White Paper

BCS Connector for SharePoint 2010

October 2012

Theobald Software GmbH
Olgastraße 15
D – 70182 Stuttgart
Phone: +49 711 46 05 99 0
Fax: +49 711 46 05 99 20
Mail: info@theobald-software.com
Web: www.theobald-software.com

Microsoft Partner
Gold Independent Software Vendor (ISV)
Silver Business Intelligence

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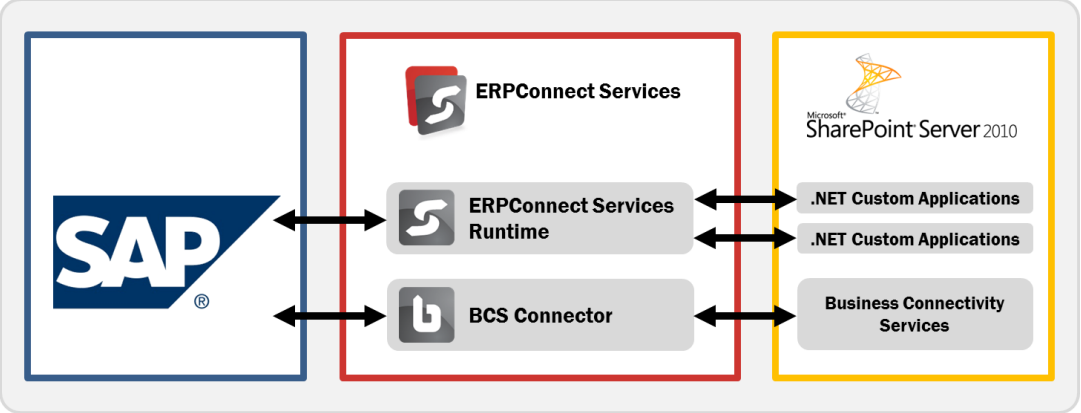
1 Introduction and Installation

1.1 BCS Connector

The BCS Connector was developed as part of the ERPConnect Services Suite for SharePoint Server 2010 and enables the integration of SAP data into SharePoint without the need to write any code. SAP data is provided as external content types via the Business Connectivity Services in SharePoint Server 2010 and can subsequently be displayed in SharePoint in external lists, for example. The BCS Connector does not require any programming skills and is therefore the ideal choice for a SharePoint power user or solution architect.



1.2 Business Connectivity Services

Microsoft SharePoint Server 2010 includes Microsoft **Business Connectivity Services** (BCS), which are a set of services and features that provide a way to connect SharePoint solutions to sources of external data and to define external content types that are based on that external data.

Microsoft Business Connectivity Services (BCS) enables a SharePoint 2010 or Office 2010 application to read and write data in external systems, such as SAP.

A core concept of Microsoft Business Connectivity Services (BCS) is the **external content type**. Used throughout the functionality and services offered by Business Connectivity Services, external content types are reusable metadata descriptions of connectivity information as well as data and behavior definitions for external data. External content types enable you to manage and reuse the metadata and behaviors of a business entity

(for example customer, sales order, employee or leave request) from a central location, and enable users to interact with that external data and processes in a more meaningful way. For example, for a business entity such as customer, you define an external content type once and then reuse it anywhere you want the user to interact with customer data, including SharePoint lists, offline in Microsoft Outlook or in Microsoft Word.

External content types offer the following benefits:

- Enable reusability
- Encapsulate the complexity of external systems, such as SAP
- Provide built-in Office and SharePoint behavior
- Provide secure access
- Simplify Maintenance
- Enable external data search
- Enable working offline

Where can you show external data?

After you create an external content type, you can use the presentation features in SharePoint 2010 and Office 2010 to let the user interact with external data, without writing any code.

- **External Lists**: An external list enables accessing data from external systems in the same way as standard SharePoint lists. External lists can be taken offline with Outlook 2010 or SharePoint Workspace 2010 and additional online and offline scenarios are supported in Office client applications. External lists enable writing data back to the external system (SAP) if the external system allows it, and if it is modeled accordingly in the external content type. This means that the user can edit external data directly from within SharePoint 2010. Any changes that were made to the items in the list are synchronized automatically with the external system. Data in an external list is stored only in the external system. External data is brought into the SharePoint list at run time when you navigate to the list.
- **External Data Columns:** An external data column enables users to add data from external content types to standard SharePoint lists. Just like an external list, the external data column can display data from any external content type that is modeled in the BDC.
- **Business Data Web Parts:** With the BCS, several Web Parts are provided offering the following benefits:
  - No coding required and reusability
  - Connectability (for example for Master-Detail applications)
  - Customization
- **External Content Type Picker**
- **External Item Picker**
- **Profile Pages**
- **Presentation Features in Office 2010**

The Secure Store Services in SharePoint work together with the BCS to provide user and group authentication for access to the external system (SAP). Logon credentials for the external system can be stored securely for individual users or groups of users in SharePoint.

For further information about Microsoft Business Connectivity Services (BCS) can be found at http://msdn.microsoft.com/en-en/library/ee556826.aspx

1.3 System Requirements

The BCS Connector was developed in C# and requires the following runtime components:

- SharePoint Server 2010
- .NET-Framework 4.0 (for the Designer)
- Librfc32.dll

The runtime component Librfc32.dll is delivered as part of SAP GUI or can be downloaded separately at http://service.sap.com.

Der BCS Connector is seamlessly integrated into SharePoint 2010.

The minimum release level for your SAP ERP system is 4.0B, or 3.0 for your SAP BW system. Both Unicode and Non-Unicode versions of SAP systems are supported.

All components support 64-bit processing.

1.4 Installation

You can download the BCS Connector from the www.theobald-software.com site and install the software with the provided installation program. The BCS Connector files will be installed in the folder **C:\Program Files\ERPConnect Services**.

The **BCS Connector Designer** application is available from the **Start** menu under **All Programs → ERPConnect Services**.

2 BCS Connector

You use the BCS Connector Designer to create a BCS model based on your SAP data and to deploy the model directly to your SharePoint server.

