



Technical Whitepaper: New Capabilities Overview - Breakthrough Insight

**Published:** December, 2011

**Applies to:** Microsoft® SQL Server® 2012

**Summary:** This technical white paper presents an overview of the new features related to the business intelligence stack in Microsoft SQL Server 2012.

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## Introduction

Organizations are struggling to understand and analyze the tremendous amount of data that has been unleashed over the past few decades at all levels of the organization and across multiple devices. To achieve their objectives and make better decisions, organizations need powerful business intelligence (BI) capabilities that span the spectrum of reporting and analysis requirements as well as new self-service capabilities, which can help reduce the burden that IT faces in satisfying the needs of the organization.

Microsoft SQL Server 2012 helps organizations achieve their objectives and make better decisions by:

- Providing a complete spectrum of BI capabilities and Enterprise Information Management (EIM) technologies.
- Helping to unlock breakthrough insights by allowing users to visualize and rapidly explore data with the new ad-hoc query capability in Power View (formerly known as Project Crescent) and new capabilities in PowerPivot.
- Making it easier for users to gain insight from data across the organization with enhanced reporting and analysis capabilities.
- Providing users with accessible intelligence across the organization through managed self-service BI, dashboards and scorecards, and the collaboration capabilities of Microsoft SharePoint®; and providing IT with dashboards to manage and monitor usage and meet business requirements.
- Empowering users to explore and resolve problems with data and streamline existing data management processes using familiar tools to improve the overall credibility and value of organizational information.

This white paper provides an overview of the new features of SQL Server 2012 for BI and EIM.

## Breakthrough Insight

SQL Server 2012 provides customers with large-scale data warehousing and analytical solutions backed by IT management and insights. New and enhanced self-service capabilities allow users to explore and unlock new insights from information spread across structured and unstructured data sources, both on-premises and in the cloud.

There are three major areas in SQL Server 2012 that help deliver breakthrough insights:

**Rapid Data Exploration:** Users can explore and analyze vast amounts of data spread across various sources in different formats, and then gain deeper insights from this data with new tools to rapidly explore and visualize this information. These new tools and highly interactive web-based interfaces provide users with the simplified yet powerful capabilities of data querying and visualization.

**Managed Self-Service BI:** Organizations can extend the impact of self-service BI across the organization through enhanced models and tools, while increasing IT and developer efficiency by delivering and efficiently managing a highly available, security-enhanced, and interoperable BI platform. With SQL Server 2012, business users can now prepare a quick prototype using familiar tools (such as PowerPivot), which BI specialists can enhance using professional tools before deploying for organization-wide use.

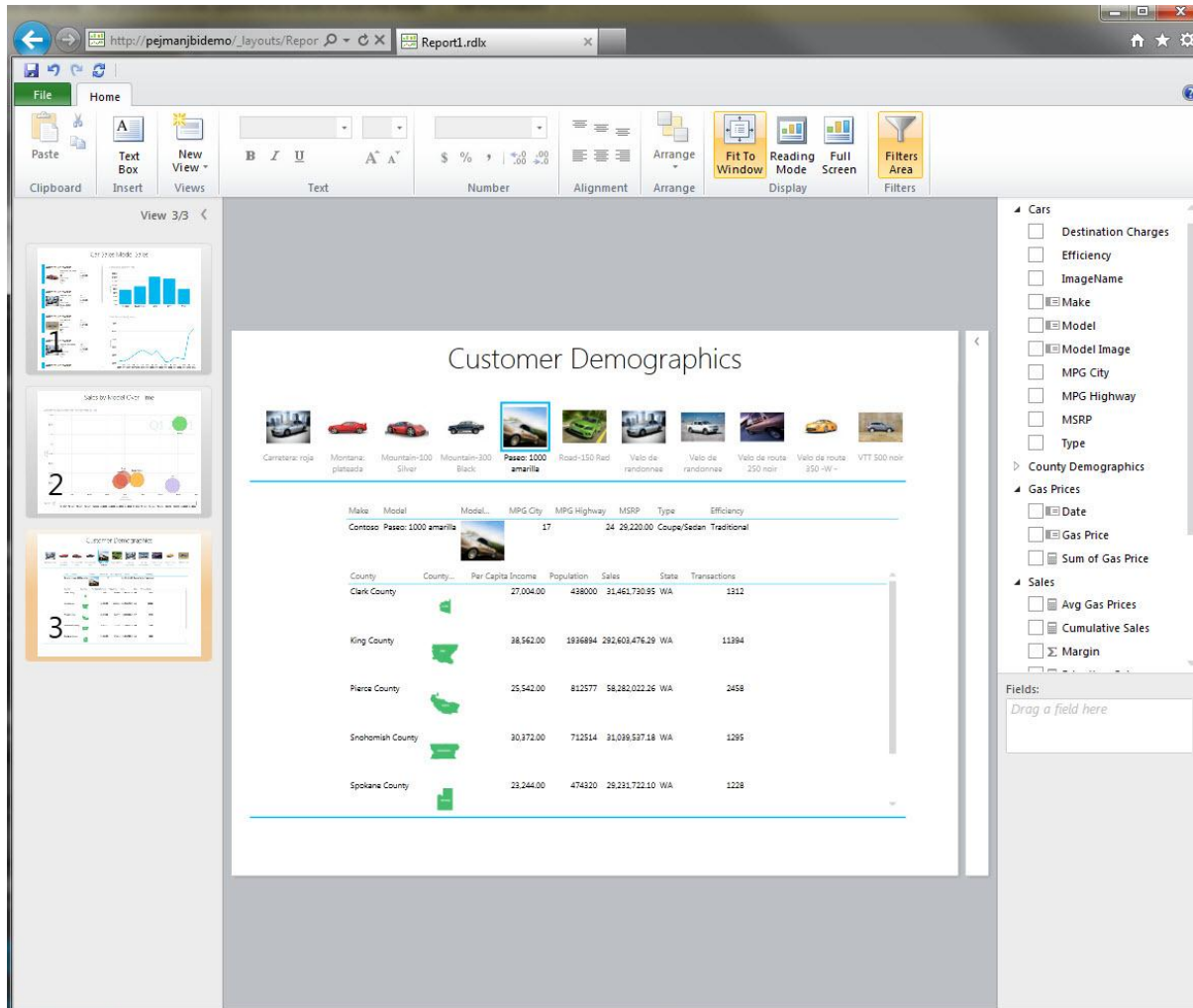
**Credible, Consistent Data:** Organizations can get the enhanced capability to integrate, manage, and cleanse disparate data sources in a simplified manner. The new advanced and efficient tools for data integration help users reduce the time and effort it takes to develop integrated data solutions, and deliver credible and consistent data reliably and efficiently across the organization.

## Rapid Data Exploration

SQL Server 2012 enhances the data exploration capabilities of organizations by empowering users to access and integrate data from virtually any source. It allows users to create compelling reports and analytical applications, and easily collaborate and share insights using familiar tools. With this new version, users can create interactive, tabular, graphical, or free-form reports using data from a wide variety of data sources, including on-premises, syndicated, or unstructured data sources. SQL Server 2012 also includes customization capabilities with several programmable features.

