Connecting SharePoint to Line-of-Business Systems to Deliver Business-Critical Solutions
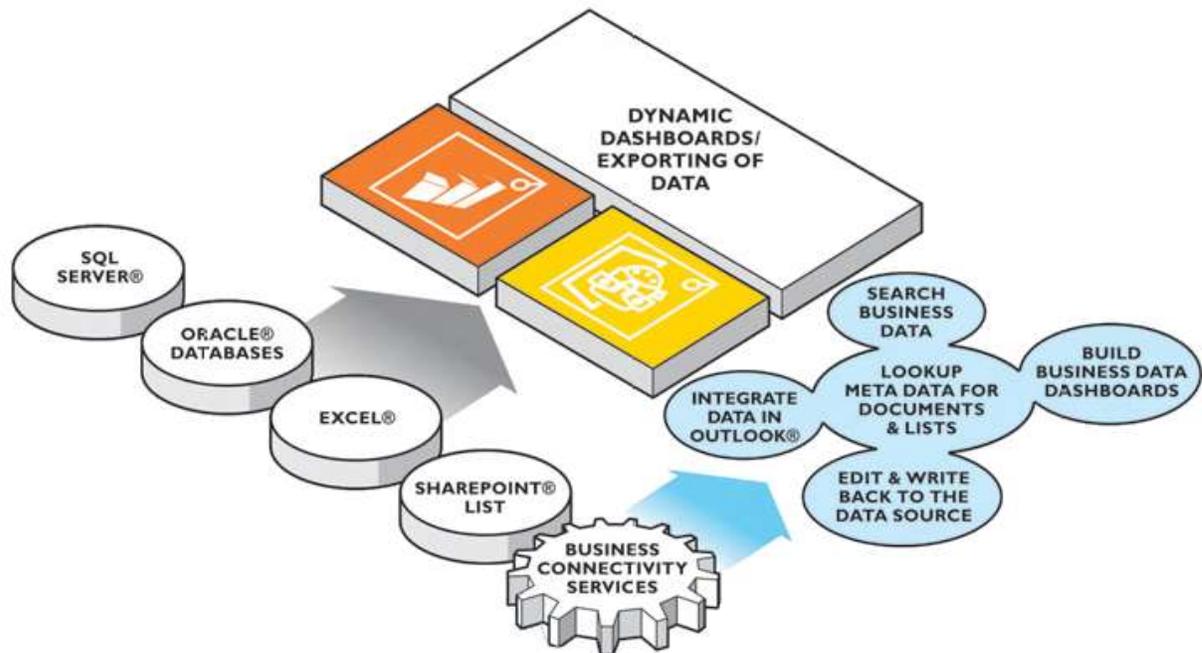
TABLE OF CONTENTS

WHO SHOULD READ THIS?

Business users at **every level of your organization** should have access to important data and be connected to processes that enable them to support operations. However, critical business data often is stored in disparate systems, and ad hoc processes block efficiencies. In such inefficient workplaces, users inevitably call on IT to assist them in reaching and reconciling this business data, which can divert important IT resources away from strategic work and position IT as a business partner, rather than a cost center.

This document is for **organizations seeking to work smarter**, who have the challenge of providing end users with an easier way to access the information locked in back-end systems. Using the interoperability capabilities of Microsoft® SharePoint—including Business Connectivity Services— we at SimplePortals can build cost-effective, manageable integrations to deliver increased productivity and return on investment (ROI) to their business clients.

This paper:

- Explains why connecting line-of-business (LOB) applications to SharePoint makes business and technological sense.
- Discusses how an enterprise architect might design an integration between SharePoint Server and a back-end system.
- Highlights the technologies and techniques involved in building a sample integration.
- Explores additional options for working with enterprise data once it is exposed in SharePoint Server.

THE CASE FOR CONNECTIVITY: INCREASED ROI AND DECREASED BUSINESS RISK

Organizations have long relied on their IT departments to "connect the dots" among disparate legacy systems. These points of connection traditionally have been ad hoc, delivering limited value but consuming many IT resources in the creation and deployment process. We combine our experience with SharePoint Server to surface business data from LOB systems and build solutions to increase the ROI of legacy systems, speed solutions' time-to-market, and connect users from multiple business functions through a single familiar interface—all of which free IT resources and eliminate wasteful overlap.

Business units can reduce training costs as our products maintain the familiar Microsoft Office experience, enabling users to quickly and easily adopt SharePoint Server versus receiving training on a variety of more complex LOB applications.

In addition, our solutions can speed the time-to-market of otherwise time-consuming and resource-intensive applications by taking advantage of native application development capabilities. Plus, powerful Search and BI capabilities provide wider end-user functionality, which can boost productivity, reduce costs, and increase user satisfaction.

Our team knows the importance of empowering your people, and we can help to reduce business risk by increasing the visibility of your critical data. The ability to access accurate, real-time business data can have a major impact across an organization. In his 2009 white paper, "Business Intelligence: A Guide for Midsize Companies," MAS Strategies' Founder and Principal Analyst Michael Schiff said the following:

> "All employees have the responsibility to make the best decisions possible, based upon the data available to them at that time. If their ability to analyze this data and transform it into useful information is improved, the overall quality of their decisions can be improved as well."