Launch the BCS Connector Designer from the **Start** menu under **All Programs** → **ERPConnect Services** → **BCS Connector Designer.**

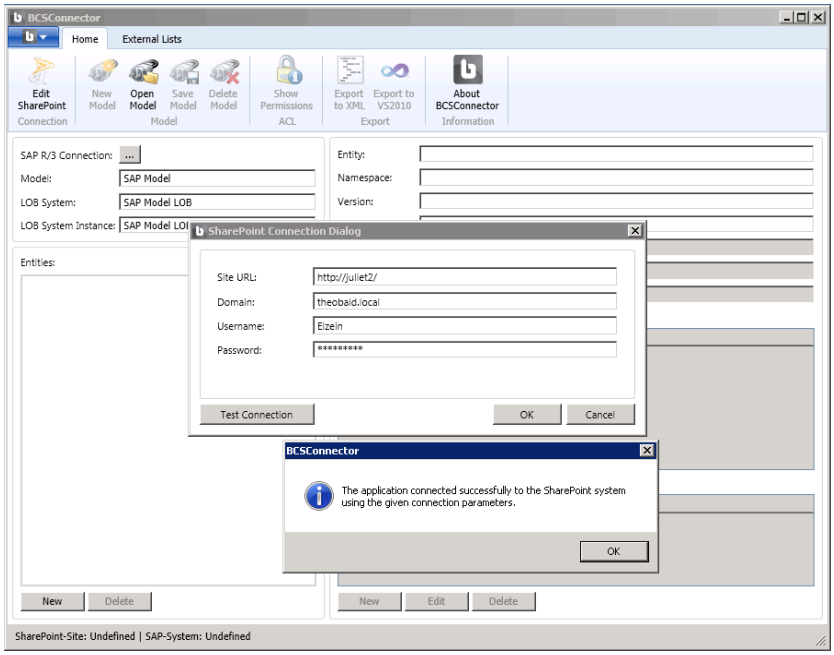
2.1 SharePoint Connection

To establish a connection to your SharePoint system, select **Edit SharePoint** from the BCS Connector ribbon. Specify the following data:

Site URL	URL of SharePoint site where you show SAP data
Domain	Domain for the user that you want to connect as (if within domain)
Username	User account name that you want to connect as
Password	Password for the user account.

If you leave the Domain, Username and Password fields empty, the credentials of the current user will be used to connect to the SharePoint server.

Select the **Test Connection** button to verify the connection, and then select **OK**.



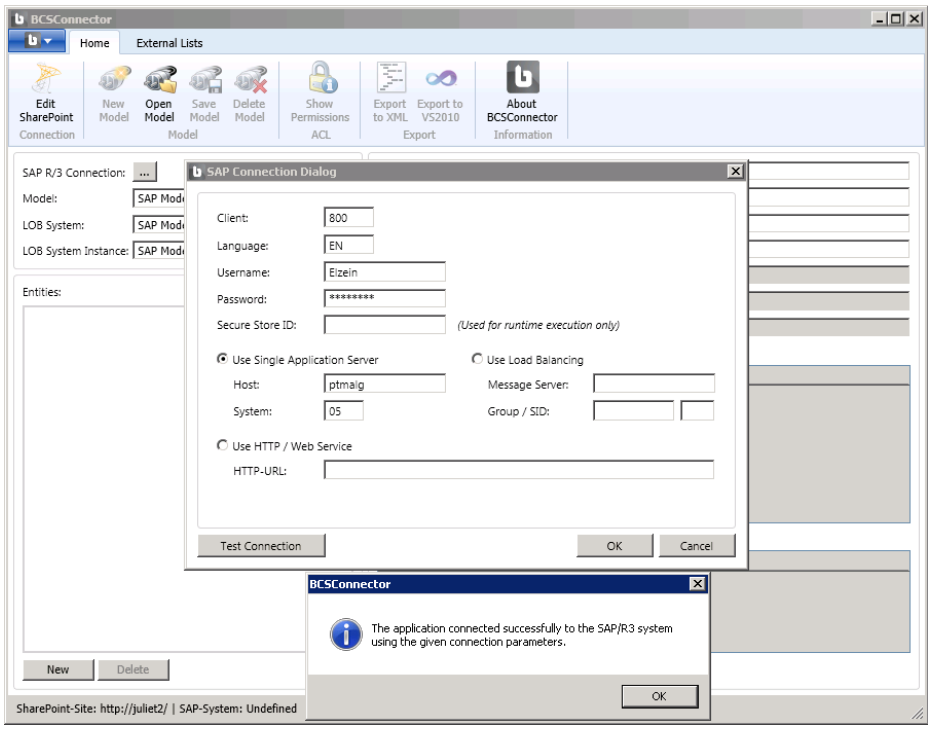
2.2 SAP Connection

As a second step, you will define the connection to your SAP system. Select the button next to **SAP Connection** and specify the following values:

Client	The SAP Client number (000...9999)
Language	The logon language for the SAP system (e.g. EN or DE)
Username	The SAP user account name
Password	The password for the SAP user
Secure Store ID	Optional parameter; used for lookup of SAP credentials in a SharePoint Secure Store application at runtime
Host	The host name or IP address of the SAP system
System	SAP system ID (00...99)
Message Server	The name of the SAP message server
Group / SID	The Group and System ID for the SAP Server selection

Select option **Use Single Application Server** if you want to directly connect to a specific SAP server. Select option **Use Load Balancing** if you have load balancing configured in your SAP landscape and want SAP to determine the appropriate server for your connection.

Select **Test Connection** to verify the connection settings, and then select **OK**.



If you want to utilize SharePoint Secure Store Services to lookup the SAP credentials for the SharePoint user at runtime, specify the ID of the Secure Store Target Application which stores the credential mappings.

2.3 BCS Model

In the next steps, you will create a BCS model. A BCS model can contain one or more entities. With the BCS Connector, you can easily define an entity based on either

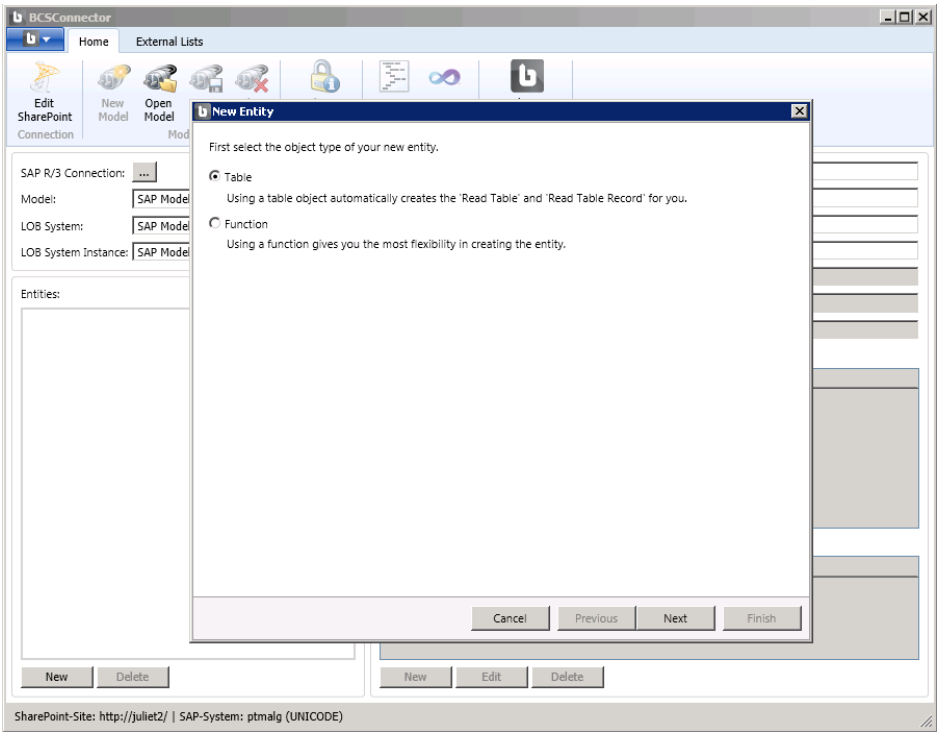
- A table or view in SAP
- A remote function module or BAPI in SAP

Each entity in the model represents an external content type in SharePoint 2010.

