligence (BI) technology stack is, in many ways, the industry's best. Its performance, features, and integration of everyday tools, like Excel and SharePoint, are excellent. Moreover, the economics of the stack are enormously compelling and competitive. Microsoft can provide so much value because it embeds BI in its major products, rather than selling BI through a collection of smaller, expensive offerings.

But that approach of embedded BI means that the fit and finish of some of the competing BI stacks, especially when it comes to data visualization and ease of dashboard development, sometimes outshines Microsoft's. Microsoft's BI stack does have a good answer for this, though: its extensibility by products from partner companies.

One such product is Dundas Dashboard. It integrates beautifully with Microsoft SQL Server, SQL Server Analysis Services, SharePoint Server and Microsoft's .NET developer platform as well. It provides a development interface that is accessible to business users and yet is highly productive for BI professionals. It supports a workflow and division of labor between data modelers and dashboard designers. It supports self-service BI through its DashBlock and mashup features. It is based on Microsoft's Silverlight technology and leverages it to produce stunning data visualizations within a web browser deployment channel. Dundas Dashboard integrates well within SharePoint, but does not require users to own it.

Dundas Dashboard is a standalone dashboard development product. But Dundas' heritage in both data visualization and developer components has resulted in a product that is also developer-extensible and whose output is hostable in custom applications (via a Silverlight viewer control). This brings BI to line-of-business applications where its value is extremely high.

Most industry dashboard products are delivered to BI professionals who then implement them for customers, meaning deployment experience is gained only after the product is released to market. Dundas Dashboard's development process differed from this pattern. The product design was derived from the methodology used by Dundas' consulting group, in their dashboard projects based on the company's first-generation data visualization components. This has resulted in a dashboard product built around a real-world workflow and role-based approach to building dashboards, which is just one of many reasons Dundas Dashboard stands out in the market.

Dundas Dashboard takes the already-powerful Microsoft BI stack and makes it even more valuable through a stunning presentation layer, powerful design environment and strong integration with existing Microsoft BI stack components. Microsoft BI shops should take a serious look at Dundas Dashboard. The points in this executive summary outline why; the remainder of this review provides details and further context to flesh out those points, helping BI pros and procurement personnel make an informed platform decision.



## Introduction

All by itself, the Microsoft Business Intelligence (BI) stack offers a lot of functionality and provides a lot of value. Unlike many BI stacks, which are licensed on a standalone basis at significant cost, Microsoft's technology and licensing are embedded with its SQL Server database, its SharePoint Server collaboration platform and its Office desktop productivity suite. The result is a great set of BI capabilities put in the hands of workers who might not otherwise have it.

But Microsoft's strategy of embedded BI also means that, at times, its functionality is more of a "jewel in the rough" than a polished stone. While reporting, analysis and Performance Management products are provided in the stack, they sometimes lack some of the finish of competing products. For example, the Microsoft BI stack makes very sparing use of Rich Internet Application (RIA) technology and its dashboard authoring environment can be daunting for casual users. No less than three products within the stack provide data visualization capabilities; while it's good to have choices, determining which tool to use and how to combine assets from different products in the same dashboard can sometimes be confusing.

Let's be clear, Microsoft's utilitarian approach to BI is to be applauded, and it's completely reasonable that this approach leaves a few gaps in the stack. Meanwhile, the stack enjoys support from other products and companies and this can mitigate the impact of those gaps.

Dundas Dashboard does more than mitigate them. It fills them. It uses RIA technology; it unifies data visualization with dashboard design; it provides a user-friendly interface and elegantly supports a self-service scenario for dashboard composition. Dundas Dashboard, while capable of integrating with a variety of data sources, integrates with the Microsoft stack especially well. Whether the data you want to get in your dashboard lives in a SQL Server relational database, data mart or warehouse, or a SQL Server Analysis Services cube, Dundas Dashboard can take it on and empower you to build state-of-the-art dashboards that help you use your data to get to the core of your organization's performance, opportunities and challenges.