## Power View

Power View is a new, highly interactive data exploration and reporting tool that enables users to visually explore their data and answer ad-hoc questions with ease. Figure 1 shows a Power View report with multiple views.



**Figure 1.** Power View Report

Power View is a web-based Microsoft Silverlight® application which can be used directly by end users—from business executives to information workers—without having to depend on IT. Using Power View, end users can enjoy the interactive views of any data residing in the form of a tabular model, including PowerPivot files published to the PowerPivot Gallery or a Tabular Business Intelligence (BI) Semantic Model on an instance of Analysis Services. With Power View, users can quickly and easily analyze their data, prepare an effective presentation of their discovered insights, and share this information broadly using only a browser.

Power View is available within Microsoft SharePoint Server 2010 and requires SQL Server Reporting Services (SSRS) in SharePoint integrated mode and a tabular instance of SQL Server 2012 Analysis Services (SSAS) or PowerPivot for SharePoint to take advantage of PowerPivot models.

Power View includes the following main benefits:

- **Visual Design Experience:** Users can access and analyze information in a completely interactive, web-based authoring environment that has the familiar look and feel of Microsoft Office. Users can create and manipulate data with a variety of tables, charts, and views to visualize data in a way that best suits their purpose.
- **Filtering and Highlighting of Data:** Power View can identify the relationships between different tables in the underlying BI Semantic Model, enabling users to interact with the data to gain insights. This common metadata layer allows users to apply various kinds of visualization filters and highlight capabilities across the entire report.
- **Presentation-ready:** Power View enables users to share information quickly and easily, and lets users browse and present data at virtually any time, without having to preview it on any other platform to see how it looks. Users publish the reports to SharePoint Server, allowing other users to easily view and interact with the information.
- **Performance:** Power View retrieves only that part of the data which is needed for visualization at any given time. This enhances performance by saving the large amount of time and resources that would be needed to load all of the data and by providing users with an immersive experience from the start.
- **Based on Tabular Models:** Users can launch Power View over a tabular model (a PowerPivot model or tabular model running on SSAS) directly from a browser, without having to download anything on their local machines.

For more details on Power View features, see the ["Power View Overview"](http://social.technet.microsoft.com/wiki/contents/articles/project-crescent-overview.aspx) article on the Microsoft TechNet Wiki (<http://social.technet.microsoft.com/wiki/contents/articles/project-crescent-overview.aspx>).

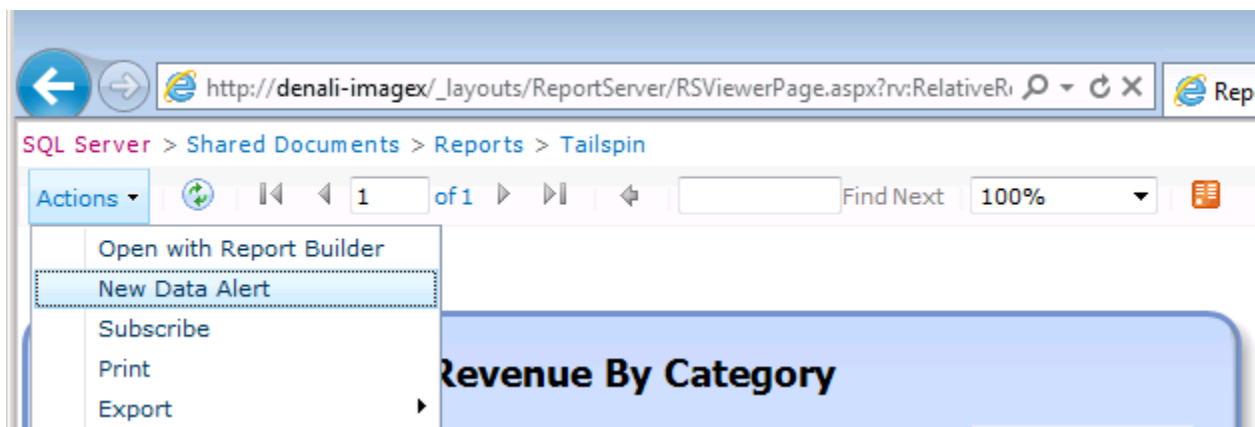


## Self-Service Alerting

Self-Service Alerting is a new feature in SQL Server 2012 Reporting Services (SSRS) that increases user productivity by providing reliable alerts for SSRS reports. Users can now define alerts to monitor a set of conditions within a report for any changes. When these conditions are met, an alert is automatically sent to notify users with the changes. Conditions can be Boolean in nature and set against report data feeds. Flexible scheduling options enable just-in-time alerting to meet user and business requirements without requiring users to manually monitor the conditions.

Self-Service Alerting is only available with SSRS in SharePoint integrated mode and requires SQL Server Agent enabled for the associated SQL Server instance as its scheduling technology. To enable Self-Service Alerting, reports must be configured with data sources that have cached credentials so that the queries required for the report can run as a background task (similar to creating report subscriptions). The new alerting capability is available on any Report Definition Language (RDL) report in SharePoint. Users and administrators can monitor and manage their alerts directly within SharePoint, and they are notified when alerts succeed or fail.

To create an alert, run the report, and then select the **New Data Alert** command (as shown in Figure 2) from the **Actions** menu.



**Figure 2.** Creating a New Data Alert in SharePoint

The New Data Alert command, as shown in Figure 3, allows users to preview the data used by the report elements so they can create an alert to help build the rule expressions.

**Figure 3.** New Data Alert for Reports in SharePoint

Table 1 summarizes the key capabilities for self-service alerting in SSRS for the SQL Server 2012 release.

Capabilities	Details
Alerts defined from within operational or ad-hoc reports	Alerts can be applied and made functional on already existing reports, without having to make any changes in their format.
Intuitive alert rules	Users can define specific data values to trigger the data alerts using rules in data alert definitions. By using AND and OR operators, users can combine multiple clauses to create complex rules for precise reporting.
Alerts self-managed through SharePoint	SharePoint provides a common interface where users can create and monitor customized alerts for their data.

**Table 1.** Self-Service Alerting Capabilities

## Reporting Spectrum – Report Designer, Report Builder, and Power View

Along with SQL Server 2012, Microsoft also provides an enhanced spectrum of reporting tools, varying from self-service tools to operational reporting to embedded report creation. The newly added Power View addresses the needs of ad-hoc reporting, which co-exists with the latest version of Report Builder. In addition to the traditional reporting capabilities that needed support from IT, users are now provided with more options to choose from, based on their skill levels and business requirements. Table 2 shows the different options available.