2.3.1 SAP Table

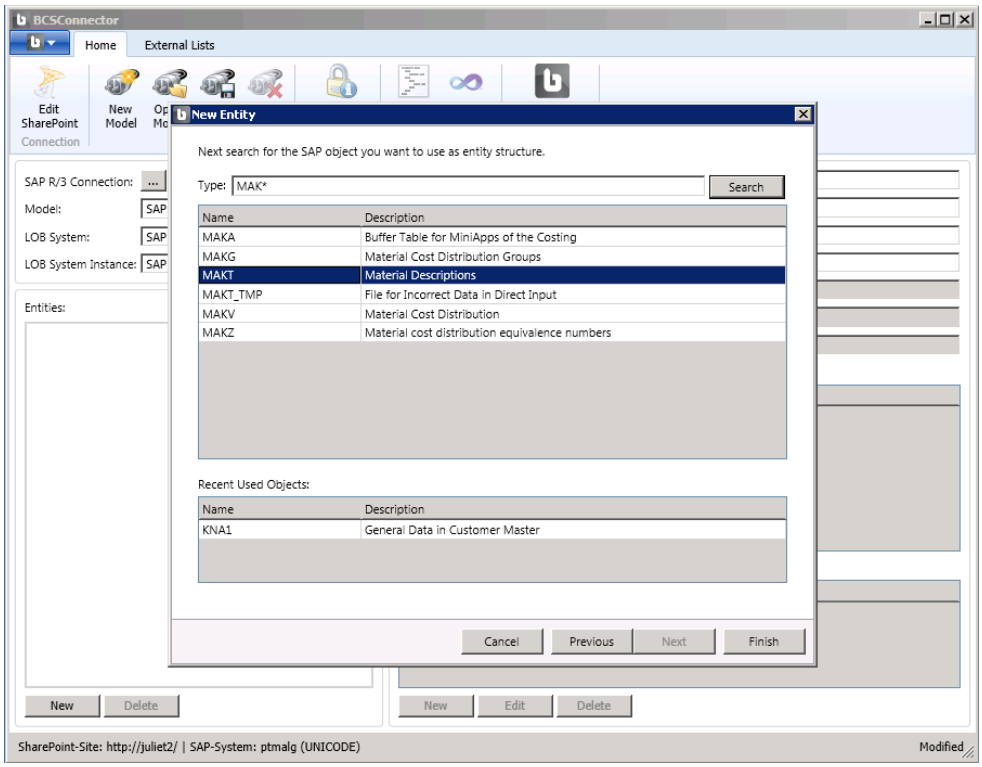
In this first example, you will define a new entity based on a table in SAP. After you save of the model to SharePoint, the SAP table entity will become available as an external content type in SharePoint. You will then create an external list based on the external content type.

In the BCS Connector Designer, select the **New** button below the **Entities** list.



In the **New Entity** dialog, select **Table** as object type for your entity, then select **Next**.

In the **Type** field, enter the name of the SAP table that contains the data that ou want to bring into SharePoint. You can use the wildcard (*) placeholder in your search.



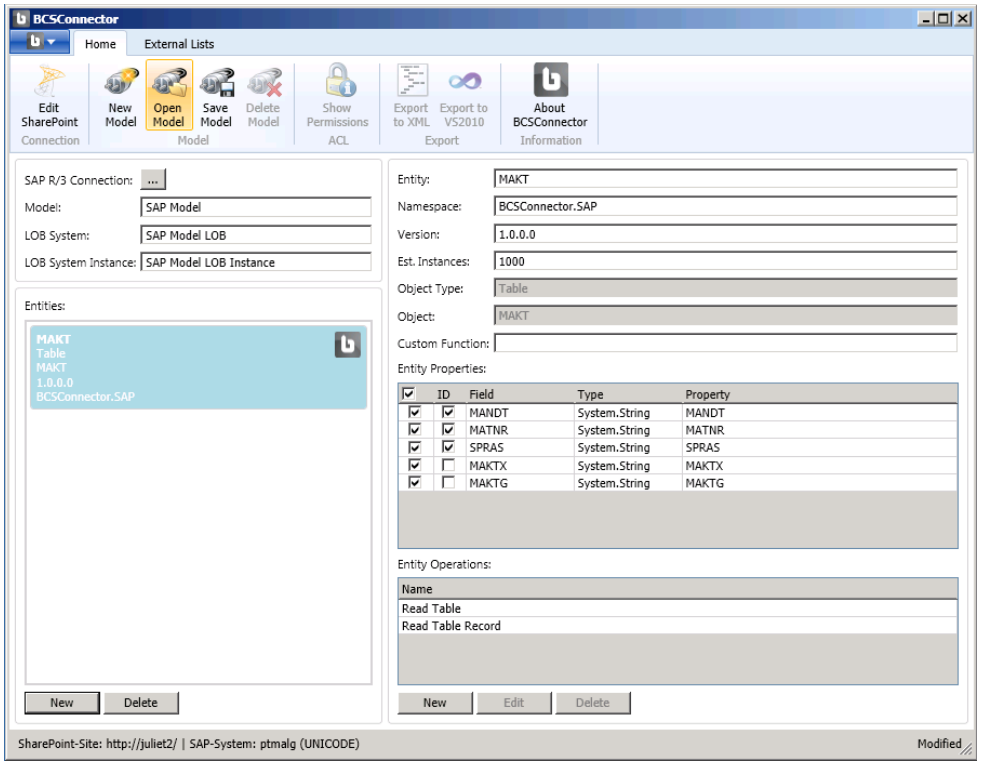
Select the table from the list, then select the **Finish** button.

The definition of the entity will be shown in the BCS Connector Designer. Optionally, you can modify the properties of the entity:

Entity	Name of the entity
Namespace	Namespace of the entity
Version	Version of the entity
Est. Instances	Estimated number of instances; This value helps the BCS to estimate how many records of an entity will be displayed and can impact its rendering behavior
Custom Function	Name of an SAP function module, in case the table is supposed to be accessed via that function module

In the **Entity Properties** section you will see a list of fields with the following columns:

(Selector)	When selected, the property will be included in the entity definition
ID	When selected, the field (or fields) will be used as the unique identifier for the entity
Field	Name of the SAP field
Type	.NET data type
Property	Name of the property in the BCS model, will show as column name on external lists.



