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What's New for Developers in Microsoft Office SharePoint Server 2007?

Microsoft's SharePoint technologies provide the foundation for collaboration and communication for information workers. The first releases of SharePoint technologies in 2001 have undergone several substantial revisions, and the technology has moved from a productivity tool supporting a limited set of scenarios to a full-fledged platform for developers to build enterprise-class applications.

The core components of the SharePoint technology stack are Microsoft Windows SharePoint Services 3.0 and Microsoft Office SharePoint Server (MOSS) 2007. In this first chapter we cover what's new for developers in SharePoint and Office and focus on some key scenarios that developers are going to need to know about. This chapter will help to provide a roadmap for the rest of the book and help you envision some of the possible uses for the Office and SharePoint platforms as a developer. Because the integration between Microsoft Office 2007 and SharePoint is such a critical component of the technology, we discuss feature sets in Office that enable developers to build solutions on the platform. Most of these areas are new to the Office 2007 release.

To understand the SharePoint technology platform and the benefits to developers, this chapter covers the following key areas:

- ☐ Portal services in SharePoint
- ☐ Search
- ☐ Document and content management
- ☐ Workflow integration

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In each of these areas we'll expand the topic to focus on integration with Office applications in some scenarios and cover other key aspects, including Visual Studio developer support, building Web parts for SharePoint, and leveraging the forms and business intelligence capabilities in SharePoint. Throughout the book we'll continue to examine each of these areas in greater depth and focus on scenarios to build out these applications and leverage the platform services along with custom code to create new solutions.

This chapter assumes that you have basic familiarity with Windows SharePoint Services 2.0 and SharePoint Portal Server 2003. We'll point out some of the differences between new and prior versions of the SharePoint technologies.

At the end of this chapter, developers should have a good understanding of the various technologies that comprise the Microsoft Office SharePoint Server and have a sense of how these can be applied to build solutions.

SharePoint and Office — Developer Platforms

The key components of Microsoft's information worker technologies include Office and SharePoint; and Microsoft's product development strategy hasn't shifted substantially in that regard. What has changed since the Office System 2003 time frame is that Microsoft has invested substantially more into the use of Office as a fully supported platform for developers. In the past, Office development was about creating macros in Excel or building tools with Visual Basic for Applications (VBA). Because of a lack of consistent APIs and platform-level services for Office, most developers have focused on writing applications that can work with Office document formats as transient data stores or output formats for data, but they have not tended to leverage the Office applications themselves as part of a business solution. Where developers have built on Office, those applications are often very client-centric and focus on plug-ins or extended functionality in just a single application such as Word or Excel.

Similarly, early versions of SharePoint and their support for Web Parts drove developers toward Web Part-centric development efforts on SharePoint. If the problem couldn't be solved with a Web Part, SharePoint was unlikely to be the tool selected for a particular application development project.

Now, in the new paradigm of SharePoint and Office development, Windows SharePoint Services and Microsoft Office SharePoint Server deliver fully featured web development and content management platforms that can leverage a rich set of services to provision, manage, and administer the sites both at a user level and from a technical architecture perspective. Office then becomes a smart client that can expose many of the business processes in SharePoint, and interact seamlessly with display, data exchange, workflow, and support for many other requirements.

Building Applications with Windows SharePoint Services

Windows SharePoint Services is a core feature of the Windows Server 2003 operating system and can be configured to be installed along with a Windows Server. An example of a basic Windows SharePoint Services site is shown in Figure 1-1. Windows SharePoint Services 3.0 provides a scalable

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platform to provision web sites of different types. In the overall SharePoint architecture, Windows SharePoint Services is a foundational component and is designed to support the creation of a substantial number of web sites, making them available to a large number of users. It is not uncommon for a single Windows SharePoint Services instance to host many sites, scaling to hundreds or even thousands in a single infrastructure and storing gigabytes to terabytes of data. Usage scenarios can range in the tens of thousands of users for these sites, even with only a single server. Like other web technologies, Windows SharePoint Services provides a web farm architecture, enabling you to scale the front-end web servers and leverage a centralized SQL Server for content storage and management of other site data.