All employees have the responsibility to make the best decisions possible, based upon the data available to them at any time. If their ability to analyze this data and transform it into useful information is improved, the overall quality of their decisions can be improved as well.

- Michael Schiff

Founder and Principal Analyst, MAS Strategies

In other words, to surface relevant data to the people who need it, when they need it, users are enabled to make better decisions faster. This can reduce mistakes that result from misinformation and decrease overall business risk.

Our next logical steps are to reduce risk by enhancing security, privacy, and compliance through a flexible authentication model. This authentication model can help an organization to maximize its SharePoint Server deployment while maintaining highly secure control over corporate assets and increasing compliance.

CONNECTING LOB APPLICATIONS TO SHAREPOINT

EXPLORING THE TOOLS

SimplePortals offers a range of options for creating solutions that connect users to business-critical information, whether it resides in SharePoint Server, LOB systems, or other unstructured repositories.

BUSINESS CONNECTIVITY SERVICES

A primary interoperability component of SharePoint Server, Business Connectivity Services (BCS) is responsible for reading from and writing to external systems. BCS in SharePoint Server enables connectivity to external data sources, such as databases and LOB systems.
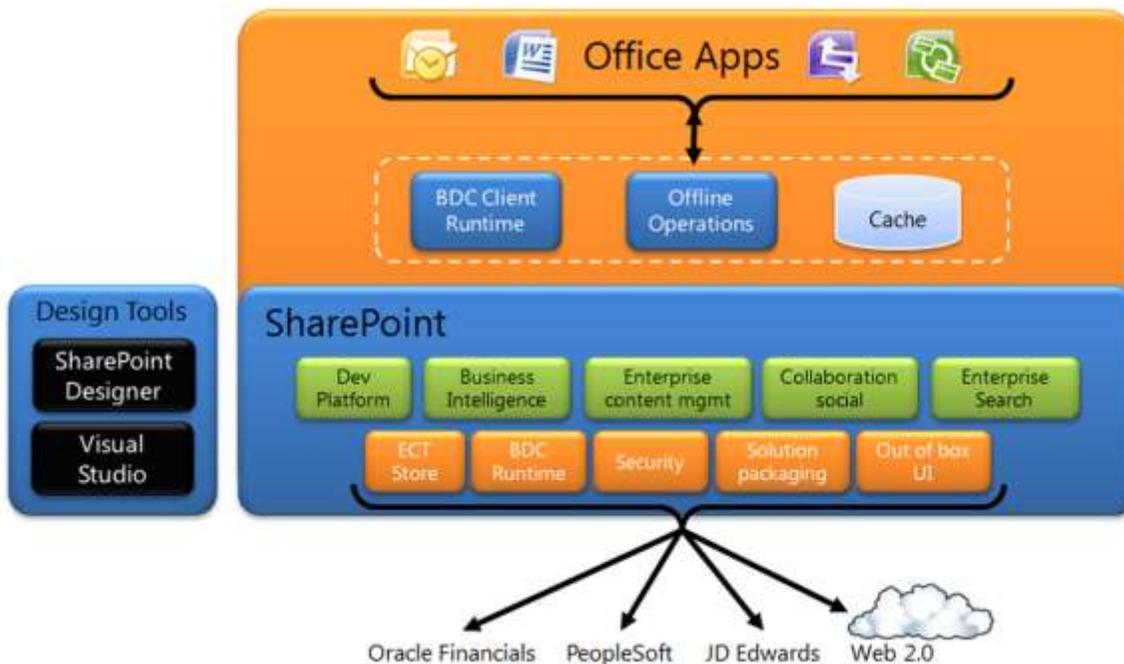
The Business Data Catalog (BDC) is the foundation of our Business Connectivity Services, and the foundation of the BDC is the entity model that defines entities, methods, relationships, and so on. After these are defined, the BDC runtime object model is populated with data, and it then provides a uniform interface to the LOB data. Other base-level components of BCS support and extend the BDC with items like security and user interfaces.

Two key building blocks of SharePoint Server are **lists** and **content types**. A list, basically, is a collection of items that generally shares a common set of properties. Think of a list somewhat like a database table, with columns representing properties of items and rows representing the items themselves. A content type is a collection of metadata about an item (principally columnar properties, but also other behaviors) that can be reused across lists. Large parts of SharePoint Server functionality, including the widely used document libraries, are built on the foundation created by lists and content types.

Usually, a list contains items of one or more content types that have been created directly in SharePoint Server. However, the functionality offered by the list infrastructure is available to LOB data, as well. Using one of the most powerful capabilities of BCS, we can create *external* content types and *external* lists that present and interact with data in virtually any system or repository.

With the BCS set of components, external lists can provide full CRUD (create, read, update, and delete) capabilities to data stored in any system that can be connected to SharePoint Server. To users, an external list looks and feels almost exactly like any other SharePoint Server list: They can create new views, easily sort and filter data, and even take data offline using Microsoft Outlook. Moreover, site owners and other power users can create custom forms using Microsoft SharePoint Server Designer and Microsoft InfoPath®; add list web parts to other pages; and create composite applications—all using LOB data. BCS uses a built-in or custom connector to ensure that this data is properly synchronized with the back-end system. (**Note**: Building this connector is discussed in a later section of this white paper.)