In the **Entity Operations** section you will see a list of operations that are defined for your entity. By default, the following operations will be defined:

Read Table: Maps to the standard stereotyped **Finder** method in the BCS and returns all data records of the table in SAP. By default, the number of returned records is limited by a filter to 1,000.

Read Table Record: Maps to the standard stereotyped **Specific Finder** method in the BCS and returns an individual record of the table in SAP.

You can select an entity operation, and then select the **Edit** button to modify the definition. For example you can change the operation name or specify additional filters for the **Read Table** operation.

You can define additional operations, based on the stereotyped methods in the BCS:

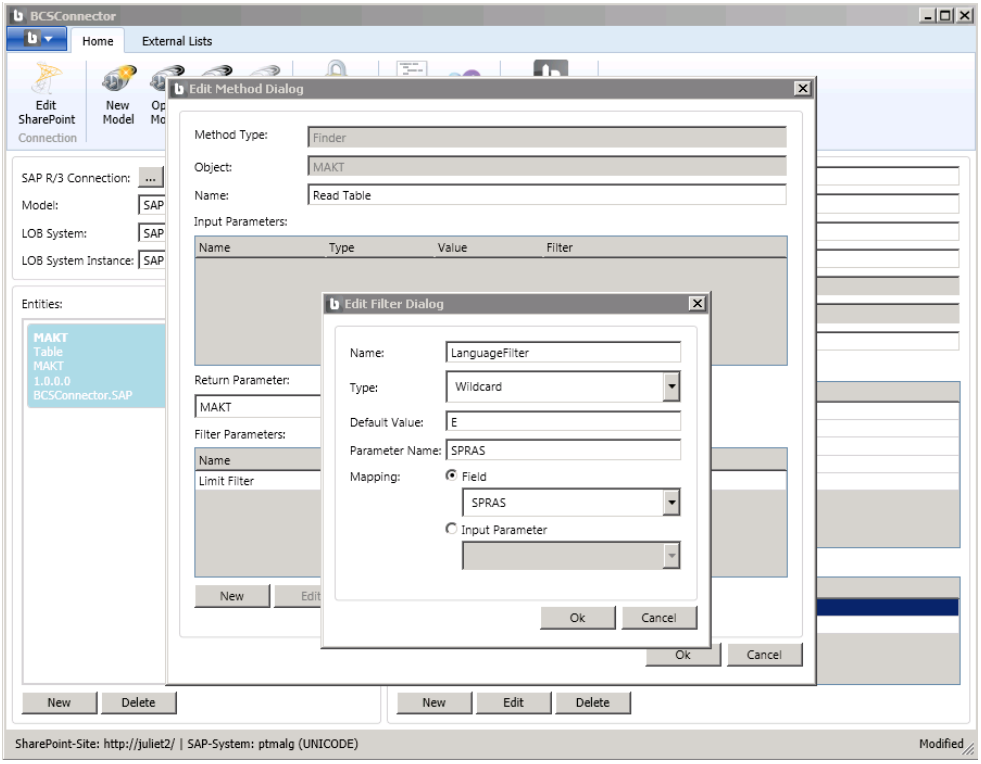
Creator	Enables the creation of a new entity record
Updater	Enables the update of an existing entity record
Deleter	Enables the deletion of an existing entity record

The default operations **Read Table** and **Read Table Record** allow you to display a list of records as well as an individual record. Additional behaviors such as create, update or delete will only be available when the respective operations are defined in the model.

In the next steps, you will add a language filter to the **Read Table** operation. Note that this is an optional step. Select the **Read Table** operation and then select the **Edit** button.

In the **Edit Method** dialog, select the **New** button and specify the filter values below.

Name	LanguageFilter
Typ	Wildcard
Default Value	E
Parameter Name	SPRAS



Select **OK** twice to return to the BCS model.

External Content Type

After you save your entity model to the SharePoint server, an external content type will be created for the entity. Use the **Save Model** button from the ribbon to save the model to SharePoint.

You can view the new external content type using SharePoint 2010 Central Administration or using SharePoint Designer.

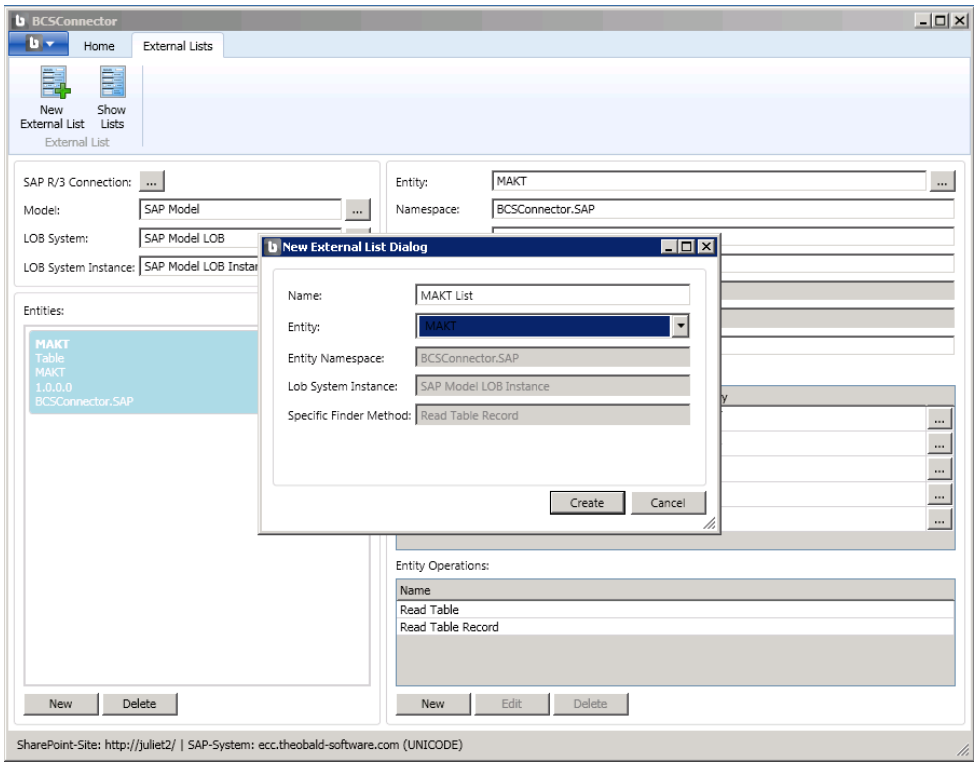
Setting BCS Permissions

In order for a SharePoint user to access external data, you need to set the appropriate permissions on the external content type in the BCS metadata store.