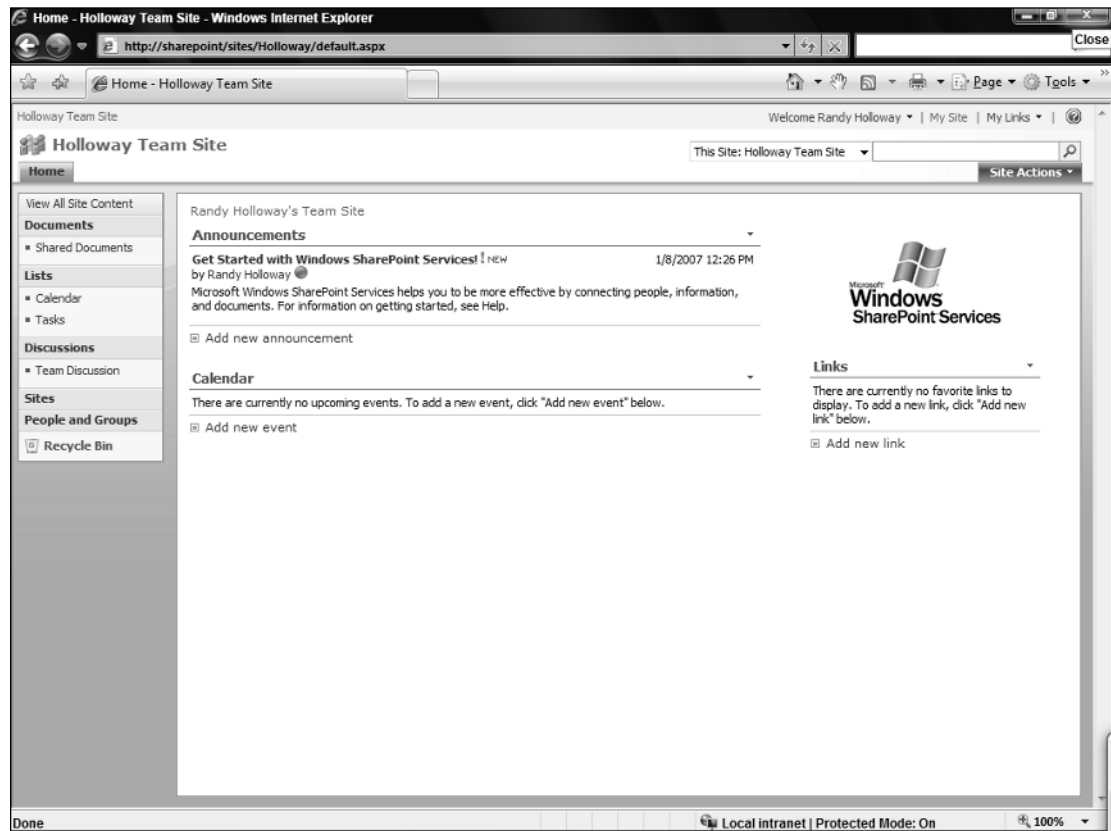


Figure 1-1

As in the previous versions of SharePoint, Windows SharePoint Services 3.0 provides collaboration and document management features that make it easy for end users and IT personnel to create and design web sites, with features including contact sharing, lists of links and resources, shared calendars, and document libraries that enable document collaboration and publishing (shown in Figure 1-2). Because of SharePoint Service's history as a collaboration tool primarily targeted to end users, developers may not see Windows SharePoint Services 3.0 as what it truly has become. In this most recent revision, the product is much more powerful than just a collaboration tool aimed at the end users, and it provides a strong development

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platform on top of ASP.NET. Nearly all SharePoint data is exposed in a series of lists, and a rich object model supports the manipulation of site data through the `SPList` class. This enables each SharePoint site to support the end user features while providing a store for developers to write code against.

A detailed review of some of the key classes supported through this object model is provided in Chapter 3.

The services provided by Windows SharePoint Services 3.0 on top of ASP.NET 2.0 include a provider model. This model supports provisioning and storage for pages, lists, and document libraries, and the provisioning can be driven through code or through user administration activities through the web browser. Without requiring user intervention or support from IT, Windows SharePoint Services 3.0 automatically determines where to store this content. Windows SharePoint Services 3.0 also eliminates many common development tasks required for a typical ASP.NET web site because of the availability of Web Parts and other UI components, enabling users to add, view, and modify content (see Figure 1-3).

