



# Layer2

## Business Data List Connector

### User Documentation

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#### Microsoft Partner

Gold Application Development  
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## Overview

The Layer2 Business Data List Connector provides an easy and powerful way to synchronize or replicate content from many different external data sources with SharePoint Lists. By integrating with Microsoft’s ActiveX Data Objects (ADO.NET) platform, the Layer2 Business Data List Connector is able to connect to a vast number of 3rd-party data sources like SQL, Dynamics CRM, SAP, and others.

## Getting Started

### System Requirements

The system requirements for the Layer2 Business Data List Connector are directly related to the SharePoint system requirements. Please see the SharePoint Documentation for detailed information about the system requirements of SharePoint.

- [SharePoint 2019](#)
- [SharePoint 2016](#)
- [SharePoint 2013](#)
- [SharePoint 2010 Foundation](#)
- [SharePoint 2010 Server](#)

Please note that the Layer2 Business Data List Connector does not support SharePoint 2013 in 2010 compatibility mode.

## Installation

### Choosing an Installer Package

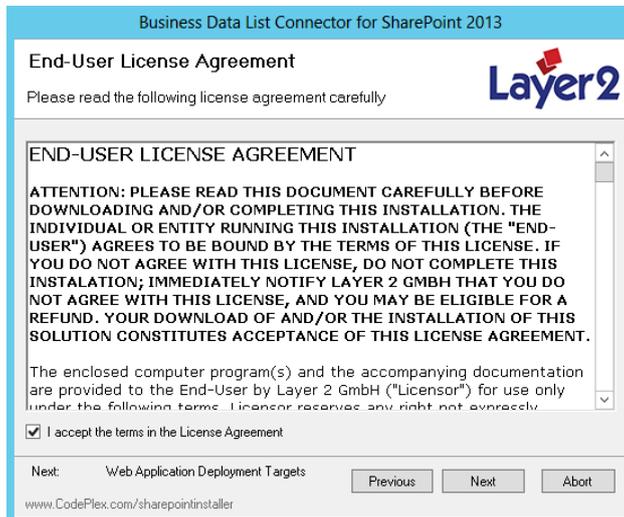
The Layer2 Business Data List Connector is provided with four different installation packages, one each for SharePoint 2019, SharePoint 2016, SharePoint 2013, SharePoint 2010, and SharePoint 2007 host servers. Which version you must use depends on the version of SharePoint installed on your host machine.

### Setup

1. Extract all files from the provided .ZIP file into a folder on the Central Administration Server.



- Using the information provided above about the three installer packages, select the correct release version for the SharePoint you are installing onto.
- Run the **Install.Layer2.BusinessDataListConnector.exe** file inside the appropriate release folder. It is recommended that you “Run as administrator” to prevent any permissions-related errors with the install.
- Read the license agreement carefully and accept it by checking the box. If you have any questions concerning licensing, please do not hesitate to contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com). Otherwise, click **Next**.



**Figure 1 - Installer license agreement**

- The Installer will now add and deploy the BDLC SharePoint solution on your SharePoint Farm. During installation, the installer restarts the SharePoint timer service. The application pool of your targeted web application will be restarted by the deployment job.
- After the installation of the Layer2 Business Data List Connector, the installation wizard will automatically start the installation process of the Layer2 ADO.NET Providers.

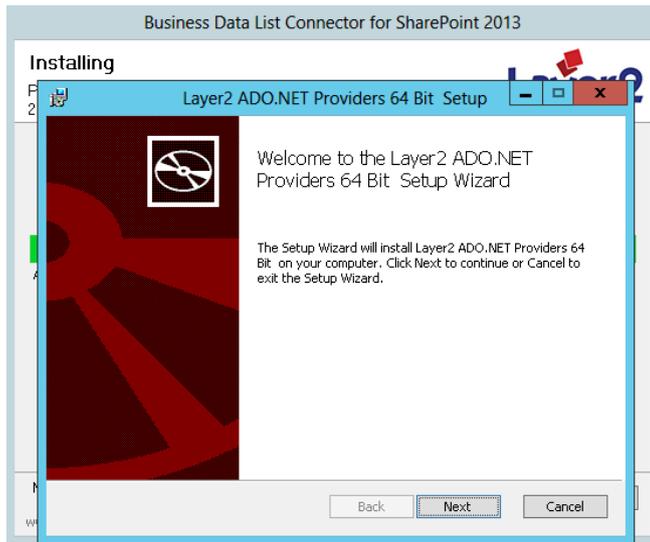


Figure 2 - Installing Layer2 ADO.NET providers

7. Read the license agreement carefully and accept it by checking the box. If you have any questions concerning licensing, please do not hesitate to contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com). Otherwise, click **Next**.



Figure 3 - Provider license agreement

8. Select appropriate install type. If unsure, select **Typical**.
9. Click **Install** to start.



10. At end of the installation should appear an “Installation Successfully Completed” window. Verify that there are no errors in the details.

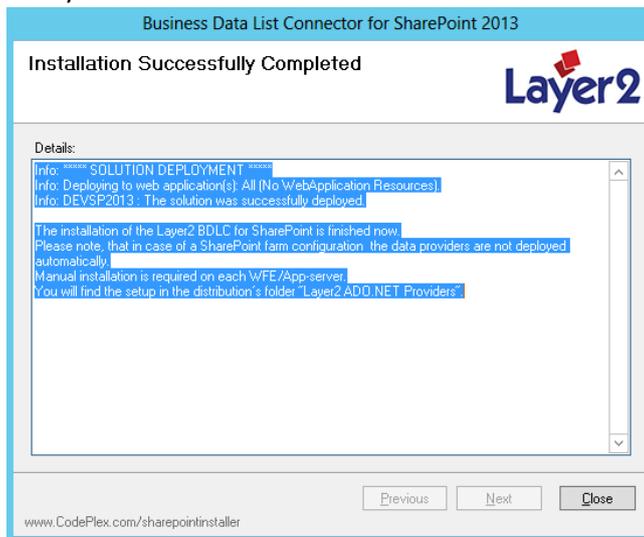


Figure 4 - Installation completed

## Activation

After the installation, you must activate the feature on your Site Collection.

1. Navigate to the **Site Collection Features** (not Site Features) of the site collection you wish to enable the Business Data List Connector on.
2. In the list, click **Activate or Deactivate** for the “Layer2 Business Data List Connector for SharePoint” feature. This should also automatically activate or deactivate the “Layer2 Business Data List Connector for SharePoint – Ribbon Control” feature as well.

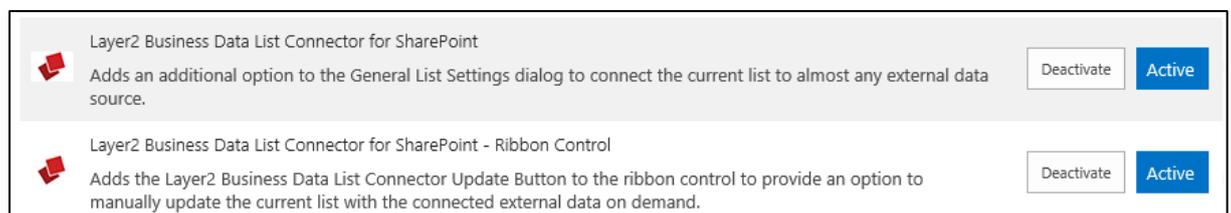


Figure 5 - Business Data List Connector features activated in Site Collection Features

After activation, you should find the “Connect to external data source” option in the list settings of every list in your site collection.