- Launch **SharePoint 2010 Central Administration**
- Select **Manage Service Applications** → **Business Data Connectivity Service** → **Manage**
- Select the external content type
- Select the **Set Object Permissions** button on the ribbon
- Specify a user acount or group, then select the **Add** buton
- Select the desired permission level (at a minimum select **Execute**)
- Check the **Propagate permissions to all methods…** box
- Select **OK**

Creating an External List

You can create an external list for your entity directly from within the BCS Connector Designer. To create an external list in SharePoint, switch to the **External Lists** tab and select **New External List**. In the **New External List Dialog**, specify a name and the entity for the new list.

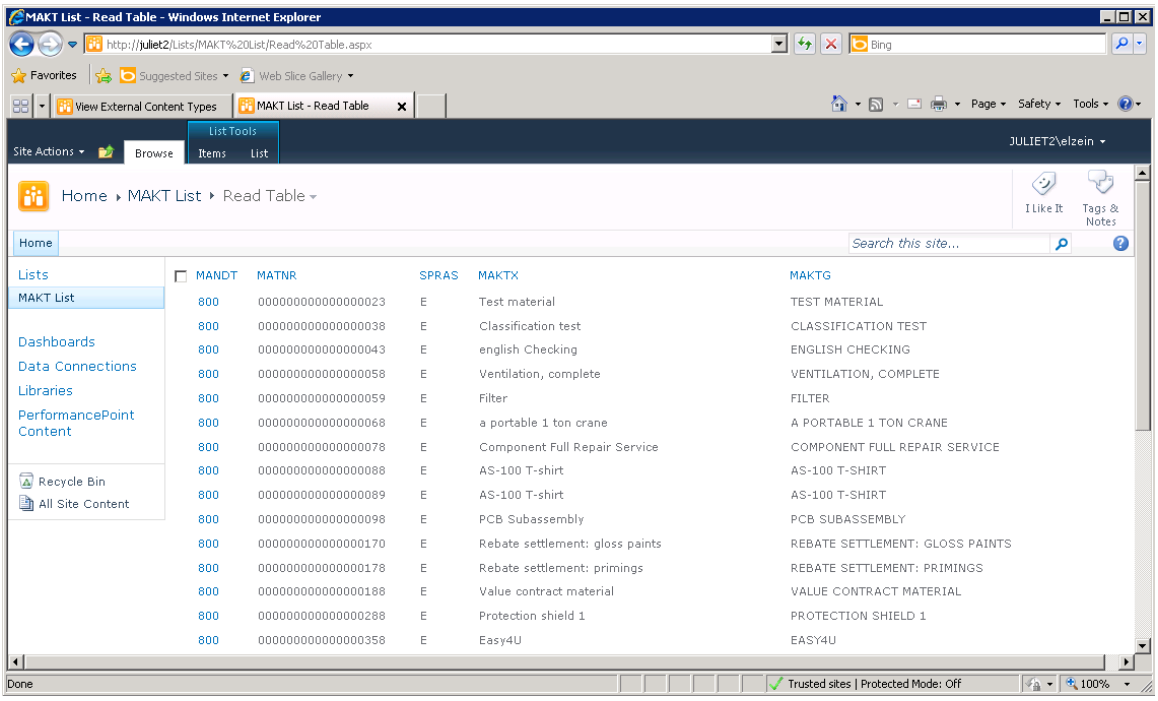


Select the **Create** button. Note that you need to have sufficient privileges on the SharePoint site to create the list.

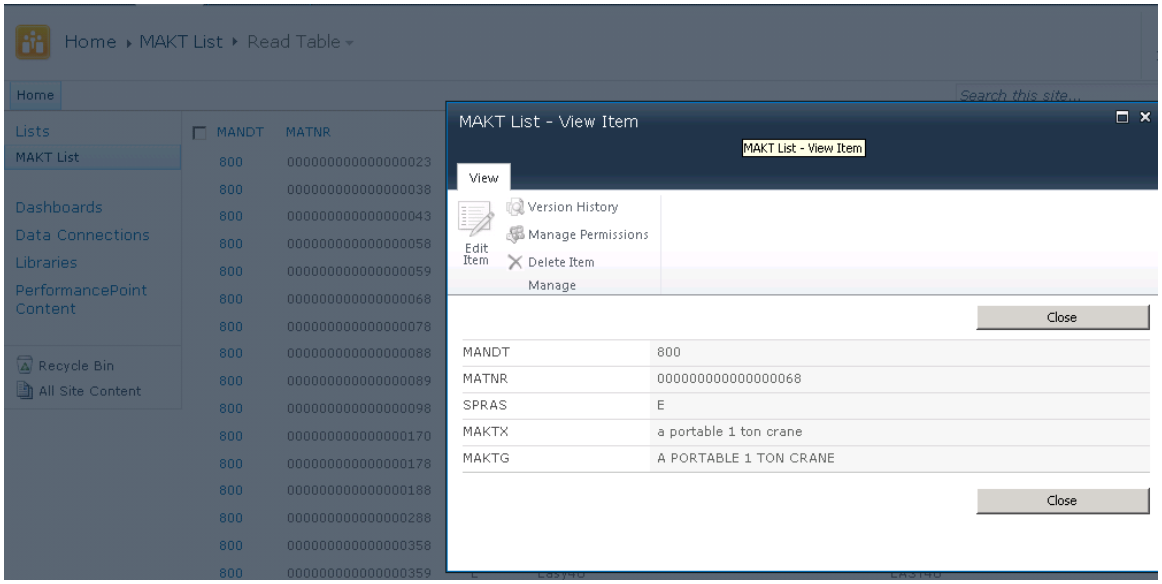
Alternatively, you can create an external list using the built-in functionality offered in the browser or using SharePoint Designer.

External List in SharePoint 2010

Using the browser, you can navigate to the new list in SharePoint



Select an individual record in the list to display its details.



2.3.2 Function Modules

In this second example, you will define a new entity based on a function module in SAP. As in the previous example, you will save of the model to SharePoint which will create the external content type for your entity. You will then create an external list based on the external content type.