	Power View	Report Builder	Report Designer
<b>Capabilities</b>	Offers an interactive data exploration and visual presentation experience designed to let users create and interact with reports based on SSAS tabular models and/or PowerPivot workbooks	Allows IT pros and users to create powerful operational reports, reusable report parts, and shared datasets across a variety of data sources	Allows IT pros and users to create operational reports, shared data sources, and shared datasets; and create report viewer controls across a variety of data sources
<b>Access Mechanism</b>	Browser with Silverlight in SharePoint Server 2010	Downloadable Microsoft installer package and/or Report Manager and/or SharePoint	SQL Server Data Tools
<b>Supported Reporting Type</b>	Ad-hoc reporting/data visualization	Business reporting/operational reporting	Embedded reporting/operational reporting
<b>Report Format</b>	RDLX reports (RDL reports not supported)	RDL reports (RDLX reports not supported)	RDL reports (RDLX reports not supported)
<b>Common Users</b>	End users, power users	Power users, IT pros	IT pros, developers

**Table 2.** Reporting spectrum provided by SQL Server 2012 Reporting Services

## Rendering to DOCX and XLSX

With SQL Server 2012, users can export the reports generated, using SSRS, to Microsoft Office file formats (.docx and .xlsx). Rendering to these formats gives users increased column and row limits, reduced document size, and more colors. Users can now generate reports in the format of their choice, and send their reports to other users directly via subscriptions or deliver it programmatically, in a format familiar to them.

For more details on rendering to Microsoft Excel® and Microsoft Word, see Riccardo Muti's Blog post, "[Announcing Open XML Rendering Extensions for Microsoft Word and Excel](http://blogs.msdn.com/b/riccardomuti/archive/2010/11/11/announcing-open-xml-rendering-extensions-for-microsoft-word-and-excel.aspx?wa=wsignin1.0)" (<http://blogs.msdn.com/b/riccardomuti/archive/2010/11/11/announcing-open-xml-rendering-extensions-for-microsoft-word-and-excel.aspx?wa=wsignin1.0>).

## PowerPivot Enhancements

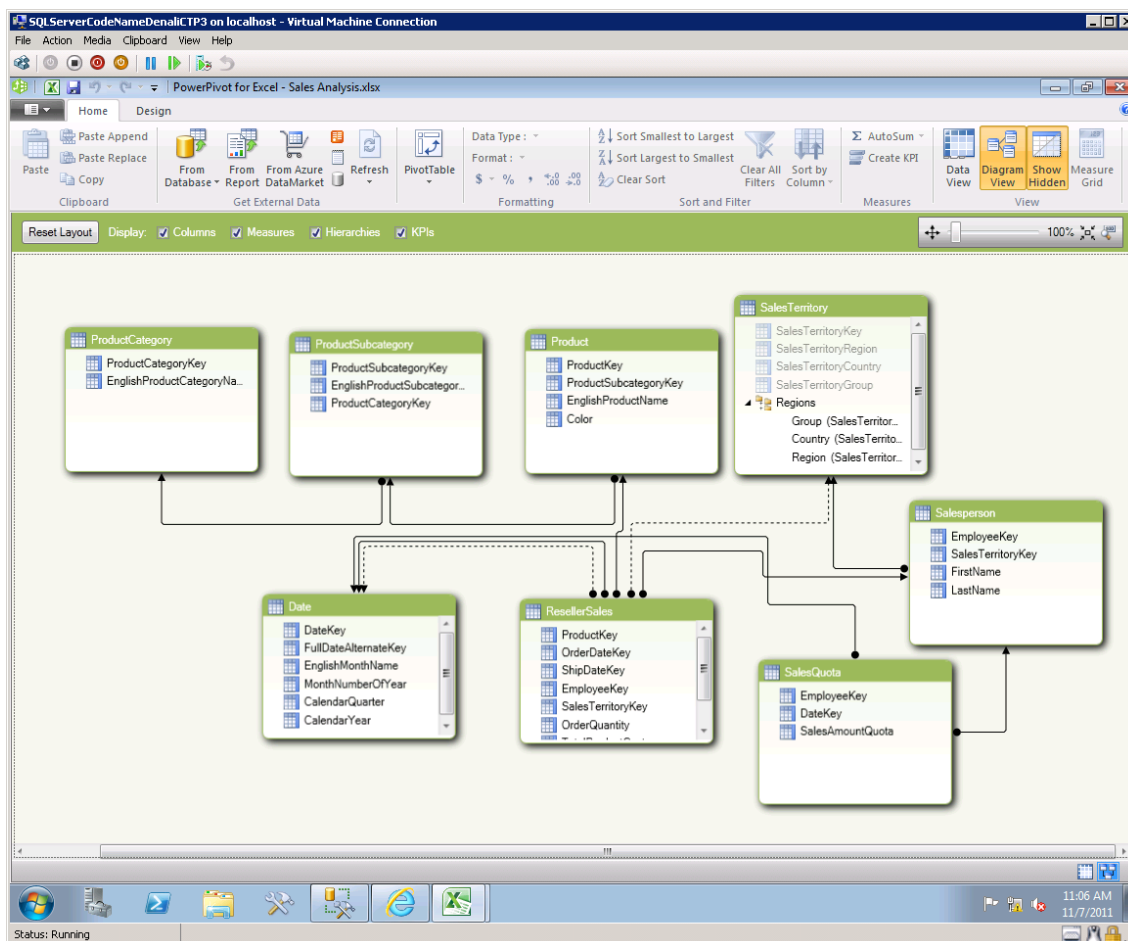
With SQL server 2012, Microsoft has enhanced the data analysis capabilities of PowerPivot for both the client-side component (PowerPivot for Excel) and the server-side component (PowerPivot for SharePoint) to provide enhanced self-service BI functionality to all Microsoft Office users. The new enhancements in PowerPivot help users integrate data from multiple sources more easily, create reports and analytical applications faster, and share and collaborate on insights more easily using the familiar environment of Excel and SharePoint.

**PowerPivot for Excel:** PowerPivot for Excel is an add-in to Excel 2010 that allows business users to work with data from any source and syndication, including Open Data Protocol (ODATA) feeds, to create business models and integrate large amounts of data directly into Excel workbooks. Sophisticated workbooks can be built using Excel only, or using the PowerPivot model as the source of data by other BI tools, including third-party tools as well as the new Power View capability discussed earlier, to generate meaningful reports. These reports can be published to SharePoint Server and then shared across the organization easily.

With PowerPivot for Excel, users have tools to analyze their data that are easier to use and more powerful. New features include:

- **Diagram View:** Enables tables to be viewed in a visually organized way (as shown in Figure 4), and allows users to easily change relationships and hierarchies with the Diagram View of all the involved tables.
- **Hierarchies:** Simplifies the selection and navigation of common data paths by allowing users to define a collection of columns as child levels, which appear separate from other columns in a reporting client tool.
- **Relationships in a Diagram View:** Allows users to easily create and view relationships between columns from different tables with a simplified way of visualizing how different tables are related to each other.
- **Multiple Relationships:** Defines multiple relationships for a single set of tables. The first relationship is displayed as active, and all other relationships are considered inactive (appearing as dotted lines in Diagram View).
- **Measure Grid:** All the measures can be viewed in a grid pattern, which simplifies the creation, update, and management of measures and key performance indicators (KPIs) involved in the model.
- **Advanced Tab:** All the advanced features—such as creating and editing perspectives, summarizing numeric values using aggregation functions, and setting the reporting tool properties (like Power View)—are available in a separate tab.
- **Reporting Properties:** All the properties of the reporting tool (such as Power View) — including table identifiers, group values, table details, representation columns, image URLs, and representative images—can be managed from within PowerPivot.
- **New Functions for Data Analysis Expressions (DAX):** More than 30 new functions, including statistical functions (such as DISTINCT COUNT and RANK), table functions (such as SUMMARIZE), search functions (such as LOOKUPVALUE), row-level security functions, filter functions (such as ALLSELECTED), and information functions (such as parent-child relationships) have been added to the new release of PowerPivot for Excel.

