

What are Business Connectivity Services?

Introducing the Microsoft Business Connectivity Services

Microsoft SharePoint Server 2010 and the Microsoft Office 2010 suites include Microsoft Business Connectivity Services, which are a set of services and features that provide a way to connect solutions based on SharePoint Server 2010 to sources of external data and to define external content types based on that external data. External content types are similar to content types and allow the presentation and interaction with data from external systems in SharePoint lists (called external lists), Web Parts, and in Microsoft Outlook 2010, Microsoft SharePoint Workspace 2010, and Microsoft Word 2010 clients.

Sources of external data that Business Connectivity Services can connect to include SQL Server databases, SAP applications, Web services (including Windows Communication Foundation Web services), custom applications, and Web sites based on SharePoint products. By using Business Connectivity Services, you can design and build solutions that extend SharePoint collaboration capabilities and the Office user experience to include external business data and the processes that are associated with that data.

Business Connectivity Services solutions use a set of standardized interfaces to provide access to business data. As a result, solution developers do not have to learn programming practices that apply to a specific system or adapter for each external system. Business Connectivity Services also provide the run-time environment in which solutions that include external data are loaded, integrated, and executed in supported Office client applications and on the Web server.

Business Connectivity Services are administered primarily by using the Business Data Connectivity service. Administrators can use this service to manage:

- External content types:** Named sets of fields that define an object, such as "Customer," or "Order," in a business application along with the methods to create, read, update, or delete that object in its external data source. Typical external content type administration tasks include adding actions to an external content type to provide users with new functionality, and associating profile pages with an external content type to customize its appearance when viewed.
- External systems:** Supported sources of data that can be modeled by the Business Connectivity Services, such as Web services, SQL Server, and other relational databases. Typical external system administration tasks include setting permissions on the data source and viewing the external content types that are associated with the data source.
- BDC models:** XML descriptions of one or more external content types along with resources, such as localized strings, and connectivity information. Typical BDC model administration tasks include importing and exporting models or resource files, setting permissions on them, and viewing the external content types associated with a model.

Typical solutions based on Business Connectivity Services

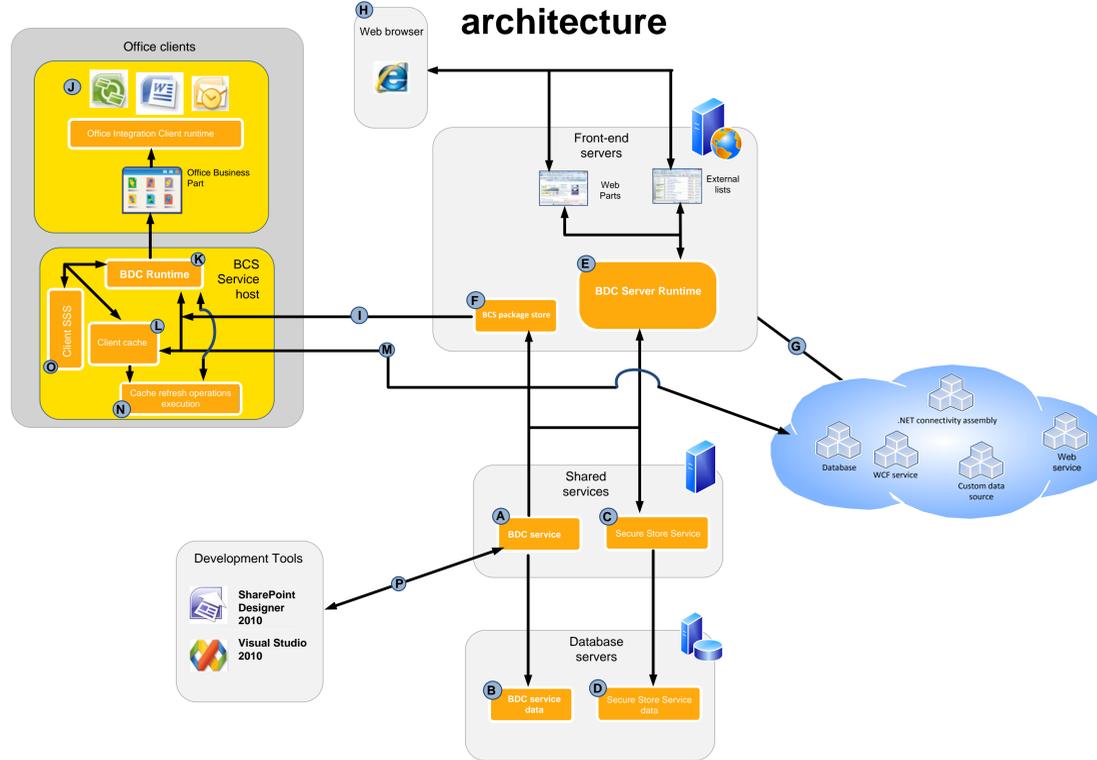
Solutions based on Business Connectivity Services can take advantage of the integration of client applications, servers, services, and tools in the Microsoft Office 2010 suites. Information workers typically perform much of their work outside the formal processes of a business system. For example, they collaborate by phone or e-mail messages, use documents and spreadsheets from multiple sources, and switch between being online and offline. Solutions based on Business Connectivity Services can be designed to fit within these informal processes that information workers use:

- They can be built by combining multiple services and features from external systems and from the Office 2010 suites to deliver solutions targeted to specific roles.
- They support informal interactions and target activities and processes that occur mostly outside formal enterprise systems. Because they are built by using SharePoint 2010 products, solutions based on Business Connectivity Services promote collaboration.
- They help users perform tasks within the familiar user interface of Office applications and SharePoint 2010 products.

Examples of solutions based on Business Connectivity Services include the following:

- Help Desk** - An enterprise implements its help desk, which provides internal technical support, as a solution based on Business Connectivity Services. Support requests and the technical support knowledge base are stored in external databases and are integrated into the solution by using the Business Data Connectivity service. The solution displays both support requests and the knowledge base in the Web browser or in Microsoft Outlook. Tech support specialists view the requests assigned to them in a browser, by using Microsoft Outlook, or, when offline, by using Microsoft SharePoint Workspace. Workflows take support issues through each of their stages. Managers on the technical support team can view dashboards that display help desk reports. Typical reports identify the number of support issues assigned to each support specialist, the most critical issues currently, and the number of support incidents that are handled by each support specialist during a given time period.
- Artist tracker** - A talent agency integrates its database of artists into its internal Web site. The entire list of artists, their contact information, and schedules can be taken offline in Microsoft SharePoint Workspace or in Microsoft Outlook. Recording contracts can be generated and filed from the Web site, Microsoft SharePoint Workspace, or Microsoft Outlook, and a workflow guides each contract through its various stages. New artists can be added from the Web site or from Microsoft Outlook. Using this solution, agents always have the information they need close at hand, and they can perform many key tasks by using familiar Office interfaces.
- My Sales Dashboard** - A sales dashboard application helps sales associates in an organization quickly find the information they need and enter new data. Sales orders and customer information are managed in an external database and integrated into the solution by using the Business Data Connectivity service. Depending on their roles, team members can view sales analytics information, individual team members' sales performance data, sales leads, and a customer's contact information and orders. Sales professionals can view their daily calendars, view tasks assigned to them by their managers, collaborate with team members, and read industry news, either from a Web browser, from Microsoft Outlook, or offline in Microsoft SharePoint Workspace. By using Microsoft Word 2010, managers can author monthly status reports that include data from the external systems.

Business Connectivity Services architecture



Elements of Business Connectivity Services

The illustration to the left shows the elements of the Business Connectivity Services:

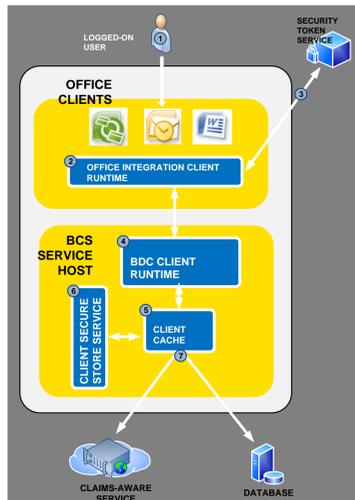
- The Business Data Connectivity service provides a means for creating external content types.
- External content types are stored in a dedicated database.
- The Secure Store Service provides the capability of securely storing credential sets and associating them to identities or group of identities. A common scenario for the Secure Store Service is an application that authenticates against a system in which the current user is known differently or has a different account for authentication. When used with the Business Data Connectivity service, the Secure Store Service provides a means to authenticate against external systems.
- Credential sets are stored in a dedicated database.
- The BDC Server Runtime on front-end servers uses the Business Data Connectivity service data to connect to and execute operations on external data sources for Web browser access.
- The BCS Package Store holds the deployable BCS packages that contain information that Business Connectivity Services and Office applications need to interact with the external systems from rich clients.
- The Business Data Connectivity service supports connecting to SQL Server and other relational databases, SharePoint content, Web services, and custom applications that are compatible with the BDC object model.
- Using Web Parts and SharePoint external lists, back-end data exposed by the Business Data Connectivity service is made available in SharePoint Web sites and available from the Web browser.
- When users connect to an external list, a BCS package is downloaded to the client computers.
- On supported Office 2010 clients (SharePoint Workspace, Outlook, and Word) the Office Integration Client Runtime acts as a connector between the BDC runtime and Office applications.
- The BDC Client Runtime uses the Business Data Connectivity service data to connect to and execute operations on external data sources for rich client access.
- Data is cached on client computers.
- The Business Data Connectivity Client Runtime supports connecting to external systems from client computers.
- The client cache refresh synchronizes the cache with the back-end data.
- The Client Secure Store enables end-users to configure their client mappings in the credential database.
- Solution developers can use SharePoint Designer 2010 and Visual Studio 2010 to create external content types.

Business Connectivity Services Security

Business Connectivity Services include security features for authenticating users to access external systems and for configuring permissions on data from external systems. Business Connectivity Services are highly flexible and can accommodate a range of security methods from within supported Microsoft Office 2010 applications and from the Web browser.

Accessing external data from an Office client application

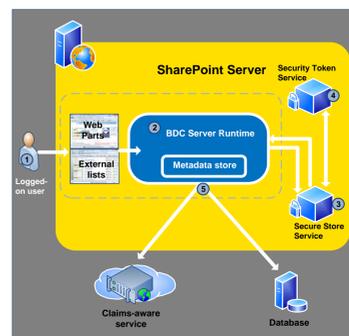
When accessing external data from a supported Office client application, two systems are involved: the client computer of the logged-on user and the external system. This model is supported when a user interacts with external data by using Outlook 2010, Microsoft SharePoint Workspace, and Microsoft Word 2010.



- Outlook 2010 users typically use external data in Outlook items such as Contacts or Tasks. SharePoint Workspace 2010 users can take external lists offline and interact with them. Word 2010 users can insert external data into Word documents.
- The Office Integration Client Runtime acts as a connector between Business Connectivity Services running on the client and the supported Office applications.
- If the external data is configured to use claims-based authentication, the client interacts with the Security Token Service on the SharePoint farm to get a claims token.
- The BDC Client Runtime on client computers uses the data from the Business Data Connectivity service to connect to and execute operations on external systems for rich client access.
- The Client Cache caches information from the Business Data Connectivity service and Secure Store Service that is needed to securely connect to external data. The cache is refreshed from the SharePoint farm to incorporate updated information.
- The Client Secure Store Service enables end-users to configure their security credentials.
- Business Connectivity Services can pass credentials to databases and claims-aware services.

Accessing external data from a Web browser

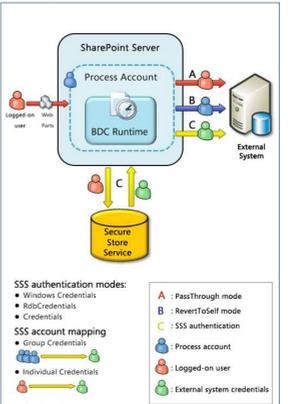
When a user accesses external data from a Web browser, three systems are involved: the logged-on user's client computer, the Web server farm, and the external system.



- From Web browsers, users typically interact with external data in external lists or by using Web Parts.
- The BDC Server Runtime on front-end servers uses data from the Business Data Connectivity service to connect to and execute operations on external systems.
- The Secure Store Service securely stores credential sets for external systems and associates those credential sets to individual or group identities.
- The Security Token Service is a Web service that responds to authentication requests by issuing security tokens made up of identity claims that are based on user account information.
- Business Connectivity Services can pass credentials to databases and Web services that are configured to use claims-based authentication.

Business Connectivity Service Credentials Authentication Modes

When configuring Business Connectivity Services to pass credentials, the solution designer adds authentication-mode information to external content types. The authentication mode gives Business Connectivity Services information about how to process an incoming authentication request from a user and map that request to a set of credentials that can be passed to the external content system. For example, an authentication mode could specify that a user's credentials should be passed directly through to the external data system. Alternatively, it could specify that a user's credentials should be mapped to an account that is stored in a Secure Store Service which should then be passed to the external system.

