Introducing SQL Server Data Tools[1]

SQL Server Data Tools (SSDT) is Microsoft Visual Studio 2010 with additional project types that are specific to SQL Server business intelligence. SSDT is the primary environment that you will use to develop business solutions that include Analysis Services and Integration Services, projects. Each project type supplies templates for creating the objects required for business intelligence solutions, and provides a variety of designers, tools, and wizards to work with the objects.

Start Page

When you first open SSDT, the Start Page appears in the center of the SSDT user interface. This page displays a list of recently updated projects; help topics, Web sites, technical articles, and other resources; links to product and event information from Microsoft; and by default, a list of articles from the RSS feed of the specified news channel. After you open an object in a project, the designer for working with that object also appears in the center window.

To display a page other than the Start Page at startup, click **Options** on the **Tools** menu, expand the **Environment** node, and in the **At Startup** list, select the item to display.

To learn more about the Start Page, click within the Start Page and press F1. If the Start Page is closed, click **Start Page** on the **View** menu.

Tool Windows in SSDT

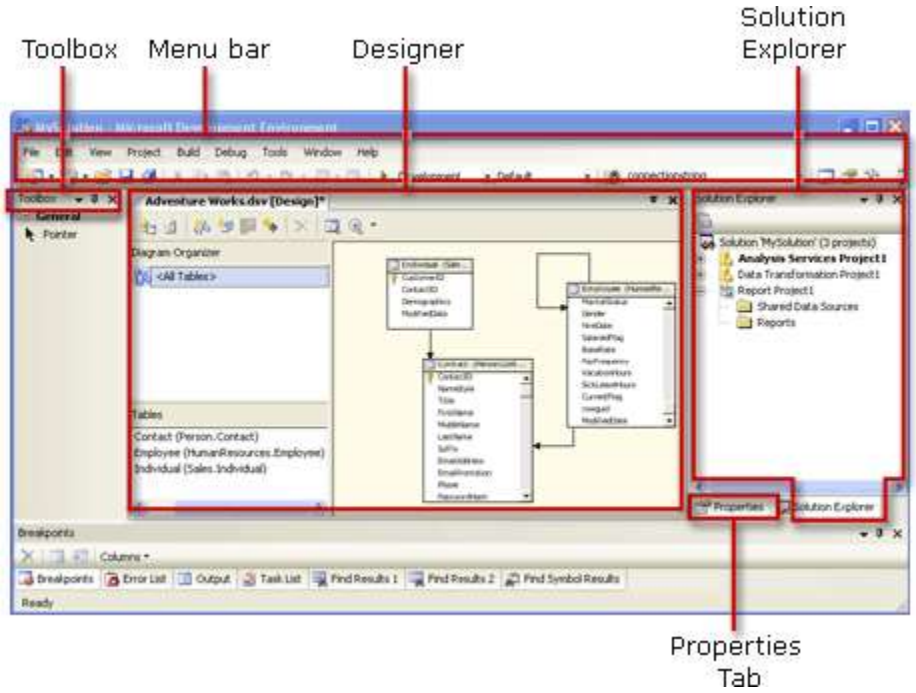
SSDT includes a set of windows for all phases of solution development and project management. For example, SSDT includes windows that let you manage multiple projects as a unit and view and modify the properties of objects in projects. These windows are available to all the project types in SSDT.

SSDT consists of four main windows:

- Solution Explorer
- Properties Window
- Designer Window
- Toolbox

[1] Adapted from http://msdn.microsoft.com/en-us/library/ms173767(v=sql.105).aspx

The following diagram shows the windows in SSDT in the default configuration.



Other windows included in SSDT let you view search results, and get information about error messages and information that are output by the project debuggers or designers. Server Explorer lists database connections; Object Browser displays the symbols available to use in a project; Task List lists user-defined programming tasks; and Error List provides detailed descriptions of errors.

To learn more about these tool windows, click the **View** menu, select the option for the window you are interested in, and then press F1 from within the window.