- **Support for Binary Large Object (BLOB) Data Types:** Users can now import images and blob data types, which are automatically detected and accepted as binary data types.
- **Perspectives:** Perspective, a metadata layer that tracks different sets of data or slices, can be defined for any specific user group or business scenario, which makes it easier to navigate large data sets.
- **Key Performance Indicators:** KPIs help organizations evaluate the current value and state of metrics against any defined target, and thus gauge performance against base values or an absolute value.
- **Date Table Settings:** Users can now apply date filtering functionality to any table by marking it as a date table.
- **Advanced Sorting:** Users can now sort columns according to values of another column, providing ways to achieve complex business logic in simple ways.
- **Persisted Formatting:** The formatting applied to any column in the modeling environment can now persist when fields are added to value areas of the pivot table.
- **Descriptions:** Descriptions about tables, measures, and KPIs now appear as tooltips when users move the pointer over objects in the field list.
- **Other Tab Changes:** New Ribbon features have been added to the **Home** and **Design** tabs based on customer feedback and usability testing.



#### Figure 4 . Diagram View in PowerPivot

For more information on PowerPivot, see the ["PowerPivot Overview"](http://social.technet.microsoft.com/wiki/contents/articles/powerpivot-overview.aspx) article on the Microsoft TechNet Wiki (<http://social.technet.microsoft.com/wiki/contents/articles/powerpivot-overview.aspx>).

### Managed Self-Service BI

The PowerPivot Management Dashboard, available as part of the SharePoint 2010 Central Administration console, helps IT monitor data and workbook usage and gather performance metrics from servers. This diagnostic information provides valuable visibility into how data is used throughout the organization and a deeper understand of usage patterns so that IT can decide where best to invest time and resources.

**PowerPivot for SharePoint:** PowerPivot for SharePoint is an add-in for SharePoint, which is used in conjunction with Excel Services to provide a publishing and sharing platform for PowerPivot workbooks as well as providing IT with insight and oversight with the PowerPivot Management Dashboard. With SQL Server 2012, Microsoft has simplified the configuration process with automated configuration tools and cmdlets scripting for Microsoft Windows PowerShell™. The newly added connection objects for BI Semantic Model connections, advanced configuration settings, and server health rules drastically improve administration and tuning capabilities for IT administrators.

PowerPivot enhancements for SharePoint include:

- **PowerPivot Configuration Tool:** A tool to scan the system to check the configuration settings of existing SharePoint or PowerPivot software, and provide necessary actions required to deploy an operational server.
- **PowerShell for PowerPivot for SharePoint:** A PowerShell cmdlet for configuring PowerPivot for SharePoint using a PowerShell script.
- **BI Semantic Model Connection Files in SharePoint:** Specifies the server location of a model database, similar to how Office Data Connection (.odc) files store connection information to external data.
- **Enhanced Configuration Settings:** Advanced configuration settings and health rules to help detect and fix problems before they occur, and provide more control over disk space consumption, caching, and data refresh activity.
- **PowerPivot Management Dashboard:** A dashboard that is accessible through SharePoint Central Administration and contains Web Parts and embedded reports that can access specific information categories such as workbook activity, quality of service, and server health.

## Integrated Reporting Services and PowerPivot with SharePoint

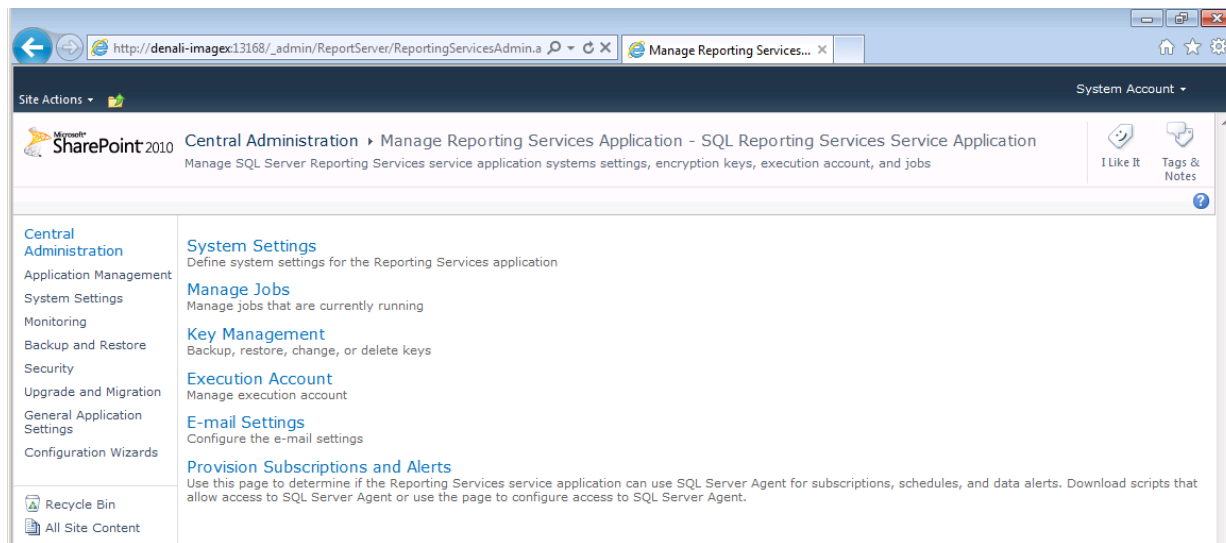
Integrating SSRS with SharePoint expands self-service BI capabilities by enabling users to visualize and interact with modeled data in a meaningful way with features like Power View and Self-Service Alerting, as well as managed reporting capabilities. With the integration of SSRS with SharePoint, the SharePoint Central Administration tool consolidates SSRS administration, configuration, and management capabilities into the Central Administration Portal of SharePoint 2010. In addition, PowerShell scripting reduces the total cost of ownership for SharePoint administrators.

Table 4 shows the key differences between SQL Server 2008 R2 Reporting Services and SQL Server 2012 Reporting Services.

SQL Server 2008 R2 Reporting Services	SQL Server 2012 Reporting Services
Windows Shared Services	SharePoint Shared Services
Configuration and Manageability Tool	SharePoint Central Administration
Manageability API	PowerShell Cmdlets
Report Server URLs	Report Server Proxy URLs

**Table 4:** SharePoint Reporting Services Integration Differences by Version

In SQL Server 2012, SSRS integration with SharePoint makes it possible to back up and restore the reporting databases as part of the Central Administration backup and restore process. As Figure 5 shows, Reporting Services configuration is now completely inside of SharePoint Central Administration under Application Management – Service Applications.