For the duration of this review, we'll discuss what the Microsoft BI stack does well, what gaps it leaves and how Dundas Dashboard fills them. We'll also discuss what makes Dundas Dashboard a unique offering in the BI market overall, and not just relative to Microsoft BI. (For those who are unfamiliar with all or parts of the Microsoft BI stack itself, the Appendix to this review provides a full inventory and description of the stack's components.)



## Assessing the Stack

So now that we know what the stack does, the question remains what does it not do? While the Microsoft BI stack's three major presentation components (Reporting Services, Excel Services and PerformancePoint) can be used -- individually or together -- to create dashboards, they do so quite differently, and without certain niceties:

- Reporting Services has the best visualizations, and features the Report Part Gallery. It also offers the best pixel-perfect layout capabilities. But it doesn't offer true drill-down (it queries everything, then hides and shows the detail levels, rather than fetching that data on an as-needed basis). It supports MDX queries, but forces them into a tabular (rows and columns) presentation. It supports reporting controls in the Windows Forms and ASP.NET Web Forms development environments, and has a powerful SOAP API that is useable from other development environments, including non-Microsoft Web development environments like PHP.
- Excel Services has a good Web UI, with high fidelity in presentation to the Excel desktop client. Unfortunately, any 3D visualizations are scaled down to 2D rendering in the browser. And while PivotTables and charts are supported and can be drilled down/rolled up, there is no browser UI for changing the composition of the PivotTable or chart (i.e. their row, column and value data). Excel Services in SharePoint 2010 offers a powerful REST API, useable from virtually all Web development environments, for creating mashups with Excel Services assets, without the need to use SharePoint Web Parts. The Excel Web Application, of which Excel Services is technically a subcomponent, allows spreadsheets to be created and/or edited in the browser. However, the inclusion of certain Excel Services features disables the edit capability.
- PerformancePoint Server allows sophisticated drill-down and cross-drill capabilities on its Analytic Charts and Analytic Grids and its Decomposition Trees. It also enables the use of scorecards as filters on the analytic elements. While all of this is useful, the charts themselves are less attractive than their counterparts in other BI stack components, and the cross-drill user interface can be confusing to casual users. The decomposition trees are available only in pop-up windows. Dashboards must be created in the Dashboard Designer application which is geared much more to BI professionals than to end users. As such, there is very little self-service capability in PPS, whereas Excel and the SSRS Report Part Gallery do support self-service scenarios.
- There is virtually no use of Silverlight in the Microsoft BI stack at this time, with minor exceptions like the Decomposition Tree and SharePoint's Gallery and Carousel controls. Given Silverlight's superior data visualization capabilities, this is a surprising gap in the stack. While it will be at least partially rectified with the next version of SQL Server, the fact remains that the major presentation medium of Microsoft's BI stack is SharePoint, and SharePoint is primarily an HTML web and content publishing system.
- While SharePoint is an excellent platform on which to base the BI stack's presentation layer, the bottom line is that certain customers do not have it. This necessarily creates a barrier to entry for some customers because out of the three presentation layer components (Reporting Services, Excel Services and PerformancePoint Services) only SSRS can be configured in a SharePoint-independent mode.



- Beyond the self-service scenario, per se, is the issue of division roles. With its Report Part Gallery, Reporting Services now supports a primary authoring role (from-scratch report development) and a secondary one (Report Part composition). Excel Services technically supports similar roles with from-scratch development possible in the Excel client and composition possible in the SharePoint Web Part page designer experience. PerformancePoint meanwhile, does not really support this dichotomy since the development of dashboard content, and the dashboards themselves, must both be conducted in the Dashboard Designer.

## How Dundas Dashboard Augments the Microsoft BI Stack

The Microsoft BI stack provides a lot of raw functionality on very compelling economic terms, especially for existing SQL Server and SharePoint customers. Meanwhile, as we've outlined above, there are gaps in the stack and filling them can make the difference between successful implementation, user buy-in, and iterative improvement of the deliverables on the one hand, and a system that only power users can take full advantage of on the other. There's nothing unusual with this. The big platform vendors often deliver core functionality and leave it to implementers and ISVs to complement the stack with value-added features. And, given that Microsoft does offer the core functionality with such favorable pricing, that certainly leaves room in budgets to add the products that add that polish.