Solution Explorer

You can manage all the different projects in a solution from a single window, Solution Explorer. The Solution Explorer view presents the active solution as a logical container for one or more projects, and includes all the items associated with the projects. You can open project items for modification and perform other management tasks directly from this view. Because different kinds of projects store items in different ways, the folder structure in Solution Explorer does not necessarily reflect the actual physical storage of the items listed within the solution.

In Solution Explorer, you can create empty solutions and then add new or existing projects to the solution. If you create a new project without first creating a solution, SSDT automatically creates the solution too. When the solution includes projects, the tree view includes nodes for project-specific objects. For example, the Analysis Services project includes a Dimensions node, the Integration Services project includes a Packages node, and the Report Model project includes a Reports node.

To access Solution Explorer, click **Solution Explorer** on the **View** menu.

Properties Window

The Properties window lists the properties of an object. You use this window to view and change the properties of objects, such as packages, that are open in editors and designers. You can also use the Properties window to edit and view file, project, and solution properties.

Fields in the Properties window have different types of controls embedded that open when you click them. The type of edit control depends on the particular property. These edit fields include edit boxes, dropdown lists, and links to custom dialog boxes. Properties that are shown as dimmed are read-only.

To access the Properties window, click **Properties Window** on the **View** menu.

Toolbox Window

The Toolbox window displays a variety of items for use in business intelligence projects. The tabs and items available in the Toolbox change depending on the designer or editor currently in use.

The Toolbox window always displays the General tab, and may also display tabs such as Control Flow Items, Maintenance Tasks, Data Flow Sources, or Report Items.

Some designers and editors do not use items from the Toolbox. In that case the Toolbox contains only the General tab.

To access the Toolbox, click **Toolbox** on the **View** menu.

Designer Window

The Designer window is the tool window in which you create or modify business intelligence objects. The designer provides both a code view and a design view of an object. When you open an object in a project, the object opens within a specialized designer in this window. For example, if you open a data source view in any of the business intelligence projects, the designer window opens using the Data Source View designer.

The Designer window is not available until you add a project to a solution and open an object within that project.

Menus in SSDT

The default menus that appear in SSDT are identical to those in Visual Studio.

When you first open SSDT, before you modify the environment, open a solution, or open any projects, SSDT includes the following menus:

- File, Edit, View, Tools, Window, Community, and Help

When you open a specific project type in SSDT, additional menus are added to the menu bar and new options may appear on the default menus in SSDT. Moreover, depending on the object you open in the designer window, the menu bar may change to include additional menus specific to the designer for the object you are working with.

File Menu

The options on the File menu support file management. When you first open SSDT, but before you have created a new project or opened an existing project, some options are unavailable. These options become available only when you start to work in the context of a solution, or open a project within a solution.

Edit Menu

The options on the Edit menu support editing of text and code in files. This menu provides commands such as undo and redo; find and replace strings and symbols, locate a specified line number in code; enable and manage bookmarks. When you first open SSDT, before you have created a new project or opened an existing project, some options are unavailable. Some options become available only when you start to work in the context of a solution, or open a project in a solution.

Depending on the project type, some menu options many not be available. For example, the **Undo** and **Redo** options are not supported in Integration Services projects.

View Menu

The options on the View menu help you manage the user interface of SSDT. This menu and its submenus provide the options to open the various windows, toolbox, explorers, and browsers. You can also select which toolbars to display.

When you first open SSDT, before you have created a new project or opened an existing project, some options are unavailable. These options become available only when you start to work in the context of a solution, or open a project in a solution. For example, the View menu includes options to navigate backward and forward, but appears only when multiple windows are open.

Tools Menu

The options on the Tools menu customize behavior of the development environment. This menu, its submenus, and the dialog boxes it accesses provide options to set the following options:

- Select process and a code type for debugging. Alternatively, select the option to automatically detect the code type.
- Connect to a database. The Database Explorer lists the data connections.
- Add, remove, or import a manager for code snippets in the specified language.
- Choose the items that appear in the Toolbox window.
- If an add-in is installed, select the add-in to include in the environment.
- Select external tools to include in the environment.
- Import and export specified environment settings or reset environment settings to their defaults.
- Choose the toolbars to display in the user interface and arrange the order of commands.
- Set the options that apply to the overall development environment, solutions and projects, source control, debugging, and designers and editors.