## Provider Installation

The Layer 2 Data Provider installation needs to be manually executed on every licensed server. You can find the provider installation executable file inside the **Layer2 ADO Providers** folder in the installer package. Please notice that there are different versions that depending on your operating



system. For all versions until Windows Server 2008 R2 (internal Version 6.1) please use "Setupx64\_NET35.msi" and for all versions above "Setupx64.msi".

Note that you will need to do the same for any vendor-specific/3rd-party data providers you wish to use.

Congratulations! You have successfully installed the Layer2 Business Data List Connector and are now ready to get started with using the Business Data List Connector to connect and synchronize data between your SharePoint Lists and different data sources.

### Configuring and Executing Connections

Below are the basic steps necessary to set up a connection between a SharePoint List and a data source, along with an example. For more detailed instructions on how to set up a connection to a specific source, please see the online examples [here](#).

1. Navigate to the List which you want to connect to an external data source. Open **List Settings** and then click **Connect to external data source**.

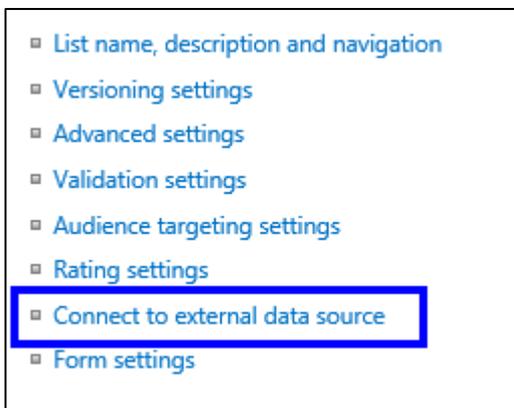


Figure 6 - Opening BDLC settings in the List settings

2. This is the settings panel for the Layer2 Business Data List Connector. Following is a short description of the properties:
  - a. **Connection Provider:** Select the correct provider for the data entity you will be connecting to. See the [Layer2 Data Providers](#) section for more details.
  - b. **Connection String:** Set the necessary parameters to connect to the data entity. See the [Layer2 Data Providers](#) section for more specific information. Has a **Validate** button to test the parameters.
  - c. **Select Statement:** Set a provider-specific query, if required, to retrieve the right data. See the [Layer2 Data Providers](#) section for more specific information. Has a **Validate** button to test the query and a **Data Preview** button to view a sample of the data that will be pulled.



- d. **Primary Key:** Set the primary key from the external data source. If you don't set a primary key, all entries will be removed and re-inserted with every update. Has a **Validate** button to test the key(s).
- e. **SharePoint:** In this section, you can add all columns from the external data source and map these columns with your SharePoint internal columns. By default, this will be configured automatically (especially if you used the **Add Columns** button action). After the mapping is completed, you can click the **Update** button to run the initial update and synchronize your data. Please see the [Add Columns](#) and [Column Mapping](#) sections for detailed descriptions.
- f. **Background Update:** Enables the automatic insert, update, and delete of SharePoint list items, if the external data is changed. By default, list data is updated every 60 minutes using a timer job. The recommended minimum interval is 15 minutes. Please see the [Background Update](#) section for more information.
- g. **Write-back to Datasource (CRUD):** When this feature is enabled, the Layer 2 Business Data List Connector will synchronize changes made to both the SharePoint list and your data source, bi-directionally. You can create, update, and delete list items in SharePoint and the Layer 2 Business Data List Connector will transmit these changes to the external data source in real-time. Please notice that this feature will not work with all kinds of data sources. For more information, see the [Write Back](#) section.
- h. **Error Reporting:** Adding a valid email address will allow the responsible person to be notified when an error occurs. You can add several recipients using a semicolon as delimiter.



<p><b>Connection Provider</b> Please select the connection provider to use. For more information please read the <a href="#">FAQs</a>.</p>	<p>Connection Provider [.Net Framework Data Provider for SqlServer] v</p>
<p><b>Connection String</b> Enter the connection string and validate it. You will find more information about <a href="#">Microsoft SQL Server</a> connection strings <a href="#">here</a>. For more information please read the <a href="#">FAQs</a>.</p>	<p>Connection String Data Source=mySqlServerAddress; Initial Catalog=myDatabase; User=myUser; Password=myPassword</p> <p>Validate</p>
<p><b>Select Statement</b> Please enter select statement and validate it. For more information please read the <a href="#">FAQ</a>. Press the Preview button to display the first 10 records of your result set.</p>	<p>Select Statement SELECT * FROM myTable</p> <p>Validate    Data Preview</p>
<p><b>Primary Key</b> Please enter the field names of the primary key(s) of the external data set. If you have multiple keys, please separate by semicolon ";". Don't forget to map your keys to SharePoint columns. You can use auto-mapping (by field / column name) or custom mapping for this. If no primary key is set, all list items are completely removed and re-inserted in updates!</p>	<p>Primary key(s) in external data set: myId</p> <p>Validate</p>

Figure 7 - Example settings for a SQL DB connection



- 3. Once you have set all required properties, you can check your connection by clicking on **Data Preview**. Everything should be configured properly if the data in the preview is as expected.

Data Preview

Note: Only the first 10 records of your result set will be displayed.

CustomerID	CompanyName	ContactName	ContactTitle	Address	City	Region	PostalCode	Country	Phone
ALFKI	Alfreds Futterkiste	Maria Anders	Sales Representative	Obere Str. 57	Berlin		12209	Germany	030-00743
ANATR	Ana Trujillo Emparedados y helados	Ana Trujillo	Owner	Avda. de la Constitución 2222	México D.F.		05021	Mexico	(5) 555-472
ANTON	Antonio Moreno Taquería	Antonio Moreno	Owner	Mataderos 2312	México D.F.		05023	Mexico	(5) 555-392
AROUT	Around the Horn	Thomas Hardy	Sales Representative	120 Hanover Sq.	London		WA1 1DP	UK	(171) 555-7
BERGS	Berglunds snabbköp	Christina Berglund	Order Administrator	Berguvsvägen 8	Luleå		S-958 22	Sweden	0921-12 34
BLAUS	Blauer See Delikatessen	Hanna Moos	Sales Representative	Forsterstr. 57	Mannheim		68306	Germany	0621-08461
BLONP	Blondesddsl père et fils	Frédérique Citeaux	Marketing Manager	24, place Kléber	Strasbourg		67000	France	88.60.15.31
BOLID	Bólide Comidas preparadas	Martín Sommer	Owner	C/ Araquil, 67	Madrid		28023	Spain	(91) 555 22
BONAP	Bon app'	Laurence Lebihan	Owner	12, rue des Bouchers	Marseille		13008	France	91.24.45.40
BOTTM	Bottom-Dollar Markets	Elizabeth Lincoln	Accounting Manager	23 Tsawassen Blvd.	Tsawassen	BC	T2F 8M4	Canada	(604) 555-4

Figure 8 - Example Data Preview using the Northwind Customers database

- 4. Column mapping between SharePoint and your data source can be done automatically with the **Add Columns** button. If necessary, you can also click on Column Mapping and manually add missing columns to your SharePoint list, and then map the SharePoint columns with the columns from the data source.