**Figure 5.** Reporting Services Configuration in SharePoint Central Administration Site

## Credible, Consistent Data

SQL Server 2012 provides a complete and integrated BI solution for organizations by empowering users of all levels at the personal, team, or organizational level. A new model is introduced in this release which allows users to access and integrate data from virtually any source and empowers them to create, monitor, and share rich, powerful BI solutions through familiar applications.

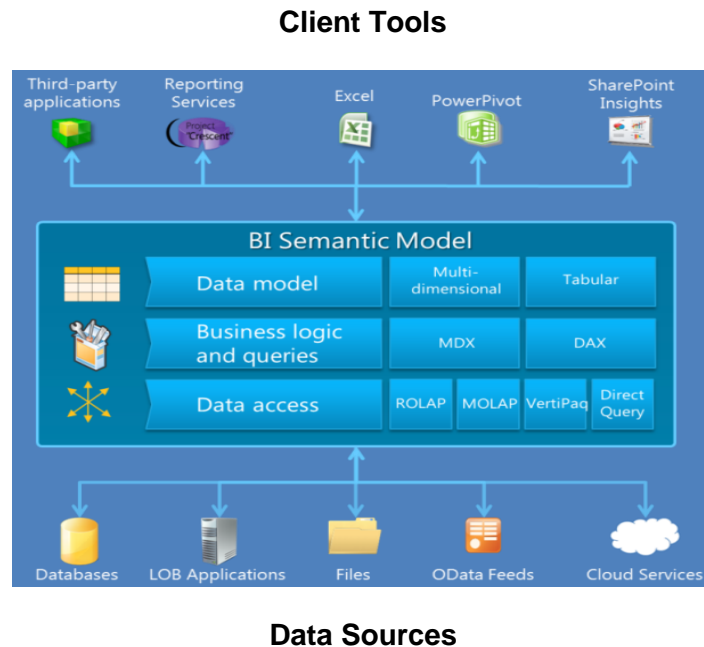
### BI Semantic Model

The BI Semantic Model is a new hybrid data model that offers the powerful analytical capabilities of multidimensional data models as well as the simplicity and familiarity of tabular (that is, relational) models. The BI Semantic Model provides a powerful yet flexible platform for nearly all BI applications, supporting virtually all of the requirements that any growing enterprise might have, including advanced analytical capabilities, professional developer tools, ease of adoption and use, wide spectrum of end user tools, sophisticated business logic, performance, scalability, and time to solution. It also enables a wide spectrum of BI solutions—including reporting, analytics, scorecards, dashboards, and custom applications—that are suitable in a wide range of business contexts, covering business users, BI professionals, and IT.

Nearly any ad-hoc BI solution, developed by a business user with simple tools (such as a PowerPivot for Excel workbook), can be enhanced by BI professionals using professional tools (such as SQL Server Management Studio and SQL Server Data Tools), and deployed on an instance of Analysis Services for organization-wide usage. Regardless of what development tools are used for model development, the client tools always allow business users to see a single model which enables them access to the information they need to make faster, more relevant decisions.

As shown in Figure 6, the BI Semantic Model has three layers. The data model is a conceptual model that supports either the traditional multidimensional or the new tabular data models. Client tools like Excel, Power View, and SharePoint 2010 Insights consume the data model for their end user experience. The business logic and queries layer represents the embedded business logic using either MDX (Multidimensional Expressions) or DAX (Data Analysis Expressions). The data access layer provides the integration of data from multiple sources such as relational databases, business applications, flat-files, and OData feeds.





**Figure 6.** BI Semantic Model: Architecture

### New Tabular Project

As part of the BI Semantic Model, SQL Server 2012 Analysis Services introduces a new tabular modeling capability that allows users to build a BI model using exactly the same processes that were introduced in PowerPivot for Excel. Users can quickly bring together data in tables and build relationships using the DAX query language to apply business logic. Previously, only the multidimensional model comprising of dimensions and MDX was supported in SSAS. So business users depended on trained BI developers and experts to create online analytical processing (OLAP) cubes to take advantage of the enormous analytical capabilities of SSAS, such as fast response times and a single data source for business reporting.

SQL Server 2012 provides a new tabular approach that allows BI professionals that have familiarity with the traditional relational model to quickly create a tabular model by importing data from multiple sources or from syndicated feeds. This in-memory model resides on the SSAS server, benefiting from the scalability capabilities of the underlying infrastructure to meet the needs of the organization.

The user experience of creating tabular data models in PowerPivot is similar to the user experience of creating an SSAS tabular project in SQL Server Data Tools. Thus, organizations can build on the strengths and success of SSAS and expand their reach to a much broader user base across the organization.

### **Tabular Model versus Multidimensional Model**

IT pros or developers have two options for developing BI Semantic Model solutions based on the needs of the application: the *multidimensional* or *tabular* approach. For developing any BI solution, IT pros or developers need to consider the following factors for choosing a model:

- Data Model
- Business Logic and Queries
- Data Access

The multidimensional approach enables developers to use the multidimensional modeling experience along with MDX and multidimensional online analytical processing (MOLAP)/relational online analytical processing (ROLAP). The tabular approach enables developers to use the tabular modeling experience along with DAX and VertiPaq/DirectQuery.

Multidimensional modeling is ideal for BI applications with complex calculations such as financial applications, where budgeting, planning, and forecasting is common. In contrast, tabular modeling is ideal for BI applications that need to process historical data, such as sales applications that analyze vast amounts of data. The choice of modeling can also be dependent on the investments already made in existing infrastructure.

The first consideration when deciding on a tabular versus multidimensional model is the expected client application. If people need to use Power View, they are currently limited to using a tabular BI Semantic Model.

Table 3 includes more details on the various considerations for using tabular versus multidimensional models.

Deciding Factors	Tabular	Multidimensional
<p><b>Business Logic and Queries:</b> This represents the intelligence or semantics of the solution to be developed.</p> <p>In SQL Server 2012, business logic can be defined using either of the expression languages, namely DAX or MDX.</p>	<p>Tabular models are similar to Excel and include easy-to-use formulas which make them useful for creating solutions with high agility and time to availability.</p> <p>The simple syntax of DAX makes this approach suitable for a wide group of people who understand RDBMS concepts.</p>	<p>MDX has a rich and powerful syntax suitable for analysis, retrieval, and manipulation of multidimensional data.</p> <p>Working with MDX requires comparatively more training than needed for DAX, or experienced professionals.</p>
<p><b>Data Access:</b> This represents data integration from multiple sources. There are two modes for retrieving and managing the data: <i>caching</i> and <i>passthrough</i>. For caching data, there are two storage engines which can be used: <i>MOLAP</i> and <i>VertiPaq</i>. For passthrough, the storage engines are <i>ROLAP</i> and <i>DirectQuery</i>.</p>	<p>For extremely fast performance with brute-force memory scans, developers or IT pros can use the VertiPaq caching mechanism which acts as an in-memory store.</p> <p>Suitable when the size of the database is comparatively smaller—less than one terabyte.</p> <p>If IT pros or developers do not need a caching mechanism, they can retrieve data and create reports directly from the tabular model, using DirectQuery mode.</p>	<p>MOLAP cubes are built for fast data retrieval, and are optimal for slicing and dicing operations. They can perform complex calculations; all calculations are pre-generated when the cube is created.</p> <p>For databases larger than one terabyte, the disk-based store of MOLAP is suitable.</p> <p>The ROLAP methodology relies on manipulating the data stored in the relational database to give the appearance of traditional OLAP slicing and dicing functionality.</p>

**Table 3.** Considerations for Using Tabular versus Multidimensional Models

## Enterprise Information Management (EIM)

Microsoft SQL Server 2012 delivers a rich set of Enterprise Information Management (EIM) technologies designed to improve the overall relevance and value of organizational information. EIM in SQL Server 2012 puts the data in the hands of the knowledge workers who rely on it with the tools they already know and use. The EIM suite of solutions allows organizations to make decisions based on a consistent, accurate view of the business.