Window Menu

The options on the Window menu manage the behavior of windows, explorers, and browsers in SSDT. For example, you can specify whether windows are floating, dockable, display as tabbed documents, or are hidden.

Depending on which windows are open, the **Windows** menu may include different options.

Help Menu

The options on the Help menu provide access to How Do I and Help topics. You can locate Help information using the index, table of content, or search features. From this menu, you can also access technical support and look for updates.

Additionally, SSDT Helps lets you save index results and maintain a list of favorite topics.

Toolbars in SSDT

When you first open SSDT the Toolbar includes only the MenuBar toolbar and only a few icons are available on the MenuBar toolbar.

To customize the Toolbar, click **Customize** on the **Tools** menu, and then select additional toolbars to display, or change options for the toolbar appearance.

Working with Solutions and Projects

In SSDT, a solution is a container that organizes the various projects that you use when you develop end-to-end business solutions. A solution lets you handle multiple projects as one unit and combine one or more related projects that contribute to a business solution.

When you create a new project, SSDT automatically adds a Solution folder to Solution Explorer and creates files that have the extensions .sln and .suo.

- The *.sln file contains information about solution configuration and lists the projects in the solution.
- The *.suo file contains information about your preferences for working with the solution.

Projects are stored in solutions. You can create a solution first and then add projects to the solution. However, if no solution exists, SSDT automatically creates one for you when you first create the project. A solution can contain multiple projects of different types. You can also create a blank solution and then add projects later.

Solutions in SSDT can include different types of projects. You can add projects of the following types:

- Analysis Services projects, for creating analytic objects.
- Integration Services projects, for creating ETL packages.
- Report Model projects, for creating report models.

- Report Server projects, for creating reports.

Integration Services in SSDT

SSDT includes the Integration Services project for developing ETL solutions. This project type includes the templates for packages, data sources, and data source views, and provides the tools for working with these objects.

Reporting Services in SSDT

SSDT includes the Report Model and Report projects for developing reporting solutions. The Report Model project type includes the templates for report models, data sources, and data source views, and provides the tools for working with these objects. The Report project includes the templates for working with reports and shared data sources.

Analysis Services in SSDT

SSDT includes the Analysis Services project for developing online analytical processing (OLAP) and data mining functionality for business intelligence applications. This project type includes the templates for cubes, dimensions, mining structures, data sources, data source views, and roles, and provides the tools for working with these objects.

Integration Services in SSDT

SSDT is the environment that you will use to develop packages for data extraction, transformation, and loading (ETL) in Integration Services. SSDT is the Visual Studio 2008 environment with enhancements that are specific to business intelligence solutions. After you create a new Integration Services project by using the **New Project** dialog box, SSDT opens, ready for you to start designing your package in the SSIS Designer. The windows that you see include the familiar **Toolbox** on the left, the design surface in the middle, and the new **Solution Explorer** on the right. For more information about the general features of SSDT, see Introducing SSDT.

The package development experience for Integration Services packages is much richer in SSDT than it was in the single-window designer available in Enterprise Manager that you may have used as a package developer in SQL Server 2000 Data Transformation Services (DTS). The DTS Designer displayed menus, a toolbox of connections and tasks, and a single package design surface. Although the **SSIS Designer** still has each of these elements, the design surface now includes multiple tabbed windows, and other new features include the **Solution Explorer** and the **Variables** and **Log Events** windows. The new development environment and new features combine to offer Integration Services developers a comprehensive and powerful environment for creating business intelligence solutions.

Note: Many useful actions are available from the shortcut menus that you see when you right-click objects in the user interface. As you explore SSDT and the Integration Services features discussed in this topic, make sure that you right-click various items to learn about these options.

Solution Explorer

By default, a new Integration Services project contains a single package file, named *package.dtsx*, but you can also add items of other types, which are grouped in the following **Solution Explorer** folders.