Our suggestion is for a simple connection to automatically add and map the columns.

### Field / Column Mappings

Please check the data source field mapping with SharePoint list columns.

Enable Custom Mapping:

Datasource Field Name	Datasource Field Type	SharePoint Display Name	SharePoint Internal Name	SharePoint Field Type
CustomerID	System.String	CustomerID	CustomerID	Single line of text
CompanyName	System.String	CompanyName	CompanyName	Single line of text
ContactName	System.String	ContactName	ContactName	Single line of text
ContactTitle	System.String	ContactTitle	ContactTitle	Single line of text
Address	System.String	Address	Address	Single line of text
City	System.String	City	City	Single line of text
Region	System.String	Region	Region	Single line of text
PostalCode	System.String	PostalCode	PostalCode	Single line of text
Country	System.String	Country	Country	Single line of text
Phone	System.String	Phone	Phone	Single line of text
Fax	System.String	Fax	Fax	Single line of text
CustomerID	PrimaryKey	Title	Title	Single line of text

Figure 9 - Example data mapping using the Northwind database



5. Now you're ready to run the synchronization! Click on "Update" and make an initial synchronization for your SharePoint List.

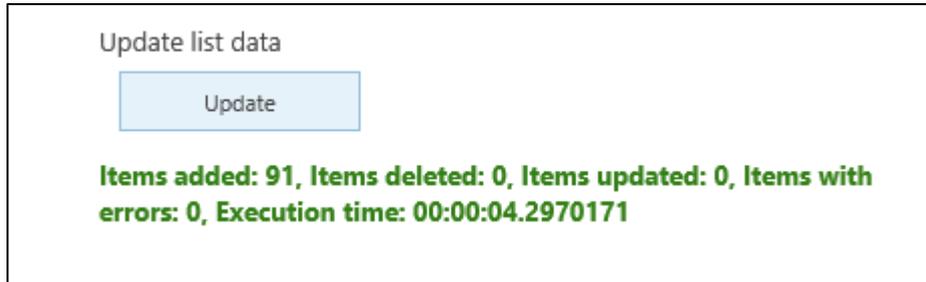


Figure 10 - Example successful run after clicking the Update button

Note that if you have a large amount of data in your data source to synchronize, the better way to perform an initial update is to use the background update. Using the **Update** button on this page could result in a SharePoint or Browser page timeout.

## Background Update Setup

Once you have your connection configured, you can now enable the background update timer job to execute automatically in background. For more information about the Background Update settings, see the [Configuration](#) section.

1. Make sure the **SharePoint Timer Service** is running on the server (generally, it will need to be running on the Application server in the farm).
2. Navigate to the List which you want to enable the background update on. Open **List Settings** and then click **Connect to external data source**.
3. Scroll down to the Background Update section. Click the checkbox next to Enable Background Update to turn the feature on. Some additional options should appear (for more detailed information see the [Background Update](#) section).



Background Update Settings

Enable Background Update

Interval [min]

Next Run   12 PM

Last Run: 9/24/2015 1:07:32 PM

Last Duration: 4 [s]

Last Message: Items added: 91, Items deleted: 0, Items updated: 0, Items with errors: 0

**Figure 11 - Background Update enabled. Set to run every 15 minutes starting at 12PM**

- Once the update has had the chance to run at the specified date and time, verify the run was successful by either checking the **Last Run** data in the connection settings, or by checking the status in the BDLC Configuration List (check your Site Contents for this list, which has configuration data for all your connections. See [BDLC Configuration List Items](#) for more information).

If you have issues with getting the background update working correctly, please contact [support@layer2solutions.com](mailto:support@layer2solutions.com) for assistance.



## Advanced User's Guide/Technical Information

### Business Data List Connector Components

The Layer2 Business Data List Connector system consists of multiple components which are installed during setup and are described in more detail below.

### Business Data List Connector Configuration List

The configuration list will appear in the Site Contents of the root site of the site collection after activating the Layer 2 Business Data List Connector site collection feature. In this list, all the settings for the connections in your site collection are stored, as well as the statistics and error logs for the last update from each list. Please note that there should be only one list with this name. While an upgrade to a new version the configuration list may be expanded but there should be never a loss of these settings.

### Business Data List Connector Settings

To setting up a connection from a list to an external data entity it's necessary to configure the connection. Therefore you can go with the settings panel inside your list settings. Go to the list settings of the list, which you want to connect, and click on "Connect to external data source". For detailed description of the properties, please see the [Configuration](#) section.

### Business Data List Connector Timer Job

You can use the background update timer job to schedule regular data updates which will ensure that your data is always synchronized with the data source. You can specify an interval to run the update and the timer job will check the data source for changes and synchronize them.

New with version 7.6 is the possibility to set up individual jobs for single connections. See [Background updates on single connections](#) for more details.

### Business Data List Connector Ribbon Item

In a connected SharePoint list, you can access the update command through your lists ribbon bar. This action will perform a so-called "long running operation" and will not run in any SharePoint or browser page timeouts. SharePoint users with no editing permissions on this list cannot use the ribbon action.

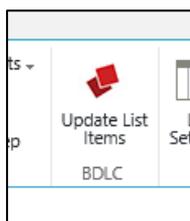


Figure 12 - Ribbon Item in SP2013



## Supported SharePoint List Types

### Supported

All non-file-based list types are supported. Note that lists containing custom field types may not be able to map these custom fields properly.

The ribbon action may not be displayed in web part pages with several lists displayed.

### Not Supported

All Document Libraries and the Discussion list are not supported.

## Configuration

The configuration and administration of list connections is primarily done by using the settings panel in the list settings. You find it by open the list settings of the list which you want to connect and then go to **Connect to external data source**.

Below is a detailed description for every property within the BDLC connection properties page.

### Connection Provider

Provides a selection of the ADO.NET providers which will be used to retrieve data and write changes for the connected data source. All installed providers that are compatible with 64-bit architecture will be shown in the drop-down (32-bit providers do not work with BDLC – you must install 64-bit version of the data provider). For more information about pre-installed, vendor-specific, and 3rd-party providers, see the [Layer2 Data Providers](#) section below.

### Connection String

This is the ADO connection string for the selected provider. These connection strings consist of key-value pairs separated by semicolons.

Example:

```
Url=http://mySharePointServer/mySharePointSite/; List=Links;  
Authentication=Windows; User Id=myDomain\myUserName; Password=myPassword;
```

Connection strings are highly specific to the provider that is used. There are many examples and documentation at [www.connectionstrings.com](http://www.connectionstrings.com) and on the Layer2 [solutions](#) page. The connection string is automatically stored as encrypted in the configuration list.

There is a **Validate** button below the connection string text box that is useful to quickly evaluate if the provided connection string is valid.



## Select Statement

In this text box a data query statement can be defined. The format to be used for the query is specific to the provider selected (see the [Layer2 Data Providers](#) section for information on the pre-installed providers, else read the vendor/3rd-party data provider documentation to find out what is required) and is not necessary for all providers.

The select statement can be validated like the connection string by clicking the **Validate** button. You can also see a preview of the data from the data source by clicking the **Data Preview** button.

## Primary Key

The **Primary Key** field is used to connect the record data present in SharePoint back to the connected external data source. Without a key, it cannot know which records are tied together, and as such, BDLC will delete and re-add all records on each update.