If you're a Microsoft BI customer, and you combine the Microsoft BI stack with Dundas Dashboard, you will fill most of the gaps we've covered in this review:

- Dundas Dashboard is completely Silverlight-based fully solving the conundrum for people who want the strong back-end capabilities of SQL Server and Analysis Services, but who also wish to bring the full data visualization impact and interactivity of Silverlight to bear in the dashboards.
- Dundas has a strong legacy in data visualization and in creating developer components. Both of these assets are brought to bear with the product. The charts and gauges are visually stunning and the dashboard elements are customizable and hostable in a variety of ways.
- Dundas Dashboard is easy to use. The design facility uses the familiar paradigm of a form designer to make dashboard creation straightforward.
- Dundas Dashboard supports separation of roles. In fact, it supports three distinct roles: a business data modeler, a dashboard designer and a self-service role. Data modelers use the design facility to build dimensions, KPIs and datasets. More visually-oriented designers can then build visualizations on top of these and combine them into full dashboards. These designers can also build standalone dashboard elements called DashBlocks, which end-users can then combine into their own dashboard mashups, on a self-service basis.



- These roles are not merely ones that are followed by convention; they are in fact enforceable through role-based security which can be set on a per-dashboard basis. In fact, this entire regime of user roles and the enforced permissioning system around them are part of the DashFlow subsystem.
- Dundas Dashboard integrates with SharePoint, but does not have a dependency on it. Much like Reporting Services, Dundas content can be surfaced through SharePoint Web Parts, but can also be delivered on a standalone basis. The standalone functionality makes the product suitable for non-SharePoint customers. The Web Part makes it compatible with SharePoint customers' investments and even provides a level of integration between it and native Microsoft BI presentation components.
- Dundas Dashboard is programmable and customizable, and this holds in two directions: through the Dundas Dashboard Silverlight Viewer Control, individual visualizations found in Dundas Dashboard can be embedded in custom applications and custom Silverlight controls can be embedded in Dundas Dashboards.

## Dundas Dashboard's Unique Position in the BI Marketplace

Beyond a discussion of how Dundas Dashboard works relative to the Microsoft BI stack, and the gaps within it, it's important to appreciate Dundas Dashboard in absolute terms. While Dundas Dashboard happens to be built on Microsoft technology, and while it also happens to integrate well with the Microsoft BI stack, it is a BI product in its own right, and can work with a diversity of data sources in a diversity of vendor environments.

Relative to products from virtually all BI vendors – be they the so-called mega-vendors, or smaller BI pure play vendors – Dundas Dashboard (DD) has some characteristics that are unique in the marketplace:

**DD is based on a RIA technology.** Dundas Dashboard uses Silverlight as its exclusive presentation technology. This allows the product to run in web browsers on both Windows and Mac OS computers, but the advantages go well beyond the cross-platform capability. As we discussed earlier in this review, Silverlight excels at data visualization. This derives from Silverlight's native support for vector graphics, and the ease with which that support can be manipulated programmatically or through eXtensible Application Markup Language (XAML). Some other BI products have RIA support (typically using Adobe Flash), but that support tends to come from add-on products which are dependent on other parts of deep stacks. Dundas Dashboard's RIA features are core to the platform-neutral, standalone Dundas Dashboard product, and are not just a rendering veneer.

**DD was borne of consulting experience,** and was designed around lessons learned from actual dashboard implementations. Unlike most BI products on the market, which were designed from concept by product organizations, Dundas Dashboard was built based on lessons learned from dashboard consulting engagements created using Dundas' first-generation chart, gauge and map products. Dashboards built with those more component-based products had to be implemented with a decent amount of code. In order for that code to be reusable to the greatest extent possible, Dundas developed its own methodology and discipline for building dashboards in this way. The Dundas Dashboard product is a



tool that implements the patterns and workflow from those engagements as features and design foundations of the product.