The shortcut menus (i.e., right-click menus) available on these folders generally let you add a new item to the folder, whereas the shortcut menus available on individual items in the folder let you open the item, copy, delete, or rename the item, or exclude the item from the project. The **View Code** shortcut menu option available on most folder items displays the XML definition of the selected item.

- **Data Sources folder**. A data source represents a connection that can be shared among multiple packages in a project. You can create a connection manager in a package from an existing data source.
- **Data Source Views folder**. A data source view represents a subset of the data in a data source, and can also contain named queries. Data source views can be shared by multiple packages in a project. You can designate tables, views, or named queries from a data source view as the source of data for a data flow source.
- **SSIS Packages folder**. A package represents an organized collection of connections, control flow elements, data flow elements, and other objects. The package is the unit of work in Integration Services that provides and supports extraction, transformation, and

loading (ETL) functionality. A single project can contain multiple packages. The shortcut menu available on the **SSIS Packages** folder lets you do the following:

  - Add a new or existing package to the project.
  - Run the **SQL Server Import and Export Wizard** to jumpstart creation of a new package.
  - Run the **Package Migration Wizard** to migrate existing DTS packages.
  - Run the **SSIS Package Upgrade Wizard** to upgrade SQL Server 2005 Integration Services (SSIS) packages.

  In the **SSIS Packages** folder, packages have a shortcut menu. This shortcut menu lets you designate a package as the startup object in the project, run the package, and perform other maintenance tasks.

- **Miscellaneous folder**. If you add files of other types to your Integration Services project, such as documents or images, these files are grouped in the **Miscellaneous** folder.

SSIS Designer

SSIS Designer is a graphical tool for creating packages that includes separate tabbed design surfaces for building the control flow, data flow, and event handlers in packages.

- **Control Flow tab**. On the Control Flow tab, you arrange and configure the tasks, including the Data Flow task, that provide functionality in packages, the containers that provide structure in packages and services to tasks, and the precedence constraints that connect containers and tasks into a control flow. The shortcut menu available on the Control Flow design surface lets you add text annotations, set breakpoints for debugging, and zoom out or zoom in on the layout of the package. The shortcut menu available on individual tasks lets you execute the task by itself, without running the whole package.
- **Data Flow tab**. On the Data Flow tab, you combine into a data flow sources that extract data, transformations that modify and aggregate data, destinations that load data, and paths that connect the outputs and inputs of data flow components. The shortcut menu available on the Data Flow design surface also lets you add text annotations. The shortcut menu available on the paths that join data flow components lets you configure Data Viewers to watch data as it passes through the data flow.
- **Event Handlers tab**. On the Event Handlers tab, you configure workflows to respond to package events. For example, you can create an event handler that sends an e-mail message when a task fails
- **Package Explorer tab**. The Package Explorer tab provides a convenient explorer view of the package, with the package as a container at the top of the hierarchy, and underneath it, the connections, executables, event handlers, log providers, precedence constraints, and variables that you have configured in the package
- **Progress tab**. The Progress tab displays information about package execution when you run a package in SSDT.

- **Connection Managers area**. Integration Services uses connection managers to encapsulate connections to a data source. These connection managers are shared within the package by control flow components, data flow components, and log providers, and are displayed in a special area of the designer at the bottom of the **Control Flow**, **Data Flow**, and **Event Handlers** tabs.

The designer also provides access to the dialog boxes, windows, and wizards that you use to add functionality and advanced features to packages and to troubleshoot packages.

SSIS Menu

When an Integration Services project is active in SSDT, an **SSIS** menu is added to the main menu bar. When the **SSIS Designer** has the focus, this menu contains the special Integration Services options listed here; when the focus moves to another part of the SSDT user interface, the **SSIS** menu displays only the **Work Offline** option.