By default, the given primary key is mapped to the Title column, but it can be manually assigned to any other column in the mapping settings. It is also not required that column set as the “primary key” in the data source be used in BDLC – you can set it to any column that contains unique values, or even create a combination key with each item separated by a semicolon character “;”.

A primary key must be assigned in order to use the **Write-back** functionality.

The primary key value can be validated like the connection string by clicking the **Validate** button. If the column(s) used for the primary key have not yet been mapped, it will give a warning that you need to do this.

Floating point numbers are not supported as primary keys.

## SharePoint

There are two buttons under this setting for automatically generating columns and to view/edit the column mappings between SharePoint and the data source.

The **Add Columns** button can be clicked to have necessary columns needed for the data to be automatically generated in the SharePoint list and then automatically mapped. This is a great time saver for larger sets of data as you don’t need to manually create each column in SharePoint. For more information about how this function works and how the mapping is generated, see the [Automatic Fields / Column Mapping](#) section.

The **Column Mapping** button will show which fields from the data source are mapped to which SharePoint columns. Within the dialog, you can check the option to **Enable Custom Mapping** and this will allow you to assign the mapping manually, as well as allow you to mark columns to ignore.



When **Enable Custom Mapping** is active, the mapping list will contain a Modify link for each column.

Datasource Field Name	Datasource Field Type	SharePoint Display Name	SharePoint Internal Name	SharePoint Field Type	Ignore	Modify
CustomerID	System.String	CustomerID	CustomerID	Single line of text	<input type="checkbox"/>	<a href="#">Edit</a>
CompanyName	System.String	CompanyName	CompanyName	Single line of text	<input type="checkbox"/>	<a href="#">Edit</a>

**Figure 13 - Example mapping dialog with Enable Custom Mapping enabled**

When that link is clicked, you can check the box to “Ignore” the data source column as well as select a new SharePoint column to map to in the dropdown list. Once you have made your changes, click the **Update** link to save them for that column set.

Click the “X” in the corner to exit the mapping dialog.

Datasource Field Name	Datasource Field Type	SharePoint Display Name	SharePoint Internal Name	SharePoint Field Type	Ignore	Modify
CustomerID	System.String	CustomerID	Title	Single line of text	<input checked="" type="checkbox"/>	<a href="#">Update</a> <a href="#">Cancel</a>
CompanyName	System.String	CompanyName	CompanyName	Single line of text	<input type="checkbox"/>	<a href="#">Edit</a>

**Figure 14 - Example of editing the mapping of a column to a different one in SharePoint**



## Background Update

Clicking the checkbox next to Enable Background Update will turn background update feature on. Some additional options should appear when it is enabled:

- **Interval [min]:** How often the timer job runs, in minutes. While you can set it shorter, it is recommended that the interval be set to **15 minutes** or more.
- **Next Run:** The date and time when the next timer job will execute an update.
- **Last Run:** The date and time of the last run attempt (manual or by timer job).
- **Last Duration:** How long the last run attempt took, in seconds.
- **Last Message:** Results of last run attempt. Will note any errors.

Background Update Settings

Enable Background Update

Interval [min]

Next Run

Last Run: 9/24/2015 1:07:32 PM

Last Duration: 4 [s]

Last Message: Items added: 91, Items deleted: 0, Items updated: 0, Items with errors: 0

*Figure 15 - Background Update enabled. Set to run every 15 minutes starting at 12PM*

There may also be an option to **Unlock** the list. Normally, the list is locked when the timer job runs so that no changes can be made during the update. It is possible though that the list can be stuck in a locked state after a run is complete (due to errors or other issues) and needs to be unlocked manually. It is recommended that you **do not unlock the list** unless you are absolutely sure an update is not running and that it is truly stuck, or Layer2 Support tells you to do so. Otherwise, may cause additional errors and the data will not update properly.

Note that repeating lock issues are usually a symptom of another configuration issue, and you should attempt to resolve that issue to remove the lock problem permanently. Contact [Support@layer2solutions.com](mailto:Support@layer2solutions.com) if you require assistance to resolve these kinds of issues.

## Background updates on single connections

With BDLC version 7.6 it is possible to use an individual timer job on a single BDLC connection. This feature is only accessible within the BDLC Configuration List.

Activate this feature by editing the connections configuration entry: Set "Use Own TimerJob" to TRUE. Within the next update cycle of the BDLC main timer job (normally 15 minutes) a new job will



be created just for this list, names "Layer2 BDLC - Background Updater for List <YourListName>", its job id will be written into the field "TimerJob ID" (this field is needed for internal use and may not be edited manually). The new job will also run every 15 minutes per default and connects only to this BDLC list.

Use this feature for lists with special needs:

- Time consuming updates that will hinder otherwise the other configured connection updates.
- Time critical updates (+/- 5 minutes) where you need no dependencies at all to other updates.
- Updates on certain time slots: Set the background update setting in the list to a low value (interval = 60 minutes) and define the timer jobs schedule settings to your best daily, weekly or monthly value.

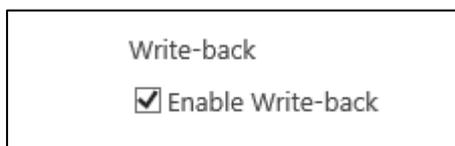
Please keep in mind that you use this feature well dosed in your farm.

To delete an existing individual job, simply deactivate the option in the configuration list item. Leave the timer job id as it is and with the next main job cycle the job will be deleted.

To delete an existing connection with individual timer job, first perform the delete option described above before deleting the connection, otherwise BDLC has no chance to delete the timer job properly.

### Write-back to Datasource (CRUD)

Clicking the checkbox next to **Write-back** will turn on the ability for BDLC to write changes made to data in SharePoint back to the data source in real-time (if the data provider supports it. See the appropriate provider documentation for details). Note that you must have a primary key set to use this feature, so that BDLC knows which records are connected by that shared key value.



**Figure 16 - Write-back function enabled**

When this is enabled, changes made to SharePoint records will be automatically and instantly made to the connected data source (updates/additions/deletions).

Please note that:



- Pre-existing records in SharePoint will not be transferred to the connected data source upon update, only new records and changes. If you need to transfer existing data from SharePoint to an external table, please see the [Initial Write-back](#) section.
- Calculated primary keys on the data source side are not supported for write-back, as the key is not generated in time for SharePoint to pick up on it during the read of what changed. That point will have passed when the record is inserted into the data source and the key is generated. You can get around this with some cases by having a GUID key generated on the SharePoint side (see [this FAQ article](#) for more details on how to do this).
- Write-back requires an updatable data query (for example, most SQL joins are not updatable and thus cannot use write-back).
- Write-back requires appropriate access-rights on the external data source side.

## Error Reporting

This setting allows for an email address to be given which will receive notifications when an error occurs during an update. More information about this functionality and how modify the message is given in the [Alerting](#) section below.

## Licensing

The licensing model of the Layer2 Business Data List Connector provides two different product editions, which are explained in more detail below. The product is licensed per local installation; each server that is running the Layer2 Business Data List Connector requires its own license key.

- **Web Frontend Server:** Each WFE needs to be licensed.
- **Application Server:** The application server running the BDLC Update Timer Job needs to be licensed. Note that SharePoint should configure this server automatically in a farm configuration.
- **Index Server, Search Server, SQL Server:** No licensing needed.