ENTERPRISE SEARCH

All of the search capabilities we offer can provide additional ways to expose and unlock data in LOB systems, either in concert with Business Connectivity Services or even as an independent component.

SharePoint Search provides an interactive, visual search experience. Visual cues can help users to find information quickly, while refiners let them drill into the results and discover insights, often in easier and more actionable ways.

Example: An account manager receives a request to adjust a custom order. Before responding to the request, she must determine whether any of her organization's warehouses have the items in stock to amend the order. Because the account manager's enterprise resource planning (ERP) system is connected to SharePoint, she can simply open her team portal and search for the part, and she finds that it is available in two warehouses.

ANALYZING THE SITUATION

At SimplePortals, we follow four main steps when designing an integration solution that connects an LOB system to SharePoint Server:

1. **Identify the business process that needs improvement**: Stating what we are trying to accomplish. Stakeholders should articulate and agree on a compelling business need (interface update?) that underpins the desire to surface LOB data in SharePoint Server. For example, the data might be linked to a core business process.
2. **Establish which LOB applications being targeted**: This application targeted will help to determine the most appropriate way to connect. In addition to its own data model and interoperability strategy, each LOB system typically has a particular philosophy of working with the information that its users provide and consume. To some degree, these details steer our design. For example, if a certain system uses a data model that is similar to the SharePoint Server tabular structure, it might make sense to connect at the data tier. Conversely, a system that provides much value in its unique presentation of data might be better connected at a higher level.
3. **Determine what data is appropriate to bring into SharePoint**: This step should be directly related to the business need being addressed and the process requiring improvement. By targeting specific data, we can better avoid data redundancy and maintain security. In short, surface only the data you need.
4. **Decide how you want users to interact with the data once it is in SharePoint Server**: By evangelizing the solution, you can help to speed the adoption process and see faster ROI. We communicate this guidance in the context of a before-and-after scenario.

MANUFACTURING EXAMPLE: FABRIKAM, INC.

Fabrikam, Inc., is a made-to-order manufacturing organization that operates several disparate systems across its business functions. In addition to various departmental implementations of small- and medium-sized systems, the company uses JD Edwards EnterpriseOne as its ERP suite for manufacturing. Fabrikam also has installed SharePoint.

IDENTIFYING THE BUSINESS NEED

Recently at Fabrikam, a product line has become so popular that customers are frequently increasing their standing orders. Therefore, LOB managers have identified the order change process as one that can be improved by connecting their JD Edwards EnterpriseOne ERP system to SharePoint Server. The managers want to enable direct communication between salespeople and the plant floor, with the goal of preventing requests for additional products after an order has entered production. It is a business-critical need for manufacturers like Fabrikam to improve production processes and avoid short-run orders when possible.

Currently, the process for communicating and initiating an order change happens in three manual steps:

- Salesperson sends an email message to the Planning and Scheduling Department.
- Department worker enters the order change into the JD Edwards system
- Department worker sends an email message to the production team to ensure that the change is reflected in the manufacturing execution system.
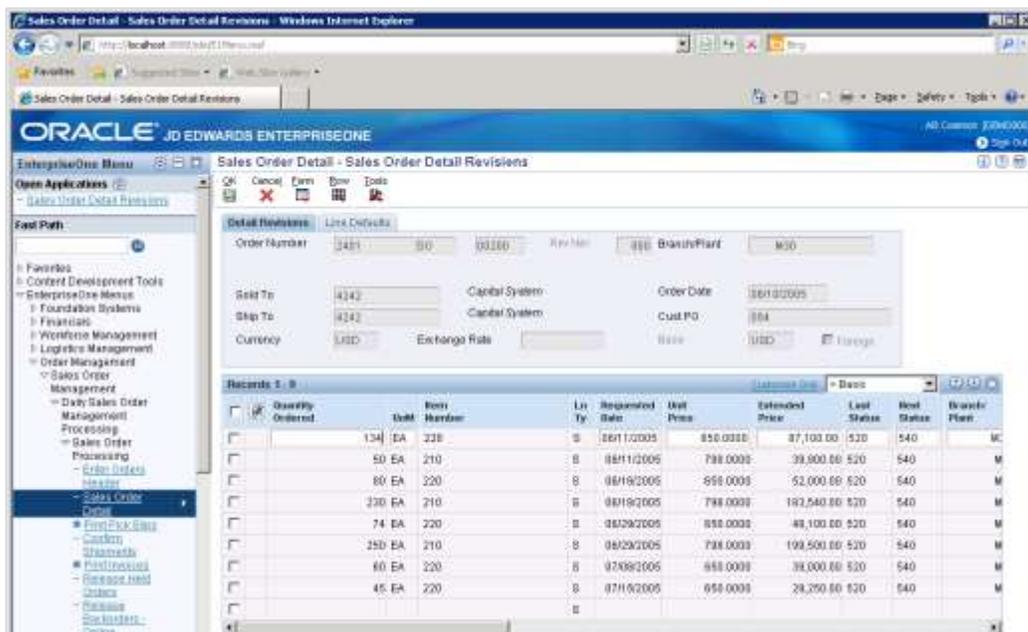
Unfortunately, the sales team's emails to the Planning and Scheduling Department often get buried, and changes are not entered before the original order goes into production. This results in additional time, effort, and resources required to correct the order. To streamline the process and use resources more effectively, the LOB managers have requested the sales team to enter order changes through SharePoint Server and IT to connect the two systems.