- **Logging**. Logging lets you keep a record of events raised by a package at run time. During design time, you can view the logged events in the **Log Events** window.
- **Package Configurations**. Package configurations let you set properties on package objects during package development, and then update the properties at run time as required. For example, you can update the values of variables or the connection strings of connection managers.
- **Digital Signing**. Digital signing lets you use a certificate to guarantee the authenticity of a package.
- **Variables**. Variables let objects in a package communicate with each other, and can be used in expressions and in scripts. Selecting **Variables** on the **SSIS** menu displays the **Variables** window.
- **Work Offline**. When the data sources for a package are not available, you can avoid error messages about unavailable connections by selecting **Work Offline**.
- **Log Events**. Selecting **Log Events** on the **SSIS** menu displays the **Log Events** window.
- **New Connection**. Selecting **New Connection** on the **SSIS** menu displays the **Add SSIS Connection Manager** window.

SSIS Designer Options on the Tools Menu

Under the **Business Intelligence Designers** node in the **Options** dialog box available on the **Tools** menu, you will find three pages of preferences for properties that are unique to the Integration Services designers.

- **General page**. On the general page, you can specify options for checking or requiring digital signatures and for displaying labels on precedence constraints.
- **Control Flow Auto Connect and Data Flow Auto Connect pages**. The two Auto Connect pages let you specify the default behavior for connecting objects that you put on the design surfaces.

- **Confirm Delete page**. On this page, you can specify whether a confirmation message appears when components are deleted.

Integration Services Project Properties

The **Project Properties** dialog box, which is available from the shortcut menu on the project node in Solution Explorer, contains three pages of default design-time property values for an Integration Services project.

- **Build page**. On the **Build** page, you can specify the output path for files generated by the build process.
- **Deployment Utility page**. On the **Deployment Utility** page, you can specify whether to create a deployment utility for the package, where to save the deployment utility, and whether to allow updates to configurations during deployment.
- **Debugging page**. On the **Debugging** page, you can specify several options that apply when you test the package by running it in SSDT at design time.

Other Integration Services Windows and Features

Integration Services objects and tools also appear in the following SSDT windows:

- **Toolbox**. Integration Services populates the Toolbox with a rich variety of ready-to-use control flow tasks and data flow sources, transformations, and destinations. The shortcut menu available on the Toolbox lets you sort the items listed there, add or remove items, or reset the list. You can optionally display the Toolbox by using the predefined Ctrl+Alt+X key combination.
    - **Control flow items**. When you are working on the **Control Flow** tab or the **Event Handlers** tab, the Toolbox displays two groups of items: **Control Flow Items** and **Maintenance Plan Tasks**.
    - **Data flow items**. When you are working on the **Data Flow** tab, the Toolbox displays three groups of items: **Data Flow Sources**, **Data Flow Transformations**, and **Data Flow Destinations**.
- **Variables window**. The **Variables** window is specific to Integration Services projects. By default, the Variable window appears near the **Toolbox**, but it may not be visible until the first time that you select **Variables** on the **SSIS** menu to display the **Variables** window. Variables let objects in a package communicate with each other, and can be used in expressions and in scripts. You can optionally display the **Variables** window by mapping the View.Variables command to a keyboard shortcut of your choice on the **Keyboard** page of the **Options** dialog box.
- **Log Events window**. The **Log Events** window is specific to Integration Services projects. By default, the **Log Events** window appears near the **Toolbox**, but it may not be visible until the first time that you select **Log Events** on the **SSIS** menu to display the **Log Events** window. Logging lets you keep a record of a package's run-time events. You can view the logged events easily at design time in the **Log Events** window.

Reporting Services in SSDT (SSRS)

SSDT is one of the Reporting Services authoring environments that you can use to design reports and is the only authoring environment that you can use to design report models. SSDT is the Visual Studio environment with enhancements that are specific to business intelligence solutions. BI Development Studio provides solution files that enable you to create and organize business intelligence project files. For more information about the general features of SSDT, see Introducing SSDT.

Reporting Services provides the following project templates in BI Development Studio:

- Report Server Project Wizard. Use this template to guide you through the steps of creating a data source and a report.
- Report Server Project. Use this template to create or add existing reports to a project.
- Report Model Project. Use this template to create a data source, a data source view, and a report model.