Technically, all servers that the BDLC is running on must be licensed. The license file has to be stored in the feature directory of the BDLC main feature and this location is explained in the [Installing a License](#) section below. BDLC tries to read the license file on the server where the BDLC process is currently running.

## Shareware Edition

This license will automatically be applied if there is no license file found inside of the License directory or if a previous license is invalid for any reason. It restricts the Layer2 Business Data list Connector to only synchronize a maximum of 25 records.

The Layer2 Business Data List Connector will read all records from both data sources and synchronize them completely, but when writing back, only the first 25 records will be written, after which the



Layer2 Business Data List Connector stops the synchronization and puts out a warning message in the BDLC settings page and in the lists result message (found in the BDLC Configuration List).

Note: If you have an active BDLC license and upgrade BDLC to a newer version that is not covered by your active license, BDLC will fall back into Shareware Mode. In lists with more than 25 items, BDLC will simply stop working. BDLC with a Shareware license will not delete your production list data until there are only 25 items left. Please contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com) for additional support and license upgrades.

### Licensed Edition

With this license, the Layer2 Business Data List Connector can be used to synchronize Microsoft SharePoint content without any limitations regarding the record count.

### Installing a License

To install a license key for the Layer2 Business Data List Connector you must manually placing the file into the root folder of the feature.

1. The license XML file (productkey.xml) will be provided by the Layer2 Sales team by email.  
**IMPORTANT:** Do not modify the signed file in any way. It will invalidate it.
2. Copy (do NOT move) the attached file into the License folder in the Layer2 Business Data List Connector feature directory.  
**SP19:** ...\\16\\TEMPLATE\\FEATURES\\Layer2.Products.BusinessDataListConnector  
**SP16:** ...\\16\\TEMPLATE\\FEATURES\\Layer2.Products.BusinessDataListConnector  
**SP13:** ...\\15\\TEMPLATE\\FEATURES\\Layer2.Products.BusinessDataListConnector  
**SP10:** ...\\14\\TEMPLATE\\FEATURES\\Layer2.Products.BusinessDataListConnector
3. Reload the website and verify the version has been updated to the correct license that was purchased. If it still says “Shareware”, then the license was not recognized. Some possible reasons why the license was not recognized are that the license does not match the installed software version, that the file was modified, or file corruption. If the product recognizes a problem with the license file, it shows a specific error message in the BDLC settings page. If there is none error message but the Shareware message is still present, check if all your WFEs are licensed properly (see the [Licensing](#) section for more details).

### BDLC Configuration List Items

The configuration list will appear in your site contents of your root site after activating the Layer 2 Business Data List Connector site collection feature. In this list, all the settings for the connections in your site collection are stored and also the statistics and maybe error logs for the last update from each list. Please note that there should be only one list with this name. When upgrading to a new version, the configuration list may be expanded but there should never be a loss of settings from this list.



**IMPORTANT!** Do not delete or change this list or the content of this list unless the Layer2 Support team, this documentation, or an article on the Layer2 website says to do so.

From version 8.x the BDLC configuration list can be used to provision BDLC connections into your SharePoint site. The list now also handles the different list event handlers needed for write back or the automatic workflow starts.

The BDLC configuration lists uses the following fields:

#### **Primary Key**

The replication key used by BDLC to ensure the data mapping.

#### **Link To List**

A link to the connected BDLC list.

#### **Web ID**

The ID (GUID) of the SharePoint web containing the list.

#### **List ID**

The ID (GUID) of the SharePoint list.

#### **Last Run**

The date and time of the last successful background update.

#### **Next Run**

The scheduled date and time for the next background update.

#### **Result**

The result message of the last manual or background update.

#### **Connection String**

The given connection string for this list. This value is encrypted by BDLC. From version 7.1.0.0 on, you can use unencrypted values as well, e.g. for provisioning websites with pre-configured BDLC settings.

#### **Select Statement**

The given select statement (if present) for this list. This value is encrypted. From version 7.1.0.0 on, you can use unencrypted values as well, e.g. for provisioning websites with pre-configured BDLC settings.

#### **Connection Provider**

The .net name of the used connection provider for this list.



### Timeout

The timeout value in seconds used for connections to the external database. Not all providers support a timeout. The default value is 30 seconds.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

### Interval

The interval in minutes for the background update if configured. The default value is 60 minutes; the minimum value should be 15 minutes (see the [Background Update](#) section for further details).

### Duration

The duration of the last update (manual or background) in seconds.

### Synchronization

A true/false value indicating if write back is configured (TRUE) or not (FALSE).

### Item Locked

A true/false value. During an update, BDLC sets the lock on the handled list to TRUE. Normally set back to FALSE after an update, whether it succeeds or not.

### List Structure Created

An obsolete setting present for downgrade compatibility.

### HideUpdateBtn

A true/false value indicating if the ribbon action button of BDLC must be shown in the list ribbon. Set to "True" by default.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

### Delay until Unlock [min]

A minute value for automatically releasing existing locks on the list after this amount of time has spent after the given "Next Run" value. Should be at least twice the given Interval. Note that while this option can be used as a workaround for locking issues, it is not generally recommended. It is better to fix possible configuration issues that cause the locking.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

### Email Address

Email addresses of the BDLC error reporting recipients.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

### Email Subject

The subject of the error reporting email.



This field is not accessible through the BDLC settings page. You may change this value if necessary.

#### Email Body / Message Text

Email text for error reporting. Valid and supported placeholders are described in the [Logging and Alerting](#) section.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

#### Max Number of Error Notifications

Maximum number of error reporting that BDLC will send for errors on one list. Default value is 10.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

#### Number of Error Notifications

Current value of the sent error reporting. This value is set to 0 after a successful update.

This field is not accessible through the BDLC settings page.

#### Log Level

Choice field for internal error logging. Default value is “Verbose”. If set to “High”, BDLC will write all log messages with the trace severity “High” into the SharePoint ULS.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

#### MappingTable

The XML configuration when using a custom mapping.

#### Disable Delete in SharePoint List

Yes/No, default is No. If activated, records that are deleted in the data source will not be deleted in the SharePoint list.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

#### Disable Insert in SharePoint List

Yes/No, default is No. If activated, records that are inserted in the data source will not be inserted in the SharePoint list.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

#### Disable Update in SharePoint List

Yes/No, default is No. If activated, records that are updated in the data source will not be updated in the SharePoint list.

This field is not accessible through the BDLC settings page. You may change this value if necessary.



### Use Own TimerJob

Yes/No, default is No. If activated, there will be an individual timer job created for this list only. The new job will be created within the next 15 minutes after activation through the main timer job.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

### TimerJob ID

Text field for internal use, holds the GUID of the individual timer job.

This field is not accessible through the BDLC settings page.

### Do Not Recycle Items

Yes/No, default is No. If activated, items in this list will not be moved to recycle bin but deleted.

NOTE: While not flooding the bin with items to delete, this method is significantly slower than the recycling.

This field is not accessible through the BDLC settings page. You may change this value if necessary.

## Logging and Alerting

BDLC will log most of upcoming errors and a limited amount of status logs into the SharePoint ULS (Unified Logging System).