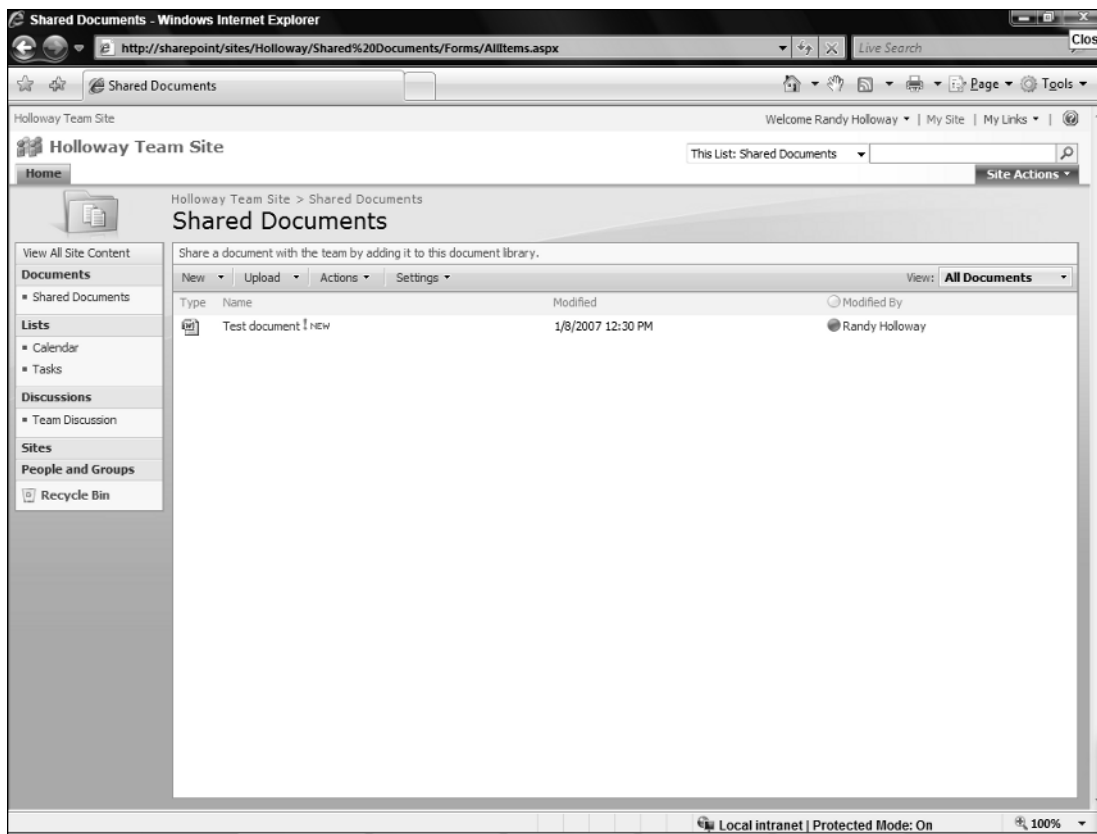


Figure 1-2

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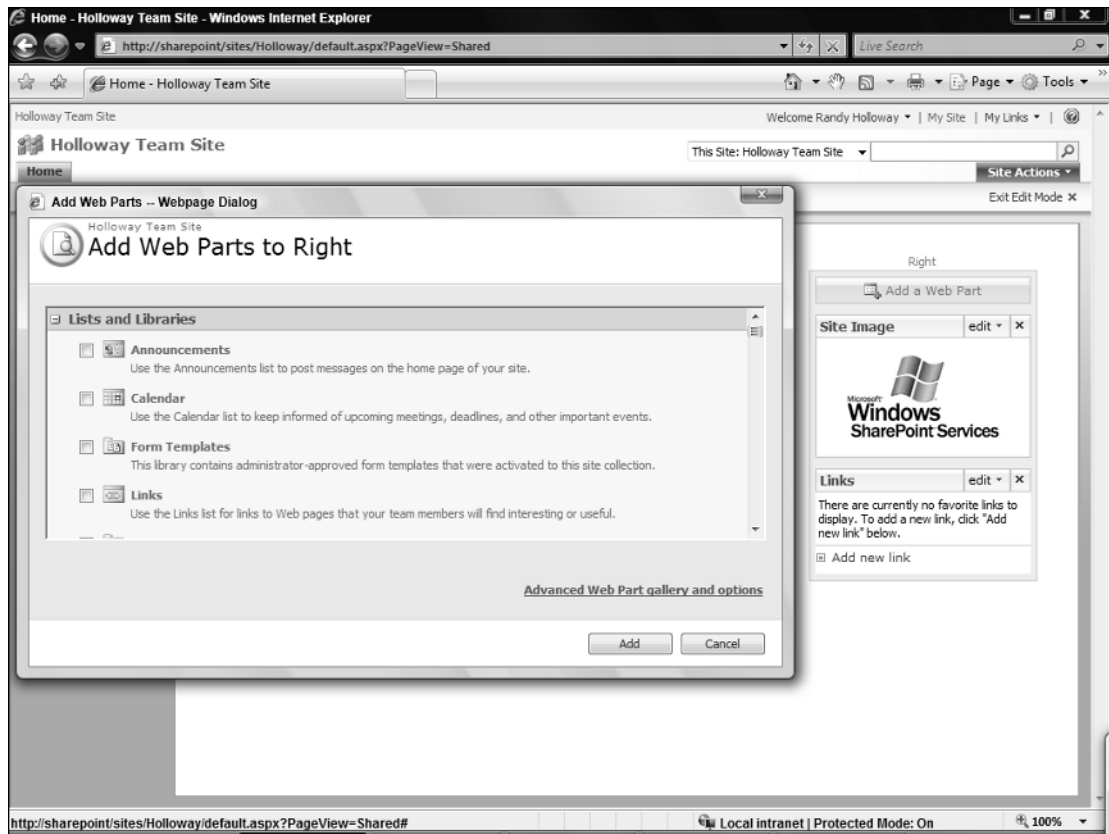


Figure 1-3

SharePoint and ASP.NET

A significant area of improvement in the architecture of SharePoint is the enhanced integration it offers with ASP.NET in the current product. In prior versions of the product, SharePoint was a “bolt on” technology that wasn’t well integrated with other web functionality, and as a result it caused problems for developers trying to integrate ASP.NET code into their SharePoint infrastructure. In Windows SharePoint Services 3.0, provisioning starts at the level of the IIS web site, and before creating your first Windows SharePoint Services site, you must act as administrator to extend 3.0 functionality onto one or more IIS web sites. In the previous version, Windows SharePoint Services 2.0, the term *virtual server* was used to describe an IIS web site that had been extended with Windows SharePoint Services functionality. In the current version, Windows SharePoint Services 3.0 now refers to an IIS web site extended with Windows SharePoint Services functionality as a *web application*.

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The previous version of Windows SharePoint Services was integrated with IIS 6.0 and ASP.NET 1.1 using an ISAPI DLL. The ISAPI integration technique results in IIS routing HTTP requests to Windows SharePoint Services before ASP.NET can process these requests. This routing has proven to be problematic in certain situations because Windows SharePoint Services takes control of an incoming HTTP request before it has a chance