SSDT also provides an environment for running Report Designer and Model Designer. For more information about other report authoring environments that you can use to create reports, see Comparing Report Authoring Environments and Designing Reports in Report Designer and Report Builder 3.0 (SSRS).

Note

SQL Server SSDT, the 32-bit development environment for Report Server and Report Model projects, is not designed to run on Itanium-based computers and is not installed on Itanium-based servers. However, support for BI Development Studio is available for x64-based computers.

Projects, reports, or models that were designed in earlier versions of SQL Server are automatically upgraded to be compatible with the current version. Projects are upgraded when you open the corresponding solution file. Each report and model is automatically upgraded the first time you open it in a project. For more information, see Upgrading Reports. For more information about specific report definition schemas, see Report Definition Language Specification. For step-by-step instructions on how to find the RDL schema version in a report, in a project, or on the report server, see How to: Find the Report Definition Schema Version (SSRS).

Report Server Project

When you select a Report Server template to create new project, Report Designer opens. Use Report Designer to author, preview, and publish a report. For more information, see Working with Report Designer in SSDT.

Use the following tabs, windows, menus, and tools to design and preview a report in Report Designer.

Tabs and Windows

Report Designer is a graphical tool for creating reports that has two views: **Design** for designing a report and **Preview** for running the report locally and viewing the rendered report in the report viewer.

- **Design** Use this view to design the report.

  In this view, the following windows or panes to provide additional functionality:

  - **Report Data** Use to define data sources, datasets, report parameters, and images.
  - **Design Surface** Use to design the report layout.
  - **Toolbox** Use to add report items such as tables and charts to the design surface.
  - **Grouping** Use to define groups for table, matrix, and list data regions. These data regions are all templates based on the Tablix data region.
  - **Properties** Use to set properties directly on a selected item on the design surface in the Grouping pane.
  - **Toolbar** Use to change formatting and alignment of selected report items on the design surface.
  - **Document Outline** Displays the report items and text boxes used by data regions in a hierarchical view of the report definition.

  From the shortcut menu on the report background, click **View**, and then **Ruler** to toggle the Ruler display.

- **Preview** Use this view to run the report on your local computer and view the rendered report in the report viewer. Preview caches report data locally. You can also set project properties to run the report in debug view, using a browser. In this view, you can also use the following components:

  - **Output** Use this pane to view error messages from the local report processor or deployment progress when you publish a report to the report server.
  - **Report viewer toolbar** Use to set report parameter values, navigate through the report, and print or export the report to a different file format.

  For more information, see Finding, Viewing, and Managing Reports (Report Builder 3.0 and SSRS).

- **Both Design and Preview** In both views, you can use Solution Explorer.

  - **Solution Explorer** Use to view shared data sources and reports for a BI Development Studio project. From the Project menu, you can set project properties and publish the report to a report server.

  For more information, see Publishing Data Sources and Reports (SSRS).

Menus

Report Designer uses the following menus:

- **View** Use to display or hide the following windows: Report Data, Solution Explorer, Code, Designer, Output, Document Outline, Toolbox, Properties, Report Borders toolbar, Report Formatting toolbar, and the Layout toolbar.
- **Project** Use to open project properties, add new or existing items to the project, and to import reports from Access. The menu item **Import Reports** only appears if Microsoft Access is installed.
- **Report** Use to add or delete the page header and footer, show or hide the Grouping pane, change from Design view to Preview view, and to show the report properties. This menu is available only when you the design surface is active. To make the design surface active, click on the Design or Preview tab.

Report Server Project Properties

Report Server project properties apply to all reports and all shared data sources in a SSDT project. These properties include the URL for the report server and the folder names for reports and shared data sources. Use the **Project Property Pages** dialog box to view the current property values. To open this dialog box, on the **Project** menu, click *<project name>* **Properties**.

To create multiple sets of project properties for deployment variations such as enterprise test and production report servers, use the Configuration Manager. For more information, see Publishing Data Sources and Reports (SSRS).