**DD requires no developer or special implementation skills to deploy, and yet it is a developer-oriented product.** I really can't emphasize this particular point enough. Those of us from the developer world know that a product is much more valuable when it has an API and can be integrated with other solutions. Consulting organizations can find immense opportunity with such products. But many API-oriented products are so geared to developers that they fall apart in the hands of business analysts, power users and end-users. Likewise, products that are well-crafted for standalone use tend to have no APIs or else have APIs that expose only a limited set of the product's full functionality. This conundrum exists for understandable reasons. Products have budgets, and budget monies are allocated to the features that have the best return on investment. Since most products are aimed primarily at developers or non-developers, it's not surprising that the less-targeted audience gets less functionality.

Dundas Dashboard is a strong standalone solution, but Dundas has so much experience in the developer world that adding rich APIs did not have to be a disruptive investment for the company. In other words, Dundas didn't have to choose between extensibility and standalone capability, because it was able to support both in stride. Furthermore, Dundas uses these APIs itself for the production of new data connectors, data visualizations and export file types. So developers have access to the same APIs that Dundas itself uses to enhance the product. This is extremely unprecedented in the BI space, and it's a welcome change.

**DD features unprecedented integration with line-of-business (LOB) applications.** Because Dundas Dashboard is so developer-friendly, it can insinuate itself into application development, and the planning around it. Embedding elements of dashboards into LOB apps brings the power of BI closer to a broader range of users. Standalone dashboards are important, of course. But some users won't use them and even those that do may spend a larger proportion of their time in LOB software. Exposing BI functionality in those LOB settings makes BI more useful, more approachable, and thus more powerful. Even the most insightful analytics findings are meaningless if people can't see them, or are intimidated by the systems that would expose them. In the early days of the Microsoft BI stack, BI had to be exposed this way because the stack had no real presentation layer. Now that it does, custom code that integrates BI is much more rare. The Dundas Dashboard approach allows both types of implementation to co-exist, and maximizes re-use as it does so.

**DD enables self-service usage while still being a professional dashboard development environment.** We have made this point obliquely before, so let's be explicit this time. Just as many BI products are either developer-oriented or user-oriented, many in the user-oriented group are aimed at either end-users or professional enterprise BI architects. Dundas Dashboard nicely accommodates both of these audiences. This allows professionals to pick up a self-service project and help it graduate to a more centralized, managed and formally-designed approach. It also allows the reverse: end-users can have a Dundas Dashboard project delivered by professional BI consultants, take it over, and work with it independently.



**DD supports vertical industry and methodology dashboard implementations.** Through Dundas Dashboard's add-on architecture, new chart types can be added, new data formats accommodated and new export formats supported. This allows for methodology-specific dashboard solutions to be built. For example, the Six Sigma Add-on allows the "control charts" prescribed by that quality management system to be produced and thus converts Dundas Dashboard from a generic performance management tool to one suited to specific requirements. Other add-ons support rendering of sparkline-style visualizations, accommodation of RSS data as an import format and export of dashboards to PDF format. Aside from the specific functionality these add-ons deliver, they also serve as examples of what organizations can do with the add-on architecture to add support for their own required input formats, renderings and output destinations.

**DD has superior economics.** Instead of having to adopt an entire stack which features a dashboard solution on top of other components, customers can instead use Dundas Dashboard directly against their data marts, data warehouse or OLAP cubes, from any or a combination of major vendors, and build dashboards that are of the highest caliber, with workflow in place during the process. Other solutions force the use of their own data modeling tools, OLAP engines and reporting packages (including standard and ad hoc reporting, as well as analytics tools). Dundas Dashboard provides polished features and an integrated toolset while still working with customers' existing database, ETL and OLAP tools. Dundas Dashboard can work with raw platform technologies and does not require commitment to, or investment in, a complex, expensive and possibly superfluous set of tools

## Conclusion

We have seen that Dundas Dashboard both complements and extends Microsoft's already strong BI stack in very useful ways, and delivers a caliber of data visualization that enhances the stack's value significantly. The DashFlow system, the extensibility, the ease of use and self-service scenarios (facilitated by DashBlocks) that Dundas Dashboard boasts make BI highly approachable for power users and end-users. Meanwhile, the product is especially valuable to seasoned BI professionals and this is not surprising given its legacy from the toolset of Dundas' implementation teams.