to be properly initialized with ASP.NET context. Windows SharePoint Services 3.0 integrates with ASP.NET in a different manner to help eliminate these problems. Windows SharePoint Services 3.0 is built upon ASP.NET 2.0, which provides enhancements over ASP.NET 1.1. In addition, the integration between Windows SharePoint Services 3.0 and ASP.NET 2.0 was changed to route incoming requests through the ASP.NET runtime before Windows SharePoint Services. This change was implemented by removing the ISAPI filter and adding an `HttpModule` and an `HttpHandler` that are registered with ASP.NET using standard `Web.config` entries. This works in the same manner as any developer extending the standard HTTP functionality would experience, meaning that incoming HTTP requests always enter the ASP.NET runtime environment and are initialized with ASP.NET context before they are forwarded to Windows SharePoint Services code to carry out SharePoint-related processing. This enables developers to run a SharePoint server and extend it with custom web applications without being concerned about a complicated or convoluted approach to administering the web server environment.

When you extend an IIS web site to become a Windows SharePoint Services Web application, Windows SharePoint Services 3.0 adds a wildcard application map to the IIS metabase. This wildcard application map serves to route all incoming HTTP requests to the ASP.NET runtime regardless of their extension. This wildcard application map is necessary to forward a request for any type of document or file for ASP.NET, which then forwards the request to Windows SharePoint Services for processing.