CONNECTING SYSTEMS WITH BUSINESS CONNECTIVITY SERVICES

We can help Fabrikam simplify the order change process by connecting the JD Edwards ERP system to SharePoint. By using the SharePoint Server platform, end users easily access the data they need from a familiar interface.

Analysis of the business requirements find that users need to be presented with custom views of sales data so that they can share up-to-date information and take appropriate action. It's decided that BCS provides the best approach to completing the integration. It's at this stage that SimplePortals' consultancy experience takes over and our IT professionals design and build the BCS connection to the JD Edwards system.

CHOOSING AN INTEGRATION METHOD

BCS supports multiple methods for connecting to external systems:

1. **SQL Server**: BCS can access data stored in Microsoft SQL Server® databases without requiring a developer to write custom code. SharePoint Server Designer is used to configure the mappings (or model) that will expose SQL Server-hosted data as external lists and content types. BCS also natively connects to other relational databases, including Oracle, OLE DB, and ODBC connections. When connecting to non-SQL Server databases, the model must be created in an XML-based file and imported into SharePoint Server. Alternatively, the code-based options discussed below can be used to connect to the database and interface with BCS.

2. **LightningTools**: one of our British partners provides a wizard driven tool called Meta Man that builds external Content Types for Oracle, ODBC, WCF, OData and Microsoft SQL without building XML code. Using BCS Meta Man, we generate External Content Types for SharePoint without writing code. Simply drag and drop the Tables, Views and Stored Procedures onto the design surface and set some properties. This speeds the process, improves reliability, and when reconfigurations are needed they are easy.

3. **Web Services**: BCS easily consumes Windows Communication Foundation (WCF) services. Again, using SharePoint Server Designer, BCS can be configured to map list operations to WCF service methods. When interacting with LOB systems that may not expose WCF-compatible services, our dev team can write a custom middle-tier service to connect natively to the back-end system and expose the necessary functionality as WCF methods.

To a large degree, no-code-required connectors often are the most cost effective and simplest choices.

In this case, JD Edwards EnterpriseOne is your target. A complex ERP system with a platform all its own, EnterpriseOne exposes a wide variety of interoperability options, including a Business Services framework where units of functionality can be encapsulated and exposed as web services and several database-tier integration points. (A full exploration of EnterpriseOne interoperability and best practices is beyond the scope of this paper).

Each implementation of each enterprise system is unique. The .NET connector approach to creating a BCS integration gives you the flexibility to interact with virtually any of these interoperability technologies. In the Fabrikam example, after consulting with the manufacturing IT team that runs the EnterpriseOne system, you decide to create a .NET connector to interact with the sales order tables in the system's Oracle Database 11g database.

BUILDING THE CONNECTOR WITH META MAN

We can build methods for you on each External Content Type. With an external data source identified, simply drag the table to the design surface to begin configuring the external content type; SimplePortals has refined this process to become as simple as possible, to make a painless transition and provide your return on investment. We need simply select a Specific Finder, ID Enumerator, Creator, Updater and Deleter methods, generate, and done!
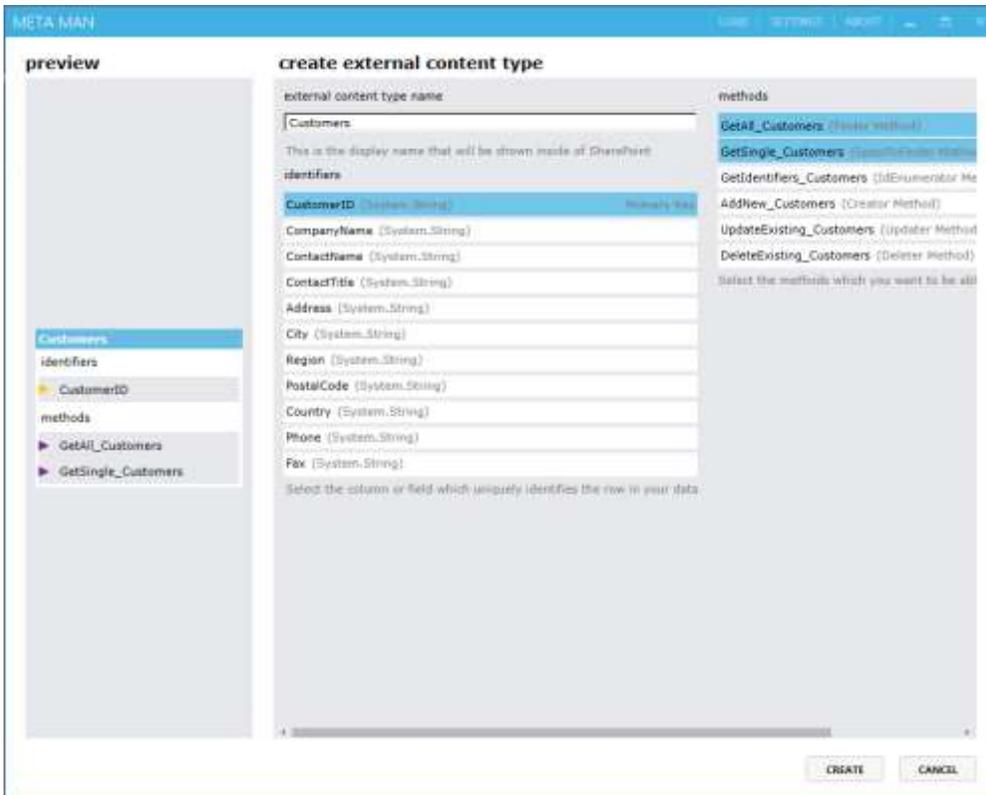
BUILD ASSOCIATIONS USING DRAG AND DROP