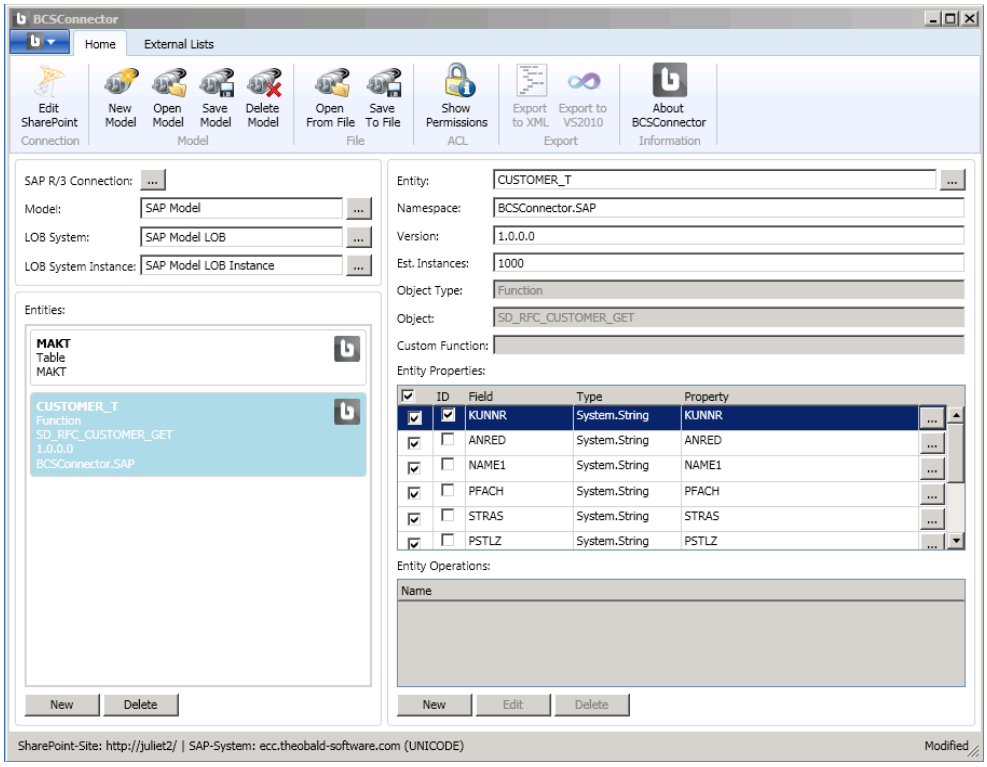
In the BCS Connector Designer, select the **New** button below the **Entities** list.

In the **New Entity** dialog, select **Function** as object type for your entity, then select **Next**.

In the **Type** field, enter the name of a remote function module (or BAPI) in SAP that represents your entity. You can use the wildcard (*) placeholder in your search. For this example we will use the standard SAP funtion module SD_RFC_CUSTOMER_GET.

Select a function module from SAP, then select **Next**. In the following dialog, you will see a list of parameters that can be used to define the entity. In this example we will select the parameter **CUSTOMER_T** to represent the customer entity. Select **Finish** to see the entity definition.

In the **Entity Properties** section of the screen, you can optionally change the field names or select what fields you want to include in the entity definition or what field(s) will identify the entity. In this example, select the field **KUNNR** (customer number) as the ID field for the entity.



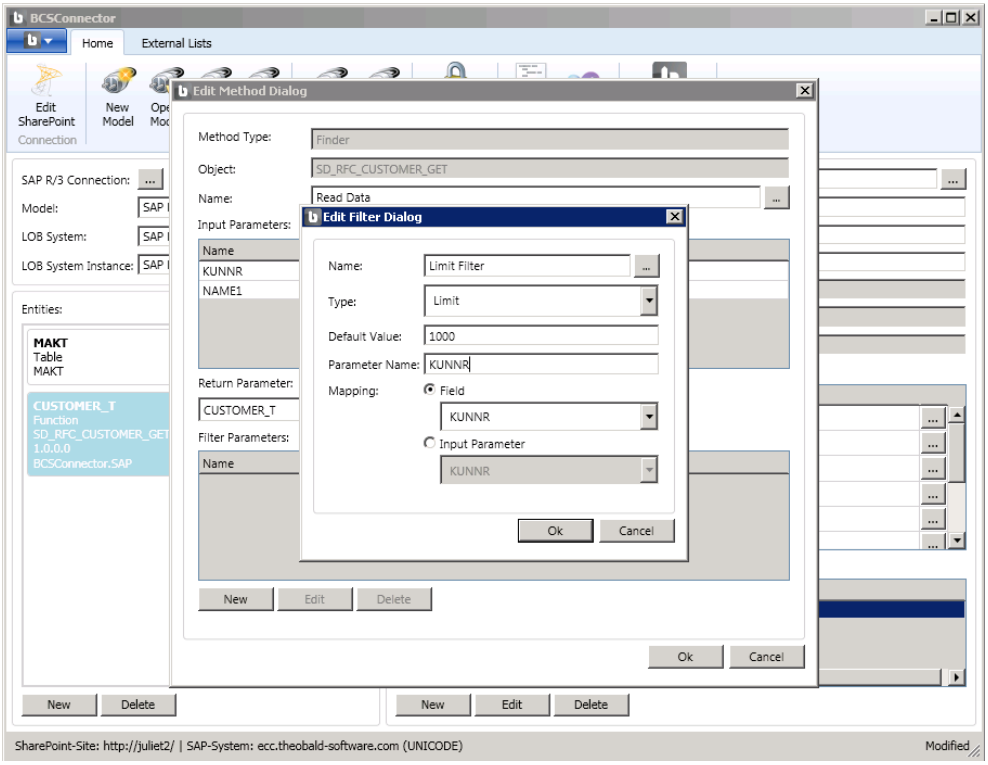
In the **Entity Operations** section of the screen, no operations will be defined yet.

To define a **Finder** operation, select the **New** button. Select the **Finder** method type, then **Finish**.

As **Input Parameters** you will see the fields **KUNNR** (customer number) und **NAME1** (customer name). The parameter **NAME1** supports wildcards, for example you can enter –, ´T*´ in the **Value** field to filter the list for customers where the name starts with the letter ´T´.

As **Return-Parameter** you can select the structure **CUSTOMER_T** which represents the entity.

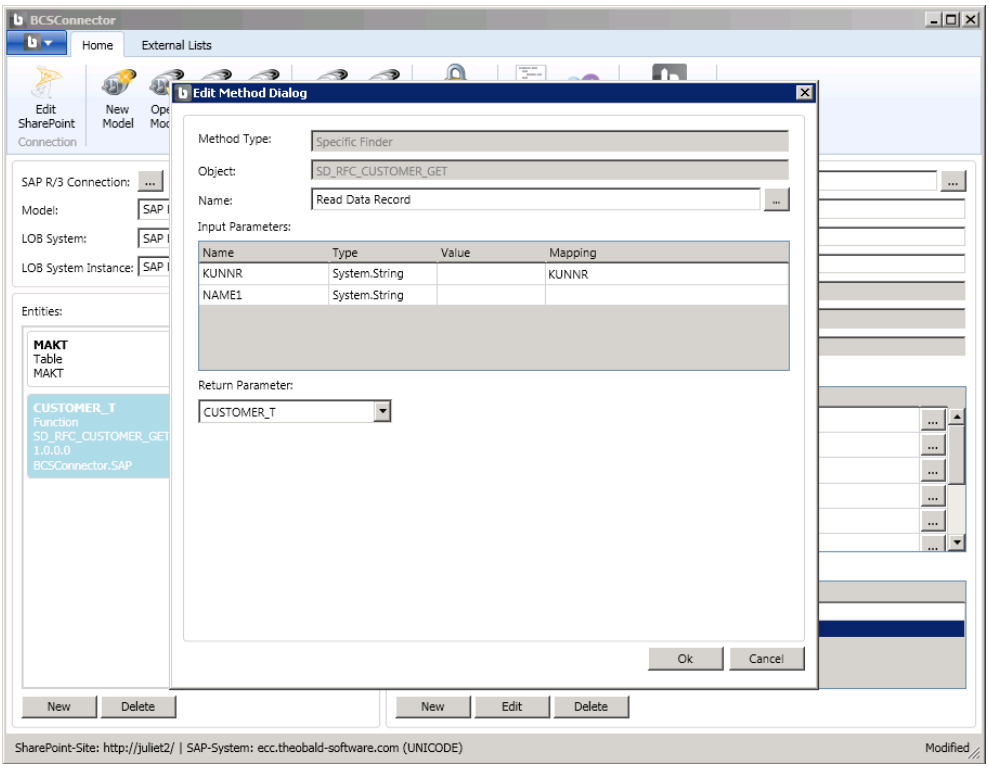
In addition, you will define a **Limit Filter** which will limit the number of records returned to 1000. Select the **OK** button twice to return to the main screen.