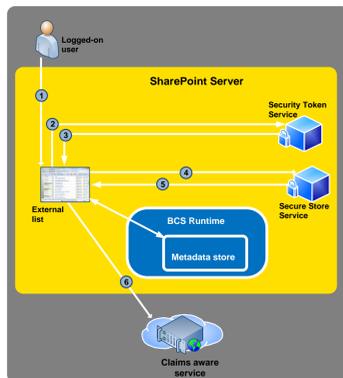


- A user tries an operation on an external list that is configured for claims authentication.
- The client application requests a security token from the Secure Token Service.
- Based on the requesting user's identity, the Secure Token Service issues a security token that contains a set of claims and a target application identifier. The Secure Token Service returns the security token to the client application.
- The client passes the security token to the Secure Store Service.
- The Secure Store Service evaluates the security token and uses the target application identifier to return a set of credentials that apply to the external system.
- The client receives the credentials and passes them to the external system so that an operation (such as retrieving or updating external data) can be performed.

Authentication Mode	Description
PassThrough	Passes the credentials of the logged-on user to the external system. This requires that the user's credentials are known to the external system. Note: If the Web application is not configured to authenticate with Windows credentials, the NT Authority\Anonymous Logon account is passed to the external system rather than the user's credentials. This mode is called User's Identity in the Microsoft Business Connectivity Services administration pages and in SharePoint Designer 2010. When the user is accessing external data from a Web browser, this mode ignores the user's credentials and sends the application pool identity account under which the BCS runtime is running on the Web server to the external system. When the user is accessing external data from an Office client application, this mode is equivalent to PassThrough mode, because Microsoft Business Connectivity Services running on the client will be running under the user's credentials.
RevertToSelf	This mode is called BDC Identity in the Microsoft Business Connectivity Services administration pages and in SharePoint Designer 2010. Notes: By default, BDC Identity mode is not enabled. You must use Windows PowerShell to enable BDC Identity mode. BDC Identity mode is not supported in hosted environments. For external Web services or databases, this mode uses a Secure Store Service to map the user's credentials to a set of Windows credentials on the external system.
WindowsCredentials	This mode is called Impersonate Windows Identity in the Microsoft Business Connectivity Services administration pages and in SharePoint Designer 2010. For an external Web service, this mode uses a Secure Store Service to map the user's credentials to a set of credentials that are supplied by a source other than Windows and that are used to access external data. The Web service should use basic or digest authentication when this mode is used.
Credentials	Important: To help preserve security in this mode, we recommend that the connection between the Microsoft Business Connectivity Services and the external system should be secured by using Secure Sockets Layer (SSL) or Internet Protocol Security (IPSec). This mode is called Impersonate Custom Identity in the Microsoft Business Connectivity Services administration pages and in SharePoint Designer 2010.
RDBCredentials	For an external database, this mode uses a Secure Store Service to map the user's credentials to a set of credentials that are supplied by a source other than Windows. To help preserve security in this mode, we recommend that the connection between the Microsoft Business Connectivity Services and the external system should be secured by using Secure Sockets Layer (SSL) or IPSec. This mode is called Impersonate Custom Identity in the Microsoft Business Connectivity Services administration pages and in SharePoint Designer 2010.
DigestCredentials	For a WCF Web service, this mode uses a Secure Store Service to map the user's credentials to a set of credentials using Digest authentication. This mode is called Impersonate Custom Identity - Digest in the Microsoft Business Connectivity Services administration pages and in SharePoint Designer 2010.

Business Connectivity Services and Claims Authentication

Business Connectivity Services can provide access to external data based on an incoming security token and it can pass security tokens to external systems. A security token is made up of a set of identity claims about a user, and the use of security tokens for authentication is called "claims-based authentication."



Creating solutions based on Business Connectivity Services

Solutions based on Business Connectivity Services surface external data through the Business Data Connectivity service and provide access to that data in Office 2010 clients, such as Microsoft Outlook 2010, and in SharePoint Web sites. This flowchart illustrates the stages in designing and creating a solution that is based on Business Connectivity Services, the roles that come into play at each stage, and tasks performed by the various team members in specifying, designing, and creating the solution :