All in all, the product is one customers should check out, and one that solution providers would do well to share with their customers. Dundas Dashboard can really help make the sale for Microsoft BI because it builds upon the stack's core strengths and fleshes out its capabilities so ably. Its add-on infrastructure and other extensibility points facilitate industry- and customer-specific scenarios and take advantage of Microsoft's technologies, like Silverlight and the .NET Framework, to make that happen.

Dundas Dashboard is an excellent companion to the Microsoft BI stack and, simultaneously, a very strong standalone offering. That's exactly what customers of a large vendor's stack should have – something that builds on the strengths of the technology they've paid for and which gives interoperability and independence as well.



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## Appendix: A Quick Tour of the Microsoft BI Stack

The Microsoft BI stack has many components. In general, the stack consists of SQL Server, Office and SharePoint, but in reality each of those three products contains many included and embedded technologies that together make up the Microsoft BI stack. Many of these overlap in capability and this can lead to some confusion. The good news is that with a review of the products in the order they were brought to market, it's actually pretty easy to get your bearings. Let's proceed with that review.

### SQL Server

SQL Server forms the platform layer of the Microsoft BI stack. Microsoft's flagship database now includes a collection of components that augment the core relational database engine, and most of them are in some way BI-related. Let's examine each of these now.

#### **SQL Server Analysis Services (SSAS)**

SSAS is Microsoft's OLAP server. OLAP stands for Online Analytical Processing, which means little until you contrast it with Online Transaction Processing (OLTP). OLTP is really designed for operational reading and writing of individual rows (or small collections of them) in tables. OLAP is designed for drill down and aggregation analysis of huge amounts of underlying transactional data. In fact, Analysis Services was originally branded OLAP Services and was introduced with SQL Server 7, though it came out about a year after the latter product's release.

The original OLAP Services product was acquired and, for the most part, simply bundled with the relational database product. Its SQL Server 2000 version brought in the rebranding to Analysis Services, because it included a basic data mining engine in addition to the OLAP technology. It also had better integration with the rest of SQL Server.

The 2005 release of Analysis Services saw a total revamp of the product, its codebase and its tools. The current 2008/2008 R2 versions have important performance improvements, but are little changed on the outside in terms of features and interfaces.

SSAS' query language is called MDX, which stands for MultiDimensional eXpressions. Its underlying protocol is an SOA web service-based technology called XMLA (XML for Analysis). Though Microsoft originally engineered both MDX and XMLA, each of these technologies has become a quasi-standard in the BI industry. They are used, to varying degrees, by competing OLAP platforms and client tools. In fact, Analysis Services itself is similarly standard, and well-regarded, in the industry.



### SQL Server Reporting Services (SSRS)

SSRS was first developed for SQL Server 2005 while that product was in Beta. The response to the beta was so positive that Microsoft retrofit the product for SQL Server 2000 and released it “out of band” (i.e. after SQL Server 2000 originally shipped, but well before SQL Server 2005 did). For the 2000 version, Microsoft gave SSRS the ability to report not only from SQL Server relational databases, but also SSAS cubes. This made Microsoft’s reporting product a true BI tool. While relational reporting is, in and of itself, a BI technology, the ability to use SSRS against OLAP databases made the claim quite credible.