To deliver credible, consistent data reliably and efficiently, SQL Server 2012 uses efficient tools in SQL Server Integration Services (SSIS) to integrate any data from different sources (both Microsoft and non-Microsoft). With the help of built-in capabilities like SSIS, Master Data Services (MDS), and Data Quality Services (DQS), users can integrate, manage, and cleanse disparate data sources.

### Data Quality Services

Data Quality Services (DQS) is a new feature in SQL Server 2012 that maintains data quality in a consistent, controlled, managed, integrated, and fast manner. DQS ensures that data is suitable for business usage. With rich capabilities in data cleansing, deduplication, and profiling functionalities, users can manage the integrity and quality of their data sources. DQS is part of SQL Server 2012 and is comprised of a DQS server and a dedicated DQS client application. DQS functionality is built into a component of SSIS and MDS that provides users with an integrated, easy-to-use cleansing and matching experience within these services.

A Data Quality Knowledge Base (DQKB) is a learning system at the core of DQS, which learns to understand data and required actions better and better the more it is used. A DQKB stores all of the knowledge related to a specific type of data source. For each data source column, DQKB has data domains. For each data domain, DQKB stores some business rules and reference data to help users perform data quality actions on the data source.

The DQS client shown in Figure 7 contains three major sections for managing the knowledge base:

- Knowledge Base Management
- Data Quality Projects
- Administration

### *Knowledge Base Management*

The Knowledge Base Management section allows users to create and maintain a DQKB, including:

- **Knowledge Management:** A set of functionalities that enable the data steward to manually define, update, and review the knowledge in the DQKB.
- **Knowledge Discovery:** A computer-assisted acquisition of knowledge from a data source sample.

- **Matching Policy Training:** Training that helps define a set of rules that will serve as the policy governing the matching process.
- **Reference Data Exploration:** Explore and select reference data from third parties and integrate it into the DQKB domains.

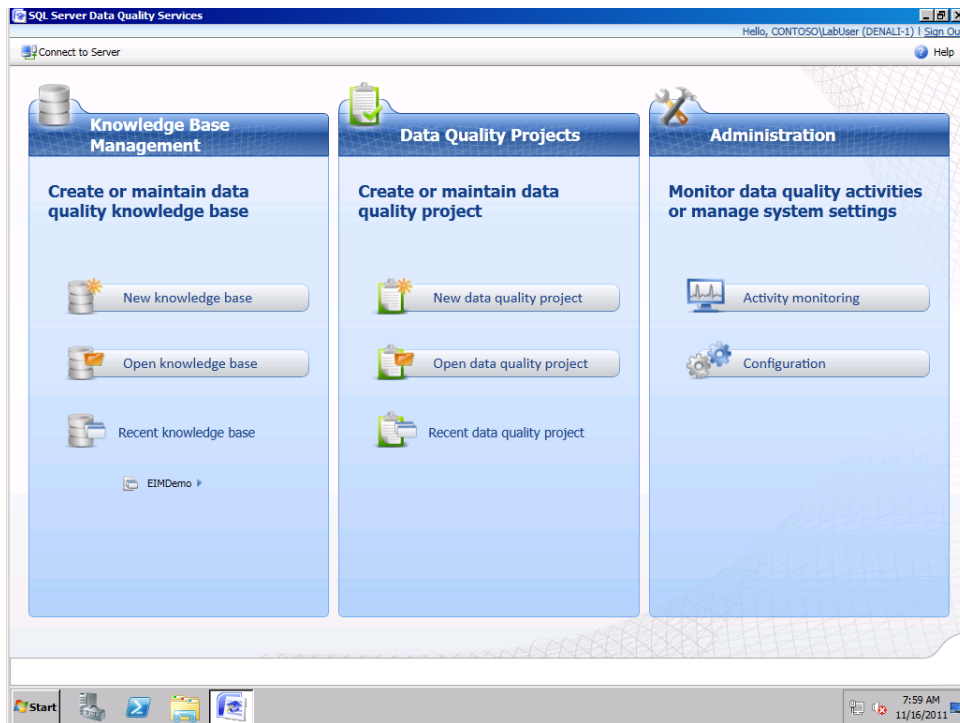
### *Data Quality Projects*

The Data Quality Projects section enables the correcting, standardizing, and matching of source data according to domain values, rules, and reference data associated with a designated DQKB.

### *Administration*

The Administration section encompasses several administrative functions, such as:

- Monitoring current and past DQS processes, including data correction and matching.
- Defining reference data providers.
- Setting parameters related to DQS activities.



**Figure 7.** Data Quality Services Home Screen

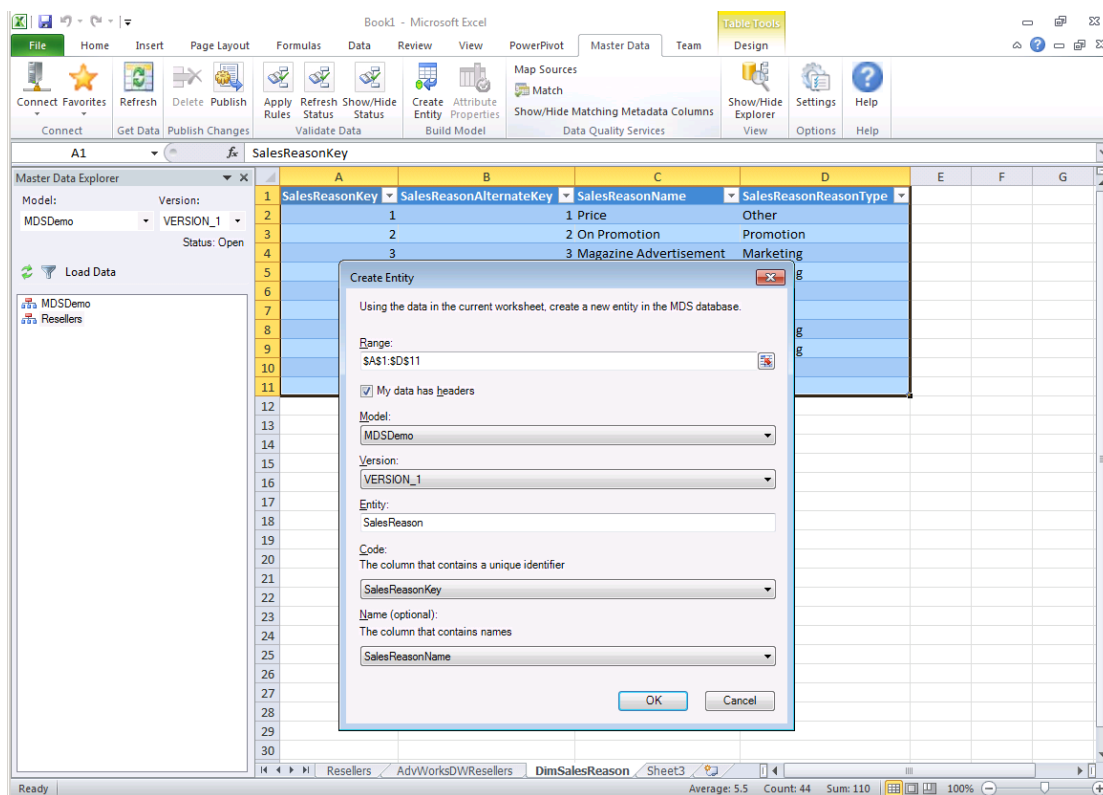
For more information on DQS, see the [“Data Quality Services \(DQS\) FAQ”](http://social.technet.microsoft.com/wiki/contents/articles/3919.aspx) article on the Microsoft TechNet Wiki (<http://social.technet.microsoft.com/wiki/contents/articles/3919.aspx>).