### Error Logs

Error logs appear if something unexpected happens or an input causes a failure. The log message can be really important by investigating the fault. If you contact the Layer2 Support, please send all directly related error logs with your support request (SharePoint ULS and any other error messages reported by BDLC). This will enable the support team to evaluate your problem as fast as possible.

### Alerting

This kind of log will be sent to the email address which is entered into the Error Reporting field in your BDLC settings page within your list settings. This helps the admin to be informed if an error occurs during the synchronization process. This is crucial for scheduled synchronizations to detect and solve problems as fast as possible. Note that alerting works on a per-list basis. Aggregated alerting is not currently supported.



## Placeholders for Email Alerts

The following data placeholders can be used in the Email Subject and/or Email Body fields for email notifications:

- **{LISTLINK}** - The URL of the originating list
- **{LISTNAME}** - Display name of the originating list
- **{WEBURL}** - The absolute URL of the current web application (SPweb.Url)
- **{ERROR\_MESSAGE}** - The error message from the update

## Automatic Fields / Column Mapping

This feature makes the integration of a huge table from a data source easy and less time consuming. With a simple click, all columns from your data source, which are selected from the select statement, will be automatically added to your SharePoint list, as well as mapped.

### The “Add columns” function

This function checks which columns from the data source can be already automatically mapped. For further information, see the [Automatic Mapping](#) section. After the BDLC adds all not mapped columns from the data source to your SharePoint list and solves in this step also all name collisions caused by SharePoint and chooses the data types with the best compatibility. For this reason, the procedure of automatically adding all columns is highly recommended because it can decrease mapping errors.

If you want to have the columns with other display names in your SharePoint list this is also possible. You can simply change the display name of the columns to what you desire, and the BDLC, which uses the internal SharePoint name, will work the same.

Please note that the Add Columns Function only adds “Single Line of Text” columns for a data source column which represents a text, independent of the length. If you want to change the text field to a SharePoint “Multiple Lines of Text”, go into the column’s settings and change **Type of text to allow** to “Plain Text”. It’s not possible to use “Enhanced rich text” with the BDLC.

## How SharePoint Generates and Handles Column Names

In the following table we summarized some of the unexpected behaviors of SharePoint when a column is created. Every column which you create in SharePoint gets an own internal name, which stays the same even when you change the display name of the column. Often the initial name of the column is the same as the internal name, but in some cases SharePoint encodes characters.

Following is a short description for each case:



SharePoint Display Name	SharePoint Internal Name	Description
MyColumn	MyColumn	In this case the Display is exactly the same as the internal name.
My Column	My_x0020_Column	In this case SharePoint encodes the space character.
ThisColumnNameIsLongerThan32Characters	ThisColumnNameIsLongerThan32Char	SharePoint internal names can only be 32 characters long.
TwoColumnsWithTheSameFirst32CharactersNumberOne	TwoColumnsWithTheSameFirst32Char	In this example the first 32 character are not enough to distinct identify the columns, so
TwoColumnsWithTheSameFirst32CharactersNumberTwo	TwoColumnsWithTheSameFirst32Char0	SharePoint adds an index at the end of the name.
UmlautsÄäÜüÖö	Umlauts_x00c4__x00e4__x00dc__x00	Similarly to the space character also umlaut characters will be encoded.
1ABC	_x0031_ABC	If your name starts with a number, this will also be encoded.
ABC123	_x0041_BC123	If your name starts with one to three letters followed by a number, the first letter will be encoded.

This behavior of SharePoint can prevent the BDLC automatic mapping from working properly. For example, inside your data source exists a column longer than 32 characters (i.e. “mobile phone number from external”) by automatically adding this column to your SharePoint list, SharePoint crops the last character. For this reason, the BDLC can’t map these columns automatically because there is no match of the data source column name, so you must map these manually. The BDLC solves the other cases automatically with its understanding of the encoding SharePoint uses.

### Custom Mapping

If the BDLC is not able to automatically map the columns of data source and SharePoint, you must do it manually. For this reason, the BDLC shows in the mapping dialog a possibility to map the external columns on SharePoint columns but only in this direction. A SharePoint column can only be mapped by one data source column to avoid synchronization problems. The BDLC only allows you to choose the columns which are compatible with your external data source column.

You can also remove automatically created columns and replace them with manually created ones, often with other column type (for example, number instead of string).

For compatibility look in the table below:



Data Source Type	SharePoint Compatible Type
<b>Boolean</b>	Text, Boolean, Note, Recurrence, AllDayEvent
<b>Int, Int16, Int32, Int64</b>	Text, Note, Number, Currency, User, Lookup, Recurrence, AllDayEvent
<b>UInt, UInt16, UInt32, UInt64, Long, Double, Single, Decimal</b>	Text, Note, Number, Currency, User, Lookup,
<b>DateTime</b>	Text, Note, DateTime
<b>String</b>	Text, Note, Boolean, URL, Currency, Lookup, Choice, DateTime, Number, User, MultiChoice, Invalid, Calculated, Recurrence, AllDayEvent
<b>Any other types</b>	Text, Note



## Customized Updates

If you want to trigger updates on specific lists from other locations than the lists pages, you can now add links to your SharePoint sites addressing these updates.

Link schema:

- `/sites/yoursite/_layouts/Layer2/bdlcupdate.aspx?list=yourListId&webid=yourWebId&source=yourSourceAddressToRedirect`
- `/_layouts/Layer2/bdlcupdate.aspx?list=yourListId&webid=yourWebId&source=yourSourceAddressToRedirect`

The yellow highlighted parts be replaced by values matching your environment.

- `yourListId`: The list ID of the BDLC connected list (GUID)
- `yourWebId`: The web ID of the SharePoint site hosting this list (GUID)

The links will work anywhere inside your site collection. If you are unsure of where to find the correct id values, please refer to the BDLC Configuration List in the root of your SharePoint site collection.

## Initial Write-back

Usually, the BDLC is used to fill and synchronize external data into SharePoint, but there are scenarios where you want to synchronize an already existing list into an external data store. This is now possible, but only through the API or a special link targeting the BDLC update page to prevent inadvertent usage.

Please note the following requirements and hints for this feature:

- Use of a BDLC primary key is **mandatory**.

If there is no useful primary key in the list you can use the `bdlcGuid` as primary key. Just add it on both sides as new column and set it as BDLC primary key.

- BDLC needs a fully configured table as external source. It will only fill records that match (a) the given primary key and (b) the mapped columns. BDLC cannot create an appropriate table in the data source.
- Best practice is to use a new and empty table as data source.
- If data is present in the data source, BDLC will overwrite matching records with the SharePoint record. Non-matching external records will not be processed.
- This feature is meant as a tool to update or migrate SharePoint data once to an external table. It should not be used regularly on the same list; after the initial update, you should be able to use the normal write-back feature.
- The table in your connected data source cannot have automated keys like auto increment or IDENTITY, if that column is mapped to a SharePoint column.



Link schema:

- /sites/yoursite/\_layouts/Layer2/bdlcupdate.aspx?action=initialwriteback&list=yourListId&webid=yourWebId&source=yourSourceAddressToRedirect
- /\_layouts/Layer2/bdlcupdate.aspx?action=initialwriteback&list=yourListId&webid=yourWebId&source=yourSourceAddressToRedirect

For details about using this link, see the [Customized Updates](#) section.