Associations enable us to show your external data using Business Data Lists and Business Data Related List web parts. Your data relationships can also be shown in profile pages and also BDC item picker dialog boxes. Simply drag the association between the two external content types. In addition, create filters, methods and custom actions in just a few clicks.
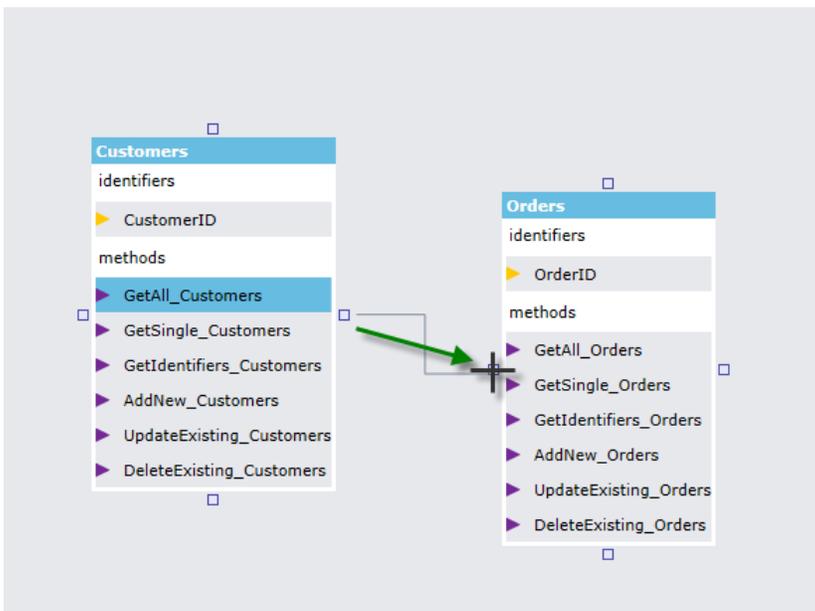
DEPLOYING THE CONNECTOR

After our development team builds the connector, it needs to be deployed to the SharePoint Server farm. The custom connector assembly must be placed in the Global Assembly Cache of the web front-end and application servers of the farm. The SharePoint Server solution deployment functionality can be used to create a WSP package for deploying the assembly across the farm.

In addition to the assembly, we must establish a **model**, or .bdcm file. The model is an XML file that tells BCS how to interact with a custom connector. The model file contains configuration information about the connector assembly and each of the entity types (in this case, sales orders).

With the connector assembly installed and the model created, we now deploy the connector to SharePoint Server. Using the SharePoint Server Central Administration web-based user interface, we import the model XML to the BDC service (Figure 5).

Figure 5: Importing a model

The BDC service validates the model, ensuring that there are no discernible errors in the mappings and configurations. It then imports the model. The model and its associated connector are now available as a data source for SharePoint Server lists (Figure 6).
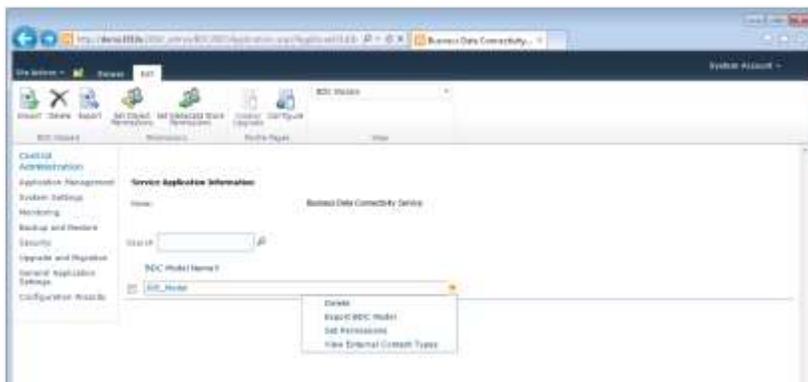
Figure 6: Imported BDC model