Report Server Wizard Project

When you select a Report Server Wizard template to create new project, the Report Wizard runs. In the wizard, you can create a report by following instructions on each page to create a connection string to a data source, set data source credentials, design a query, add a table or matrix data region, specify report data and groups, pick a font and color style, publish the report to a report server, and preview the report locally.

After you create a report with the wizard, you can change the report data and the report design by using Report Designer. The next time you open the project, you can open it as a Report Server project.

Report Model Project

When you select a Report Model Project template, the Model Designer opens. Model Designer is a graphical tool for creating report models based on SQL Server databases. Report models are used in Report Builder 1.0 to create ad hoc reports. When you create a report model, only the Report Model tab is displayed by default.

- **Report Model tab** On the Report Model tab, you can add or remove model objects. The Report Model tab is divided into two panes: the Tree view pane on the left side, and the List view pane on the right side. Tree view lists every entity contained within the model. List view displays items contained within the selected entity or folder. You can use shortcut menus in both views to add or delete items from the model.

- **Data Source view tab** On the Data Source view tab, you can create a view for a single shared data source that has been defined for the project. The Data Source View tab is not open by default, but you can view the Data Source View tab by double-clicking the name of the data source view in Solution Explorer. For more information about the Model Designer user interface, see Model Designer F1 Help.

For more information, see Working with Model Designer in SSDT. For more information about creating ad hoc reports in Reporting Services, see Designing and Implementing Reports Using Report Builder 1.0 on msdn.microsoft.com.

Menus

When the Report Model tab is active in SSDT, a Reporting Model menu is added to the main menu bar. When the focus is not on the Report Model tab, the Reporting Menu is removed from the main menu bar.

Model Designer Project Properties

When you select a report model item, the contents of the Properties window change to reflect the properties that are associated with the selected item. Model Designer sets some properties by default but you can change the current properties or assign new properties.

Analysis Services in SSDT (Analysis Services - Multidimensional Data)

SSDT is the environment that you use to develop Online Analytical Processing (OLAP) cubes and data mining models in SQL Server Analysis Services. SSDT is the Microsoft Visual Studio 2008 environment with enhancements that are specific to business intelligence solutions. For more information about the general features of SSDT, see Introducing SSDT.

SSDT provides several unique features that help you work with Analysis Services projects and integrate Analysis Services projects with Reporting Services and Integration Services. These features are described in this topic.

The design surface in SSDT is specialized for each object that you work with in Analysis Services. For example, there is a designer for working with data mining models, named Data Mining Designer, and another designer for working with cubes, named Cube Designer. Solution Explorer, located to the right of the design surface, provides a mechanism for navigating between design surfaces and managing the items in a project. SSDT also contains a deployment window that displays the progress of a deployment, and a Properties window, enabling you to change the properties of selected objects. For an in-depth look at how to work in these design spaces, see the following tutorials: Basic Data Mining Tutorial, SQL Server Analysis Services Tutorial

Note: Many new and useful actions are available from the shortcut menus that you see when you right-click labels and objects in the user interface. As you explore SSDT and the Analysis Services features discussed in this topic, make sure that you right-click various items to learn about these options.

Analysis Services Solution Explorer

You can use Solution Explorer to move through the different components of your projects. Double-click an item in a folder to open the associated designer, and right-click a folder to add a new item to the folder.

Solution Explorer contains the following project items when you open a new Analysis Services project.

- **Data Sources**. A data source represents a connection that can be shared among OLAP cubes and data mining models in a project. For more information, see Defining a Data Source Using the Data Source Wizard (Analysis Services).
- **Data Source Views**. A data source view represents a subset of the data in a data source, and can also contain named queries and named calculations. Data source views can also be shared among multiple OLAP cubes and data mining models in a project. You can designate tables, views, or named queries from a data source view as the source of data for an OLAP cube or data mining model. For more information, see Defining a Data Source View (Analysis Services).