## Upgrading and Migration

### Upgrading BDLC Version

Instructions for how to update BDLC can be found here on our website under “Upgrading the Business Data List Connector” section:

<https://layer2solutions.com/support/general-faqs>

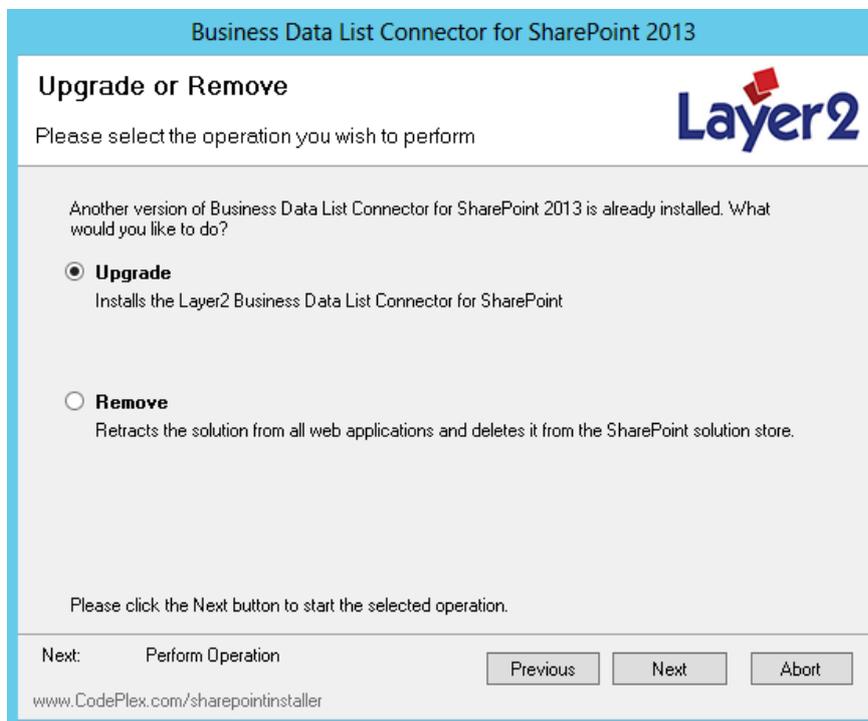


Figure 17- Upgrading BDLC

NOTE: If you experience that the BDLC background update is not running anymore after an update, please go to *Central Administration* -> *Manage Farm Features* and re-activate the Feature “Layer2 Business Data List Connector for SharePoint - Timer Job”.



## Migrating BDLC to a New SharePoint Version

When migrating your SharePoint version from 2010 -> 2013, 2013 -> 2016 or 2016 -> 2019, it is possible to take your BDLC environment and all connections with you.

The easiest way to do so is to re-attach the database. Here are some points to consider when doing so:

- Make sure the BDLC is installed in the appropriate version in your new environment.
- BDLC is not meant to run in 2010 compatibility mode AND in the standard 2013 mode on the same farm. While the BDLC timer job will work properly in both modes, the UI in either 2010 or 2013 is not usable.
- BDLC configuration items identify their connected lists through the ID of the list and the ID of its website. Migrating by re-attaching the database will not alter these IDs so your configurations are still valid, and you can use BDLC immediately after upgrading.

When using migration tools, the possible change of the list and web IDs should be looked over carefully. If, after a migration your BDLC connected lists seems to have no connection settings anymore, it is most likely that the IDs have changed and no longer refer to the values in the configuration list.

BDLC itself does not provide functionality to detect changed IDs. You will have to correct all these IDs manually before the BDLC will be able to run as expected within your new environment.

Please note that you will need a new license for the new server(s). Contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com) for assistance in getting the updated licenses with the new server names.

## Running BDLC in SharePoint 2010 Compatibility Mode

It is generally possible to let BDLC work in a 2010 Compatibility environment.

Due to technical conditions it is not recommended to use both versions of BDLC side by side. Either you install BDLC 2010 to run in compatibility mode, or you install BDLC 2013 to use as supposed in a SharePoint 2013 environment.

To install the BDLC 2010 in SharePoint 2013, the given installer is not suitable, so you must install BDLC 2010 with PowerShell.

Please run the following steps in the given order:

- a. You must add the BDLC 2010 version manually via PowerShell. Make sure that you only add one version of BDLC on one SharePoint farm.

```
(PowerShell Sample: Add-SPSolution -LiteralPath 'C:\BDLC for  
SharePoint  
2010\Layer2.sharepointbusinessdatalistconnector2010.wsp')
```



- b. Install then using the parameter '-CompatibilityLevel 14'  
(Install-SPSolution -Identity  
layer2.sharepointbusinessdatalistconnector2010.wsp -  
GACDeployment -CompatibilityLevel 14)
- c. Now attach and mount your 2010 database. The BDLC features should be in the same state as before.
- d. Make sure to apply an updated license file to the new server to avoid falling back to shareware mode.

When switching to 2013 on this, just retract the 2010 solution of BDLC and install the BDLC 2013.

## Uninstallation/Deactivation

To completely uninstall the solution, first deactivate the feature "Layer2 Business Data List Connector" on the site collection level. Then the **BDLC Configuration List** can be removed by deleting the list in the root site of every site collection where the feature has been activated.

Note that you can't delete the **BDLC Configuration List** of a given Site Collection until the BDLC feature is deactivated for the Site Collection.

Finally, start the installation wizard and choose "Remove". All installed files for BDLC will be removed. However, list items of the previously connected lists are kept in the BDLC Configuration List, unless you then delete that list after deactivation

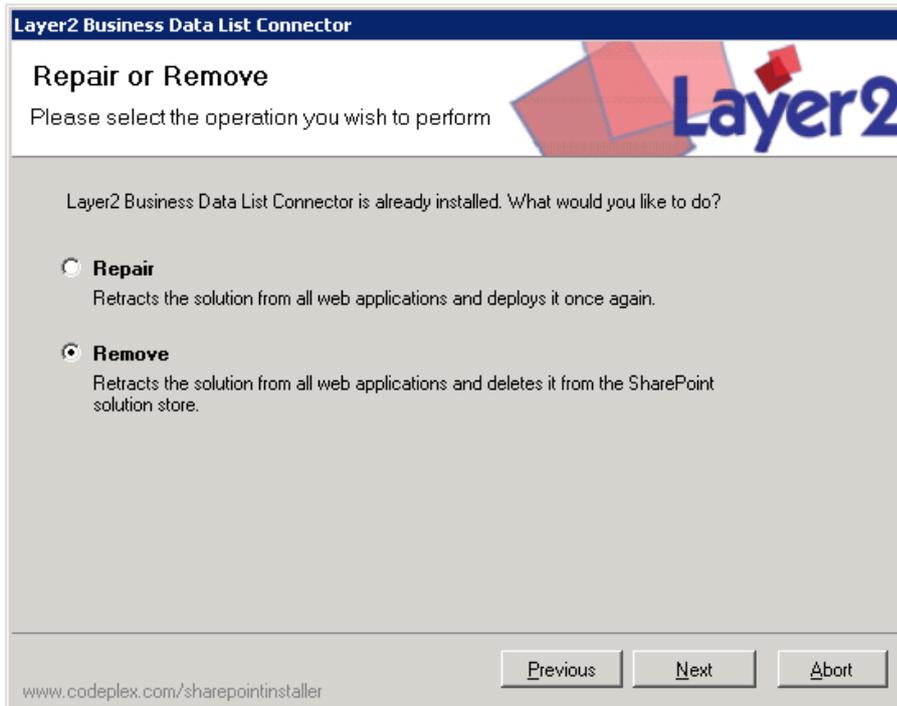


Figure 18 - Dialog to remove the Business Data List Connector feature



## Layer2 Data Providers

### Included Providers

The following 64-bit data providers come pre-installed with BDLC:

#### **Layer2 Data Provider for SharePoint (CSOM)**

Used to connect other SharePoint lists in other site collections, other installations, or even SharePoint Online.