VIEWING AN EXTERNAL TABLE AS A SHAREPOINT SERVER LIST

With deployment complete, the connector work is finished. Now we bring the newly exposed sales order data into one of the sales team's SharePoint Server sites. In this example we achieve this by navigating to the Western Region sales team's existing site and, using the SharePoint Server web-based user interface, we create a new list (Figure 7).
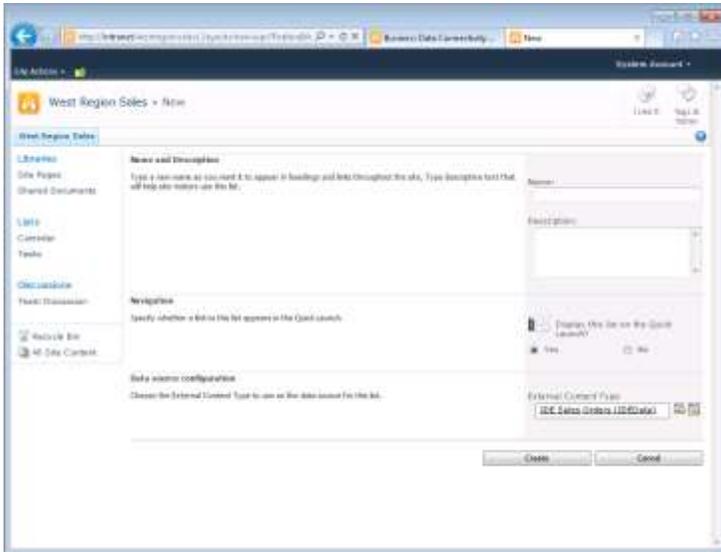

Figure 7: Creating an external list

At this stage we're able to deploy the new external content type we created earlier when applying the model to BCS. Seen below with the list name "Orders," we are taken to the list's default view, which depicts a list of orders from EnterpriseOne (Figure 8)

Notice that this list shows an extremely limited number of parameters about each item as compared to the full EnterpriseOne view. This is by design: We have limited your model to only those fields relevant to the process you want to improve. Before releasing this new list to the salespeople of the Western Region, it is important to be sure that the correct and most relevant data for their process is exposed.

To modify this, we edit the default view of the sales order list. The data source filters that were configured as part of your model can bet set up here. In addition, we can use SharePoint Server filtering capabilities to further refine the list. Note, however, that it is often far more efficient to design the filter logic into the LOB connector rather than relying on the presentation-layer technology to do this filtering.
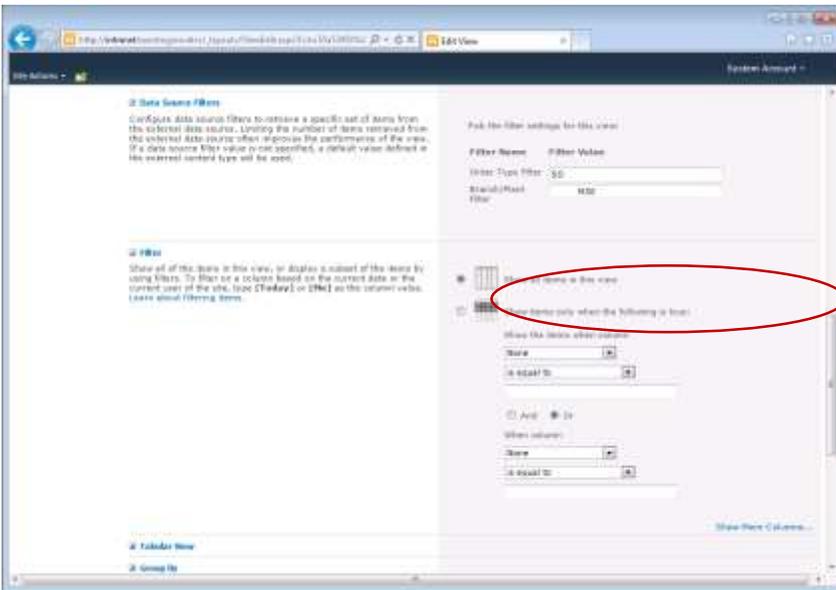

Figure 9: Filtering the list, with the "Branch/Plant" location code highlighted

Now, Fabrikam salespeople can browse to this list and view their upcoming orders (Figure 10).
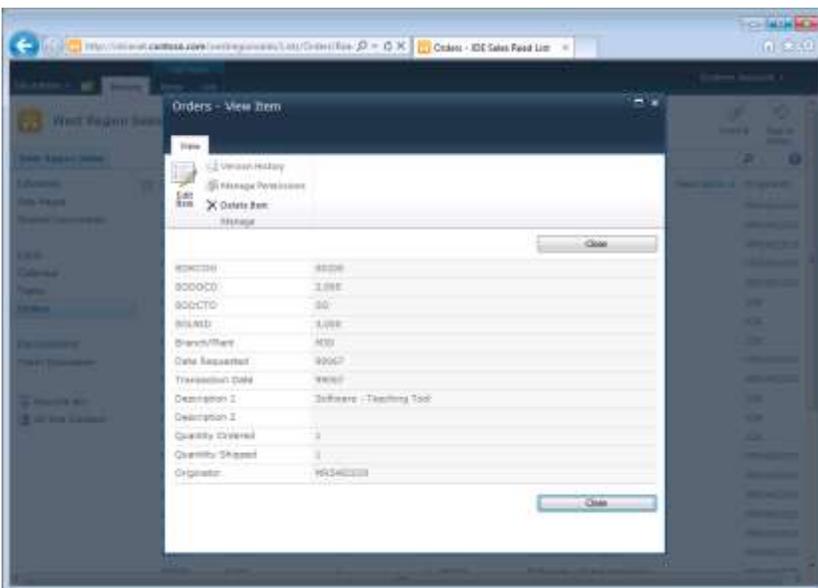
USING A LIST TO WRITE DATA BACK TO THE LOB SYSTEM