In the next step zou will define the **SpecificFinder** operation**.** Select the **New** button, then **Specific Finder** as the method type, the select **Finish**.

As **Input Parameters** you will see the fields **KUNNR** (customer number) and **NAME1** (customer name). The function module accepts the field **KUNNR** as the unique identifier for a customer record. This is specified in the dialog with the **Mapping** field which has the identifier of the entity (also **KUNNR**) selected.

As **Return Parameter** for the funtion module you select the structure **CUSTOMER_T**. Select the **OK** button to complete the defnition of the **Read Data Record** operation.



External Content Type

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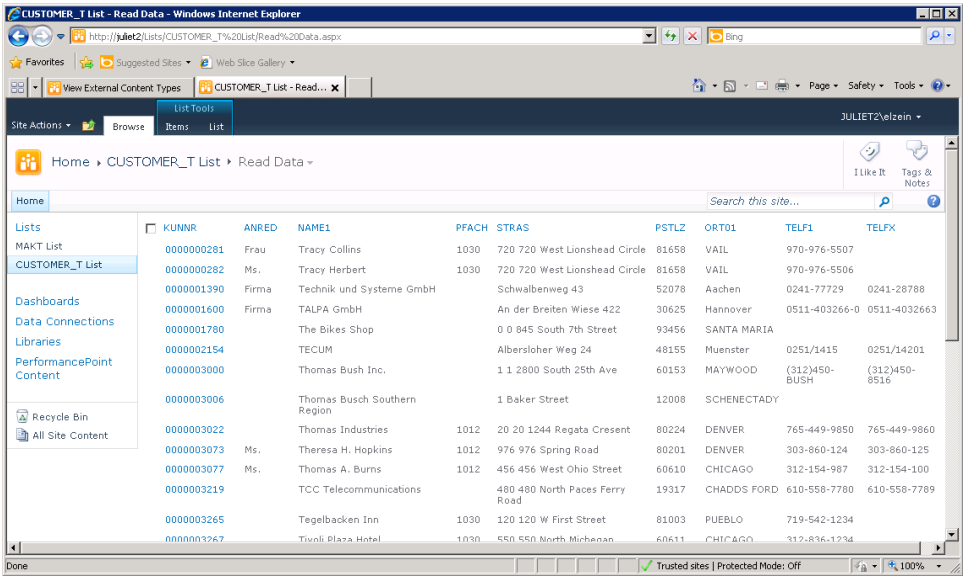