## Master Data Services and Integration with Excel

Unlike in the previous version of SQL Server, users can now install Master Data Services (MDS) along with the SQL Server 2012 installation. In this release, the Explorer and Integration Management features of the Master Data Manager web application have been improved with a new look and feel based on Silverlight, which allows users to add and delete members more quickly. Now users can load all members and attribute values for an entity at the same time by matching the data. MDS now uses SQL Server DQS, which compares two sources of data—the data from MDS and the data from another system or spreadsheet.

New in this release of SQL Server 2012 MDS is an Excel plug-in that enables business users to access and manage information directly through the use of familiar tools. This will allow end users to make changes, add and remove entities, and publish the data to the database all within Excel. Users can send information to others more securely, ensuring they only see the information they are allowed to access. IT can manage the process to make sure governance and compliance concerns are alleviated.

The **Create Entity** dialog box, as shown in Figure 8, allows the user define the **Entity** name, the column that uniquely identifies entity values, and the **Name** column.



**Figure 8.** Creating an Entity with the MDS Excel Add-In

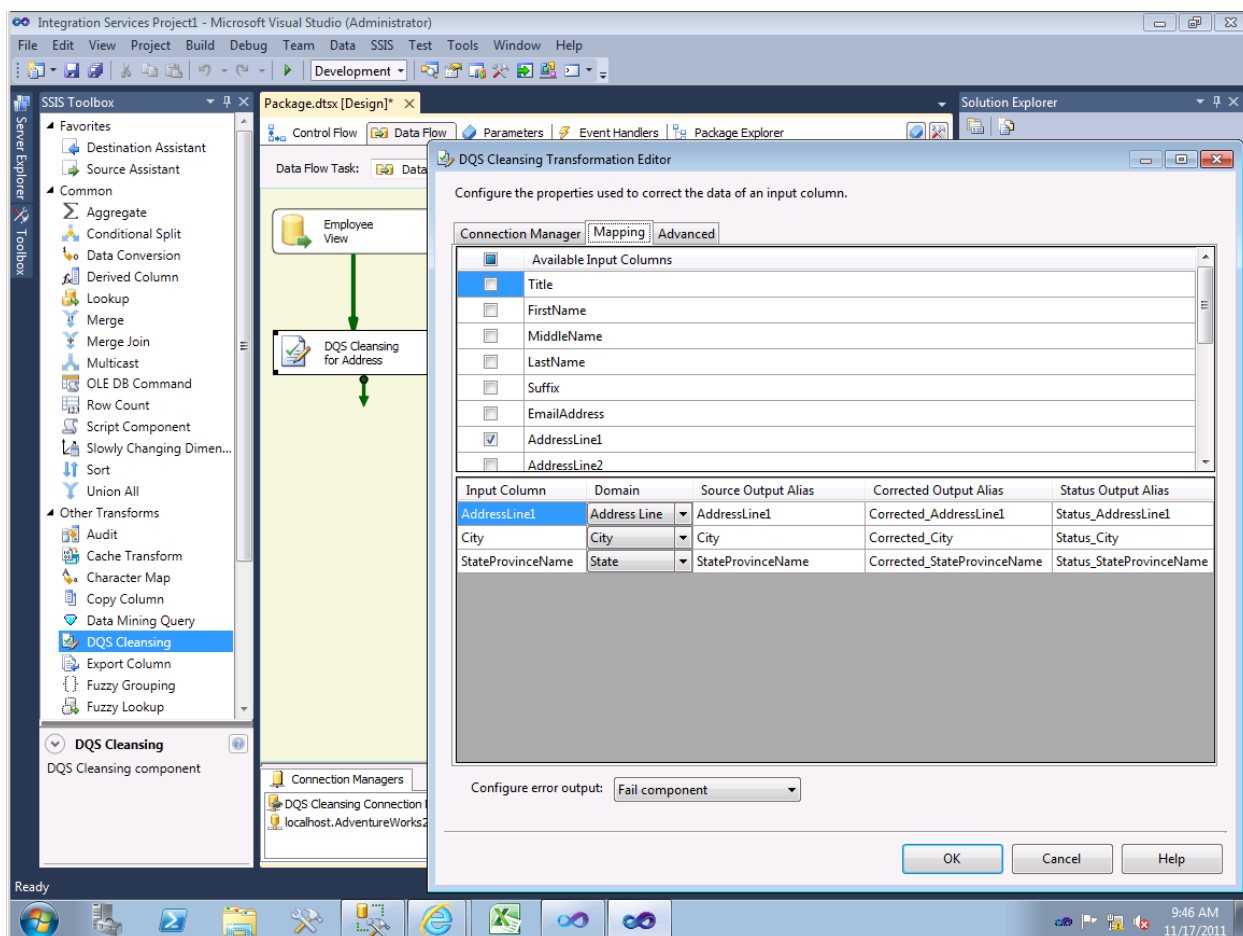
For more information on MDS, see the [“What's New in Master Data Services \(MDS\) in Denali CTP3”](http://social.technet.microsoft.com/wiki/contents/articles/3714.aspx) article on the Microsoft TechNet Wiki (<http://social.technet.microsoft.com/wiki/contents/articles/3714.aspx>).

## SQL Server Integration Services Enhancements

To increase the power and productivity of developers and administrators, SSIS has introduced new features and enhancements. SQL Server 2012 has a new deployment model which allows users to define parameters for packages and projects and modify the parameter values at runtime. The same set of parameter values can be defined and applied to multiple packages and projects.

For simplified management and deployment, SSIS now includes built-in reports that help users troubleshoot and do performance analysis. These reports help users to view package execution status and identify the cause of execution failures. SSIS provides simplicity as well as the power, scale, and extensibility to build complex data integration solutions. Transact-SQL or PowerShell scripts can also be used to do administrative tasks on SSIS projects and packages.