- **Cubes**. A cube represents a set of measures that are grouped into measure groups and hierarchically organized by dimensions. Cubes are typically constructed from data retrieved from relational data sources, such as an OLTP database, a data warehouse, or a data mart. For more information, see Designing Cubes.
- **Dimensions**. Dimensions are used in Analysis Services to organize data within cubes. Dimensions use a combination of hierarchies and attributes to represent levels of categorization within a cube. For more information, see Designing Dimensions.
- **Mining Structures**. A mining structure defines the data domain from which mining models are built. A single mining structure can contain multiple mining models that share the same domain. For more information, see Data Mining Projects (Analysis Services - Data Mining).
- **Roles**. Roles are used in Analysis Services to manage security for OLAP and data mining objects and data. For more information, see Security Roles (Analysis Services - Multidimensional Data).
- **Assemblies**. Analysis Services enables you to add assemblies to an Analysis Services instance or database. Assemblies enable you to create external, user-defined functions using any common language runtime (CLR) language or any Component Object Model (COM) automation language. For more information, see Assemblies (Analysis Services - Multidimensional Data).
- **Miscellaneous**. If you add files of other types, such as documents or images, to your Analysis Services project, these files are grouped in the **Miscellaneous** folder.

Analysis Services Designers

You can use the following designers in an Analysis Services project in SSDT. To use a designer, open its associated project item in Solution Explorer.

- **Data Source View Designer**. The Data Source View Designer provides an environment that you can use to add and remove objects, designate logical primary columns, define relationships between tables, replace tables with other tables or with named queries, and add named calculations to existing tables in the data source view. For more information, see Adding or Removing Tables or Views in a Data Source View (Analysis Services), Viewing or Changing Data Source View, DataTable and DataColumn Properties in a Data Source View (Analysis Services), and Lesson 3: Modifying Measures, Attributes and Hierarchies.
- **Cube Designer**. The Cube Designer provides an environment to configure the cube and the objects in the cube. For international applications, you can add translations for Analysis Services objects. For processed cubes, you can browse the cube structure and view data. For more information, see Cube Designer (Analysis Services - Multidimensional Data).
- **Dimension Designer**. The Dimensions Designer provides an environment to configure the dimension and the objects in the dimension. For international applications, you can add translations for the dimension metadata. For processed dimensions, you can browse

the dimension structure and view data. For more information, see Dimension Designer (Analysis Services - Multidimensional Data).

- **Data Mining Designer**. The Data Mining Designer provides an environment that you can use to create, explore, and work with data mining models. For more information, see Data Mining Designer.

Analysis Services Menus

SSDT contains the following custom menu items that you can use with an Analysis Services project.

- **Database**. Use the **Database** menu options to make changes to the Analysis Services database associated with the current Analysis Services project. For more information, see Defining an Analysis Services Database.
- **Cube**. Use the **Cube** menu options to navigate through the Cube Designer, or to perform operations specific to the cube selected in Solution Explorer. For more information, seeDesigning Cubes.
- **Dimensions**. Use the **Dimensions** menu options to navigate through the Dimension Designer, or to process the dimension selected in Solution Explorer. For more information, seeDesigning Dimensions.
- **Mining Model**. Use the **Mining Model** menu options to navigate through the Data Mining Designer, or to perform tasks specific to the tab and options selected in the designer. For more information, seeData Mining Projects (Analysis Services - Data Mining).

Note: The full functionality of the menu item is not available unless the associated project item is selected in Solution Explorer.

Analysis Services Tools/Options

You can set the following options, which are specific to Analysis Services, in the **Options** dialog box. To access the **Options** dialog box, select **Options** from the **Tools** menu.

- **Connection and query timeouts**. Use to set the default time-out for connecting to an instance of Analysis Services, and the default time-out for querying against an instance of Analysis Services. The timeouts are measured in seconds.
- **Default Deployment Server Edition**. Use to set the edition of the server that the project will be deployed to, and to adjust the defaults for new projects that you create. This property serves as the basis for designer validations, which are specific to the edition. You can select one of the following options:
    - Developer
    - Enterprise
    - Evaluation
    - Standard

- **Default Target Server**. Specifies the default server for new projects.
- **Data Mining Viewers**. Use to adjust the default colors that are used in the data mining viewers.