Remember that the previous Building the Custom Connector subsection discussed the Creator and Updater methods for implementation. Because these methods encapsulate all of the complex business logic necessary to insert and update items in JD Edward EnterpriseOne, we can simply use the SharePoint Server built-in list editing capability to allow the limited updates needed to improve Fabrikam's order change process (Figures 11 and 12).
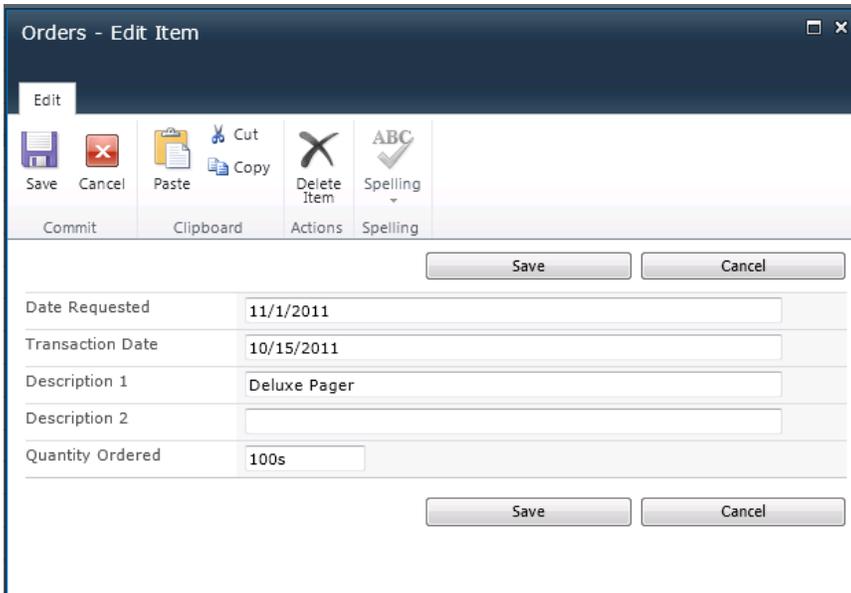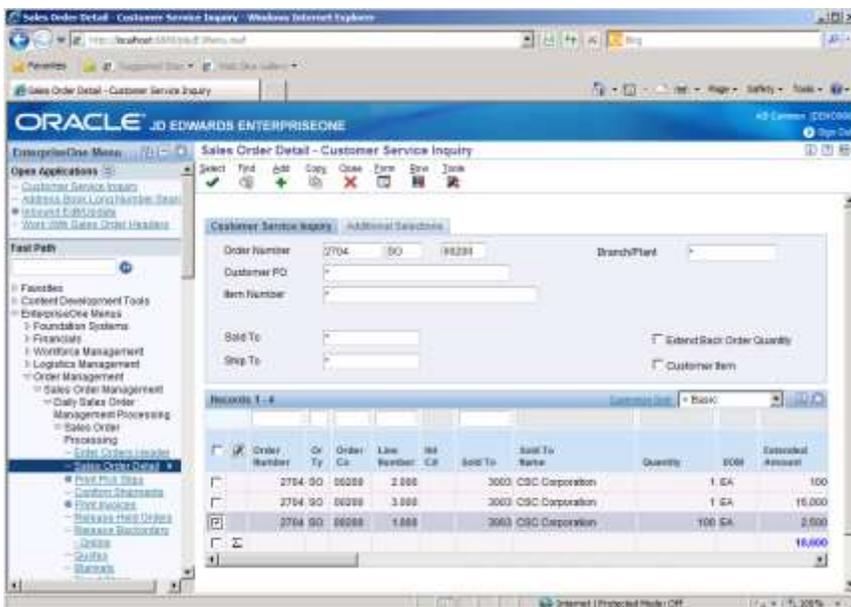

Figure 11: Editing a sales order

Figure 12: Updated sales order in EnterpriseOne

In addition, new items can be added using the same pattern. A salesperson can simply select **New Item** from the SharePoint Server Ribbon and enter the necessary data (Figure 13).
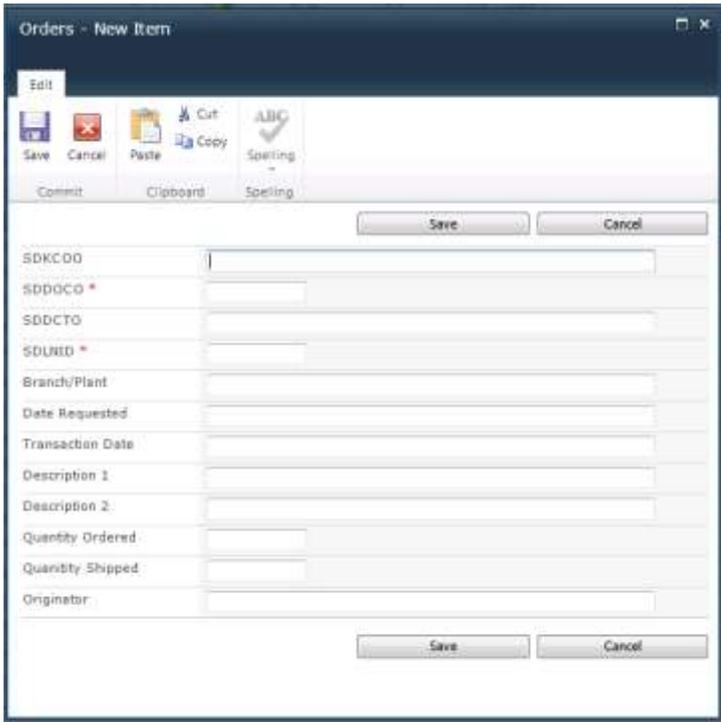