SSRS 2005 brought a visual designer for OLAP queries (the 2000 version required report developers to write their own MDX queries) making it a tool that, in and of itself, enabled use of Analysis Services. SSRS was revamped for SQL Server 2008 and again for SQL Server 2008 R2. The product now has many advanced data visualizations, including charts, gauges, maps and sparklines, as well as the ability to build new reports by dragging and dropping elements published from other reports.

### The Data Warehousing Platform: SQL Server Integration Services (SSIS), SQL Server Parallel Data Warehouse (PDW) and SQL Server Itself.

SSIS is Microsoft’s Extract, Transform and Load (ETL) product and is a great tool for the operational side of data warehouse population and maintenance. SSIS also includes features specifically geared to SSAS cubes and data mining models. SQL Server Change Data Capture (CDC) feature (introduced with SQL Server 2008) allows the warehouse to be updated without putting strain on the transactional tables. Excellent data mart and data warehouse implementations, up to the 48 terabytes, can be implemented in the SQL Server relational database (using its Fast Track Data Warehouse reference architectures, when warehouse size so demands). For even larger data warehouses, Microsoft now offers its PDW product which is a massively parallel processing (MPP) data warehouse appliance that manages an array of SQL Server instances and federates them into a single logical warehouse.

New to SQL Server 2008 R2 is SQL Server Master Data Services, Microsoft’s initial offering in the world of Master Data Management. This component is still very early stage and not yet widely adopted, but the next version of SQL Server will likely have a more mature MDM offering, as well as a Data Quality facility.

### Office, PowerPivot

On the Windows client side, Excel is the Microsoft BI tool of choice. It has very tight integration not only with SQL Server, but also with SSAS, supporting virtually all of the latter’s features through its PivotTable, PivotChart, CUBExxx formula functions as well as “slicers,” a filtering UI new to Excel 2010. Other Office applications have data connectivity to SQL Server, and Visio can also connect to SSAS OLAP cubes, allowing the use of Visio diagrams for OLAP data visualization.



PowerPivot is a new Excel Add-In (it's also available as a SharePoint Service Application – more on that shortly) with which end-users without formal BI skill sets can build data models they can then query in Excel. PowerPivot is actually a client version of Analysis Services, albeit with a new and very different storage engine, called VertiPaq. Excel's ability to query PowerPivot models derives from its ability to query SSAS cubes, because Excel, in fact, sees the former as the latter. PowerPivot's storage engine keeps the data model in memory allowing for very short query times, and it uses compression aggressively allowing for huge models to fit there.

### SharePoint

SharePoint, in a general sense, is Microsoft's main presentation channel for its BI technologies. The thing that makes this a bit tricky to follow is that there are four different technologies within SharePoint that make this possible, each of which can be used individually or in combination with the others.

For example, SQL Server Reporting Services has a special SharePoint Integration mode allowing its reports to be rendered in SharePoint directly, either in full-page view or through the use of SharePoint Web Parts. Next, Excel Services and the Excel Web Application allow cell ranges, PivotTables, charts, Slicers and parameter cells from Excel spreadsheets to be viewed and interacted with in a web browser, through a pure HTML/AJAX interface. And because the PowerPivot engine is available in the form of a SharePoint Service app, such content in Excel workbooks with embedded PowerPivot models can be rendered in and used from the browser as well.

Capping all this off is SharePoint's PerformancePoint Services (PPS) component. This is Microsoft's scorecard, analytics and dashboard technology, and was formerly available as the Monitoring and Analytics component of the stand-alone PerformancePoint Server product. PPS offers complex scorecarding -- including support for the Balanced Scorecard methodology; it also offers in-browser drill-down and drill-across capabilities and its dashboarding facility allows SSRS and Excel Services content to be integrated with PPS' own scorecards, Analytic Grids and Analytic Charts.

On the SharePoint side, one other point should be made: PowerPivot models that are deployed to SharePoint are queryable by any Analysis Services client, including Reporting Services and, interestingly, Excel itself. Dundas Dashboard can query PowerPivot models as well. All this is possible because PowerPivot really is Analysis Services, in special form and, on the server, it supports all the same query interfaces and APIs.