#### **Layer2 Data Provider for File System**

Used to connect to a given file directory to retrieve file metadata (moving files themselves is not supported).

#### **Layer2 Data Provider for XML**

Used to retrieve XML data from a file or URL.

#### **Layer2 Data Provider for RSS**

Used to retrieve content from RSS feeds.

#### **Layer2 Data Provider for Exchange**

Used to connect to Microsoft Exchange Server or Online data, like contacts.

#### **Layer2 Data Provider for OData**

Used to connect to any OData source like Microsoft Dynamics CRM/ERP, SAP, and others.

#### **Layer2 Data Provider for SOAP Web Services (beta)**

Used to retrieve data from most SOAP web services.

For more information about the specifics of each provider, please see the **Layer2 Data Provider User Documentation** which is included in the Layer2 Business Data List Connector installation package.

### Vendor-Specific Data Providers

The BDLC works together with almost any vendor-specific data provider, such as SQL Server, Oracle, MySQL, IBM DB2, and others. Vendor-specific data providers are generally free and often are part of the vendor's software installation package.

In some cases, you may need to download the provider separately from the vendor's web site. Note that you will need to install the 64-bit version of the provider for it to work with BDLC.

If you have the BDLC connection settings page open while installing a new provider, you will have to reopen it before you can see the new provider in the list.



### 3rd-Party Data Providers

Most 3rd-party data providers (ADO .NET, OleBD, and ODBC) are supported by BDLC. One can usually find downloads for these on the 3rd-party's website. They will come as an executable setup file which can be run, and the provider will appear in the list of options under the **Connection Provider** dropdown. Note that you will need to install the 64-bit version of the provider for it to work with BDLC.

If you have the BDLC connection settings page open while installing a new provider, you will have to reopen it before you can see the new provider in the list.

Note that 3rd-party data providers may require additional licensing.

### Authentication Methods

#### General Information

While classic authentication in Microsoft SharePoint Server 2010 (domain-based NTLM) is no challenge for the Layer2 Business Data List Connector (BDLC), the change to claims-based authentication in SharePoint 2013 and 2010 requires a completely different handling of authentications by BDLC.

For more information, known issues, and workarounds regarding this, please see the [Authentication via BDLC page](#) on the Layer2 web site.



## Support

### Online FAQs

You can find answers to frequently asked questions online:

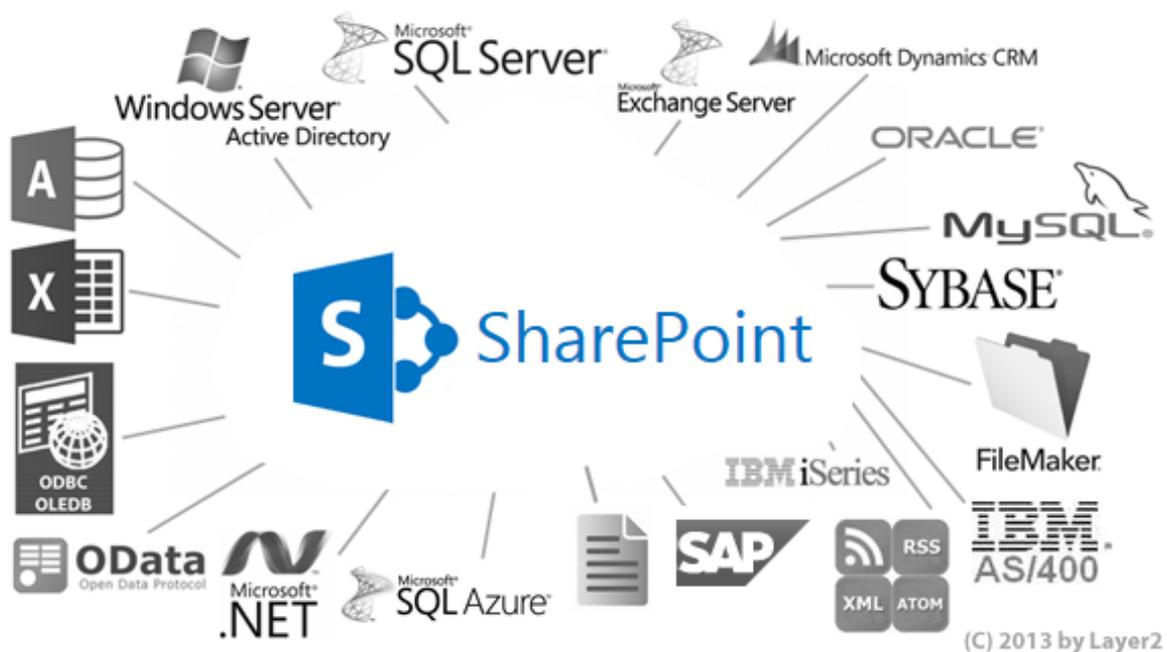
<https://layer2solutions.com/support/general-faqs>

<https://www.layer2solutions.com/support/business-data-list-connector-faqs>

### Common Scenarios

You will find common scenarios and supported systems/applications online here:

<https://layer2solutions.com/solutions/sharepoint-on-prem-data-integration>



## Trial and Evaluation

Please visit the [product home page](#) to register for trial. You will then receive instructions on how to download and install a Shareware Edition. Please notice that the trial is limited to synchronization of a maximum of 25 list items.

If you are interested in evaluating the application with full features, please contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com) to receive a time-limited license key.

### Microsoft Partner

- Gold Application Development
- Gold Collaboration and Content
- Gold Small Business
- Cloud Accelerate
- Silver Volume Licensing
- Silver Midmarket Solution Provider



## Ordering

Please visit the [product home page](#) to order online. For specialty orders (such as volume packages) please contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com) for a detailed quote.

## Software Assurance

License holders who optionally acquire Software Assurance (SA) benefit from future improvements and new features of the licensed product. Software Assurance enables you to migrate your software from a lower-level software version to a higher-level version or from one server to another. It also makes available maintenance, updates and upgrades, and minor and major releases.

The Software Assurance is valid per one license (server) for one year from the date of product license purchase. It can be renewed after expiring. Additional services, which may be required for updating or upgrading, are not included.

## Upgrade

When a new version of Layer2 Business Data List Connector is released, we announce the changes in the change log on the [version history page](#). You can subscribe via RSS to stay up-to-date. Please take a look at the release notes online before installation. Contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com) to request a license upgrade, if required.

See the [Upgrading BDLC Version](#) section above for additional details and instructions.

## Contact

In case of general questions about the Layer2 Business Data List Connector, contact [sales@layer2solutions.com](mailto:sales@layer2solutions.com).

If you have detailed issues or errors with a connection, please contact [support@layer2solutions.com](mailto:support@layer2solutions.com).