SSIS includes a new Data Cleansing transformation shown in Figure 9 that uses DQS to automate the data cleansing process based on the DQKB for the available domains.



## **Figure 9.** Using the DQS Cleaning Transformation in an SSIS Data Flow

Source tables change over time. A data mart or data warehouse that is based on source tables needs to reflect these changes. However, a process that periodically copies a snapshot of the entire source consumes too much time and too many resources. Alternate approaches that include timestamp columns, triggers, or complex queries often hinder performance and increase complexity. What is needed is a reliable stream of change data that is structured so that it can easily be applied by consumers to target representations of the data. Change data capture (CDC) in SQL Server provides this solution.

SSIS for SQL Server 2012 includes a new CDC source component, a CDC Splitter that helps direct rows based on whether they are Updates, Inserts, or Deletes, and a CDC Control Task that helps track changes that occurred since the last time the package ran.

For more information, see the “[What’s New in SSIS for SQL Server 2012 RC0](http://blogs.msdn.com/b/mattm/archive/2011/11/17/what-s-new-in-ssis-for-sql-server-2012-rc0.aspx)” article on Microsoft MSDN (<http://blogs.msdn.com/b/mattm/archive/2011/11/17/what-s-new-in-ssis-for-sql-server-2012-rc0.aspx>).

### **New SQL Server Data Tools**

SQL Server 2012 provides a unified and simplified development experience across databases, BI, and cloud functions through the new SQL Server Data Tools integration with Microsoft Visual Studio®. The new SQL Server Data Tools (formerly known as Business Intelligence Design Studio, or BIDS) includes all the functionality of BIDS, such as reporting, analysis, and integration services projects, along with the new database project.

For more information on the database project, see “[The ‘Juneau’ Database Project](http://msdn.microsoft.com/en-us/magazine/hh394146.aspx)” on MSDN Magazine (<http://msdn.microsoft.com/en-us/magazine/hh394146.aspx>).

## **Conclusion**

SQL Server 2012 is a significant product release that helps customers enhance the data exploration capabilities of their organization with the help of new tools and enhancements. It provides a complete and integrated BI and performance management solution which enables breakthrough insight across all levels.

This white paper provides an overview of the new key BI features in SQL Server 2012. To find more comprehensive information on SQL Server 2012, see the “For More Information” and “Additional Resources” sections below.

### **For More Information**

For more information on the new features of SQL Server 2012 covered in this white paper, see the following resources:

- SQL Server website: <http://www.microsoft.com/sqlserver/>
- SQL Server 2012 website: <http://www.microsoft.com/sqlserver/en/us/product-info/future-editions.aspx>



- SQL Server TechCenter: <http://technet.microsoft.com/en-us/sqlserver/>
- SQL Server DevCenter: <http://msdn.microsoft.com/en-us/sqlserver/>

## Additional Resources

Table 5 provides a list of resources used for this paper. Review these resources for additional information.

Pillar	Title	URL
Overview	Breakthrough Insight	<a href="http://www.microsoft.com/sqlserver/en/us/future-editions/denali-breakthrough-insight.aspx">http://www.microsoft.com/sqlserver/en/us/future-editions/denali-breakthrough-insight.aspx</a>
	SQL Server 2012	<a href="http://www.microsoft.com/sqlserver/en/us/default.aspx">http://www.microsoft.com/sqlserver/en/us/default.aspx</a>
Rapid Data Exploration	Power View	<a href="http://social.technet.microsoft.com/wiki/contents/articles/project-crescent-overview.aspx">http://social.technet.microsoft.com/wiki/contents/articles/project-crescent-overview.aspx</a>
	Self-Service Alerting	<a href="http://blogs.msdn.com/b/sqlrsteamblog/archive/2011/07/12/sql-server-codename-quot-denali-quot-ctp3-including-project-quot-crescent-quot-is-now-publically-available.aspx">http://blogs.msdn.com/b/sqlrsteamblog/archive/2011/07/12/sql-server-codename-quot-denali-quot-ctp3-including-project-quot-crescent-quot-is-now-publically-available.aspx</a>
	Reporting Spectrum	<a href="http://technet.microsoft.com/en-us/ff657833.aspx">http://technet.microsoft.com/en-us/ff657833.aspx</a>
	Rendering to DOCX and XLSX	<a href="http://blogs.msdn.com/b/riccardomuti/archive/2010/11/11/announcing-open-xml-rendering-extensions-for-microsoft-word-and-excel.aspx?wa=wsignin1.0">http://blogs.msdn.com/b/riccardomuti/archive/2010/11/11/announcing-open-xml-rendering-extensions-for-microsoft-word-and-excel.aspx?wa=wsignin1.0</a>
	PowerPivot Enhancements	<a href="http://social.technet.microsoft.com/wiki/contents/articles/powerpivot-overview.aspx">http://social.technet.microsoft.com/wiki/contents/articles/powerpivot-overview.aspx</a>
Managed Self-Service BI	BI Semantic Model	<a href="http://blogs.msdn.com/b/analysisservices/archive/2011/05/16/analysis-services-vision-amp-roadmap-update.aspx">http://blogs.msdn.com/b/analysisservices/archive/2011/05/16/analysis-services-vision-amp-roadmap-update.aspx</a>
	New Tabular Project	<a href="http://blogs.msdn.com/b/analysisservices/archive/2011/07/13/welcome-to-tabular-projects.aspx">http://blogs.msdn.com/b/analysisservices/archive/2011/07/13/welcome-to-tabular-projects.aspx</a>
	Tabular Model and Multi-Dimensional Model	<a href="http://blogs.msdn.com/b/analysisservices/archive/2011/05/16/analysis-services-vision-amp-roadmap-update.aspx">http://blogs.msdn.com/b/analysisservices/archive/2011/05/16/analysis-services-vision-amp-roadmap-update.aspx</a>
	Integrated Reporting Services and PowerPivot with SharePoint	<a href="http://technet.microsoft.com/en-us/library/ee210631.aspx">http://technet.microsoft.com/en-us/library/ee210631.aspx</a>
	PowerPivot Management Dashboard	<a href="http://msdn.microsoft.com/en-us/library/ff718155.aspx">http://msdn.microsoft.com/en-us/library/ff718155.aspx</a>
Credible, Consistent Data	Data Quality Services	<a href="http://social.technet.microsoft.com/wiki/contents/articles/3919.aspx">http://social.technet.microsoft.com/wiki/contents/articles/3919.aspx</a>
	Master Data Services	<a href="http://social.technet.microsoft.com/wiki/contents/articles/3714.aspx">http://social.technet.microsoft.com/wiki/contents/articles/3714.aspx</a>
	SSIS Enhancements	<a href="http://blogs.msdn.com/b/mattm/archive/2011/11/17/what-s-new-in-ssis-for-sql-server-2012-rc0.aspx">http://blogs.msdn.com/b/mattm/archive/2011/11/17/what-s-new-in-ssis-for-sql-server-2012-rc0.aspx</a>
	SQL Server Data Tools	<a href="http://msdn.microsoft.com/en-us/magazine/hh394146.aspx">http://msdn.microsoft.com/en-us/magazine/hh394146.aspx</a>

**Table 5.** Resources