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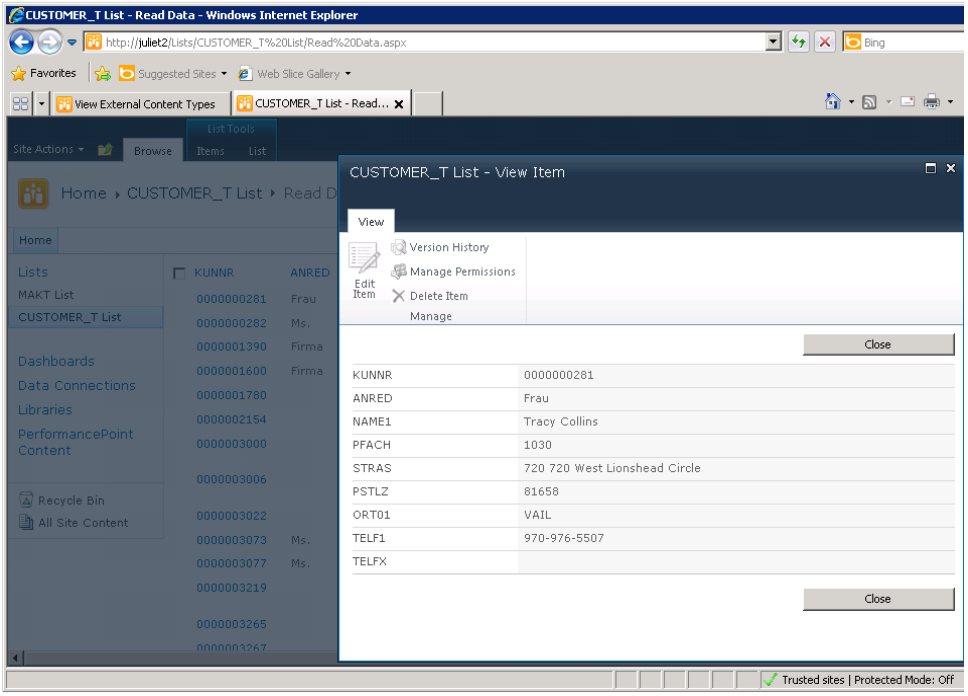
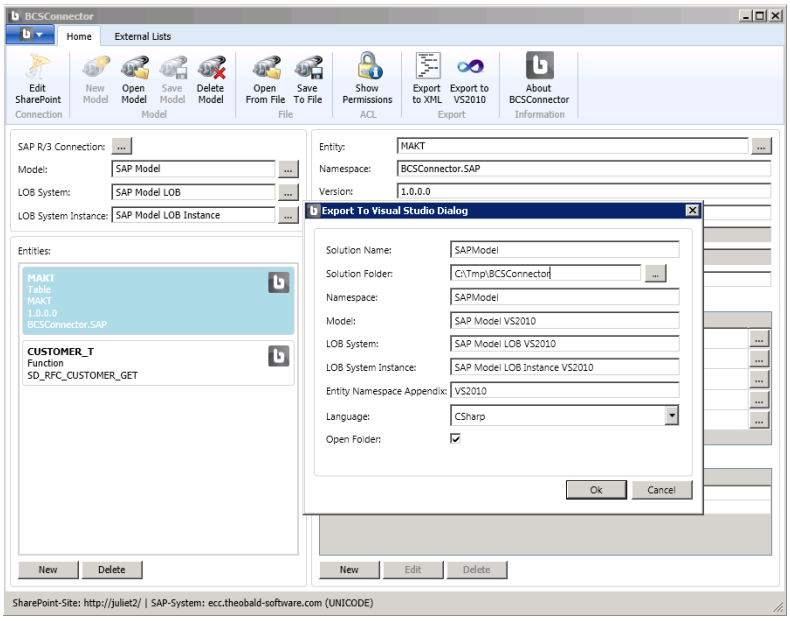
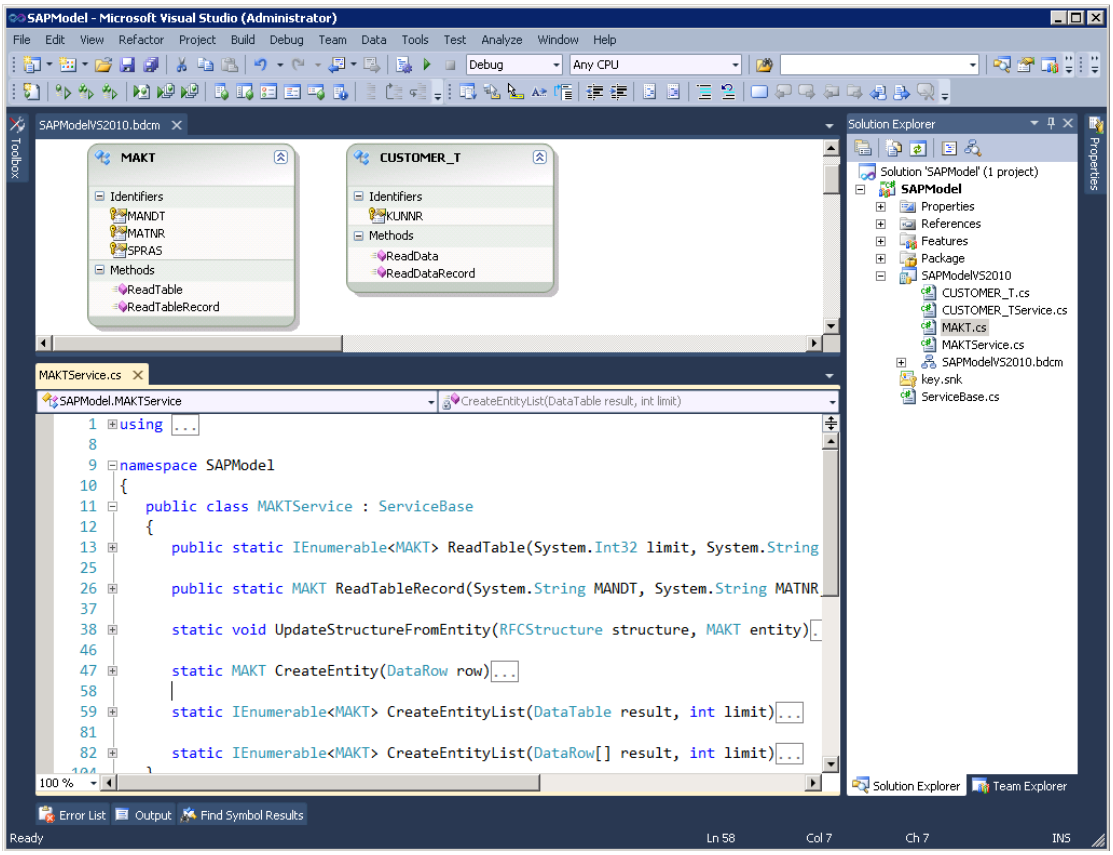


2.4 Extension with Visual Studio 2010

With the BCS Connector Designer you can export a BCS Model into a Visual Studio Solution. Select the **Export to VS2010** button from the ribbon and specify the solution and model properties in the export dialog.



This functionality enables developers to create an initial model as a template using the BCS Connector Designer and subsequently extend the model within the familiar Visual Studio environment according to specific requirements. The BCS model can be deployed from Visual Studio directly to the SharePoint server.


SAPModel - Microsoft Visual Studio (Administrator)
File Edit View Refactor Project Build Debug Team Data Tools Test Analyze Window Help
Debug
Any CPU
SAPModelVS2010.bdcm
MAKT
Identifiers
MANDT
MATNR
SPRAS
Methods
ReadTable
ReadTableRecord
CUSTOMER_T
Identifiers
KUNNR
Methods
ReadData
ReadDataRecord
Solution Explorer
Solution 'SAPModel' (1 project)
SAPModel
Properties
References
Features
Package
SAPModelVS2010
CUSTOMER_T.cs
CUSTOMER_TService.cs
MAKT.cs
MAKTService.cs
SAPModelVS2010.bdcm
key.snk
ServiceBase.cs
MAKTService.cs
SAPModel.MAKTService
CreateEntityList(DataTable result, int limit)
using ...
namespace SAPModel
{
public class MAKTService : ServiceBase
{
public static IEnumerable<MAKT> ReadTable(System.Int32 limit, System.String
public static MAKT ReadTableRecord(System.String MANDT, System.String MATNR
static void UpdateStructureFromEntity(RFCStructure structure, MAKT entity)
static MAKT CreateEntity(DataRow row)...
static IEnumerable<MAKT> CreateEntityList(DataTable result, int limit)...
static IEnumerable<MAKT> CreateEntityList(DataRow[] result, int limit)...
100 %
Error List
Output
Find Symbol Results
Solution Explorer
Team Explorer
Ready
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Ch 7
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3 Additional Information

This last chapter of the White Paper contains additional information about **ERPConnect Services** specifically with regards to the licensing and maintenance of the product.

3.1 License Model and Costs

ERPConnect Services is licensed on a ´per SharePoint Server´ basis. Not relevant for the license is the number of users interacting with SAP data or the number of developers contributing to solution development or the number of SAP systems involved.

You can find the licensing price sheet on our Web site or you can contact us directly for further information.

3.2 Maintenance

With our maintenance terms, we guarantee that the software will work without defects as described in the documentation and that the software will work in conjunction with the latest SAP and Windows product versions. For technical problems, our hotline is available by phone or email.

A license includes six months of maintenance. After six months, annual maintenance is offered at 20% of the price of a license at that time.

If maintenance has expired, you no longer have the right to obtain Updates.

3.3 Evaluation and Presales

We will gladly support you during the evaluation phase of our products. You can download a demo version from our Web site and take your time to test drive it. The demo and evaluation version is only limited in time, not in functionality.

Our support is available to you via email or phone for any questions you may have about our products:

info@theobald-software.com

www.theobald-software.com

Phone: +49 711 46 05 99 0