Figure 13: Adding a sales order

EXTENDING THE REACH OF LOB DATA

Using the SharePoint Server list interface, we have fulfilled Fabrikam's business goal of streamlining the sales order change process. This improvement eliminates manual communication steps and, ultimately, avoids costly additional production runs. However, this is not the limit to how your organization can use this business-critical data. Once the data is in SharePoint, we have the flexibility to use it for other purposes, including:

- **Implement, Extend, and Improve Business Processes**: Find and visualize the information you need in SharePoint Server. Take advantage of out-of-the-box platform capabilities like collaboration, social computing, and content management to enable the right people to access the right information at the right time. IT can design and administer solutions quickly so that users can build their own templates and workflows to connect business data to their processes.
- **Gain Additional Productivity**: SharePoint Server provides several capabilities, including Search and Insights, that can help organizations to improve workforce productivity and visualize business data in real-time. These capabilities have built-in security and manageability to help ensure safe and easy use.
- **Define and Measure Success**: SharePoint Server Insights provides interactive dashboards and scorecards that can help people to define and measure success: Key metrics can be matched to specific strategies and then shared, tracked, and discussed. Users can create meaningful visualizations that convey the right information the first time, aggregating content from multiple sources and displaying it in a web browser in an understandable and collaborate environment. Moreover, rich interactivity allows users to analyze up-to-the-minute information and work with data quickly and easily to identify key opportunities and trends (Figure 14).
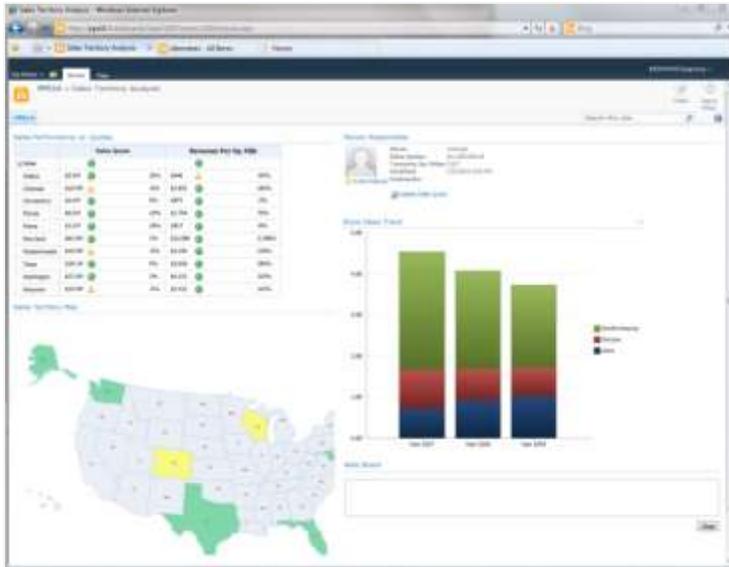
Figure 14: Dashboard in SharePoint Server Insights

CONCLUSION

Many organizations today face the problem of having critical business data locked in siloed legacy systems. SimplePortals can resolve this problem by connecting its LOB systems to SharePoint Server, which provides both business and technological benefits. Workers from across the organization can use a single interface to access appropriate data more quickly and easily, helping to increase the ROI of legacy systems and decrease the need for training. In addition, the native application development capabilities of SharePoint Server can help to speed the time-to-market of your solutions, ultimately freeing IT resources to focus on more strategic initiatives.

SimplePortals and SharePoint Server provide many options for building solutions that integrate business-critical data from disparate systems. Two of the most powerful tools in SharePoint Server are Business Connectivity Services and Enterprise Search. These tools can provide unprecedented access to data from external sources, and they can display this data in a highly interactive and visual manner—all on a unified platform that is easier to manage and more secure than legacy applications.

To design a seamless SharePoint Server-to-LOB connection, IT architects should consider the following four key steps. It is a good idea to plan all of these steps before beginning:

1. Identify the business process that needs improvement.
2. Establish which LOB application (or applications) you are targeting.
3. Determine what data is appropriate to bring into SharePoint Server.
4. Decide how you want users to interact with the data once it is in SharePoint Server.

Planning around these four steps will help us define the most appropriate connectivity method based on your business goals. The fictional example of Fabrikam Manufacturing in this white paper demonstrates each of the four steps in action, with an emphasis on the technical capabilities of Business Connectivity Services.

Importantly, a core benefit of connecting to external business-critical data is flexibility: Once data resides in SharePoint Serve, it can be viewed and manipulated in numerous ways. We can implement or extend additional business processes using out-of-the-box platform capabilities; improve your productivity using advanced capabilities for visualizing data in real time; and we can do all of this while using interactive dashboards and scorecards to measure your success.