Another relevant feature of the new architecture is related to how `.aspx` pages are parsed and compiled. The `.aspx` page parser used by ASP.NET 1.1 works only with `.aspx` pages that reside on the local file system. However, Windows SharePoint Services architecture relies on storing `.aspx` pages inside SQL Server. Because Windows SharePoint Services 2.0 relies on ASP.NET 1.1, the Windows SharePoint Services team had to create a custom `.aspx` page parser. Unfortunately, the `.aspx` parser of Windows SharePoint Services 2.0 does not support many of the richer features offered by the ASP.NET `.aspx` page parser. ASP.NET 2.0 has also introduced a new pluggable component type known as a *virtual path provider*. A developer can write a custom component that retrieves `.aspx` pages for any location, including a database such as SQL Server. Once a custom virtual path provider retrieves an `.aspx` page, it can then hand it off to ASP.NET to conduct the required parsing and compilation. ASP.NET also gives the virtual path provider a good deal of control over how `.aspx` pages are parsed and whether they are compiled or run in a noncompile mode.

The key takeaway for developers is that this new platform for SharePoint application development is substantial and feature-rich, and provides many capabilities above and beyond previous product versions.

New SharePoint Developer Features

Microsoft Office SharePoint Server 2007 (along with Windows SharePoint Services) provides a number of capabilities that developers can leverage in their existing applications or use as a platform for building new solutions. Among those features is support in SharePoint for building portal applications with

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concepts of site membership, content targeting, and flexibility in content organization in management as part of the core features. More advanced features in the areas of search, document and content management, and workflow are also significant capabilities that developers can build upon in their applications. The following sections provide an overview of some of these new key features.

Portal Services

Developers and IT professionals will find all the portal features in Microsoft Office SharePoint Server 2007 that they have become accustomed to in SharePoint Portal Server 2003, including user profiles, audience targeting, My Sites for private and public sites designed for the individual, enterprise search, and single sign-on capabilities. However, if you're experienced in building portal solutions on top of SharePoint Portal Server 2003, you will find that Office SharePoint Server 2007 has many differences as well. For instance, Office SharePoint Server 2007 also includes several new portal features, such as the Business Data Catalog, which extends the search capabilities of the platform. In addition, SharePoint Portal Server provides its own separate administrative web application for provisioning and configuring portal sites. Office SharePoint Server 2007 doesn't require its own separate administrative application and instead integrates its administrative features and configuration links into the Windows SharePoint Services Central Administration application.

Office SharePoint Server 2007 is also quite different from SharePoint Portal Server under the hood from an architectural perspective. SharePoint Portal Server builds its portal site infrastructure around the concepts of "areas" and "listings." Areas in SharePoint Portal Server 2003 represent a relatively complex layer on top of Windows SharePoint Services 2.0 that is hard to extend using standard Windows SharePoint Services development techniques. As a result, many developers were not effectively able to leverage this functionality. The concepts of areas and listings from SharePoint Portal Server 2003 have been eliminated in Office SharePoint Server 2007 and replaced with a portal infrastructure that has been designed and implemented much more in line with Windows SharePoint Services best practices.

An Office SharePoint Server 2007 portal site is a Windows SharePoint Services site collection containing a top-level site along with several child sites below it. Unlike SharePoint Portal Server 2003, the portal site does not have to be created at the root of an IIS web site. This provides more flexibility because you can host hundreds of portal sites inside a single IIS web site. This is important for many organizations that need a number of portals but don't want to support a complex or sprawling infrastructure for applications that shouldn't require it due to minimal load or complexity. This has also made it possible for application service providers and hosting companies to provide more functionality with SharePoint hosting.

You create a new Office SharePoint Server 2007 portal site the same way that you create any other new site collection — through the Windows SharePoint Services Central Administration application, the Stsadm.exe command-line utility, or through custom code. When creating a new Office SharePoint Server 2007 portal site, you can use one of the portal site templates that ship with the product. Examples of site templates that can be used to create a new Office SharePoint Server 2007 portal site include a template for an Internet-facing web site, a content publishing site, and a standard corporate intranet (see Figure 1-4).

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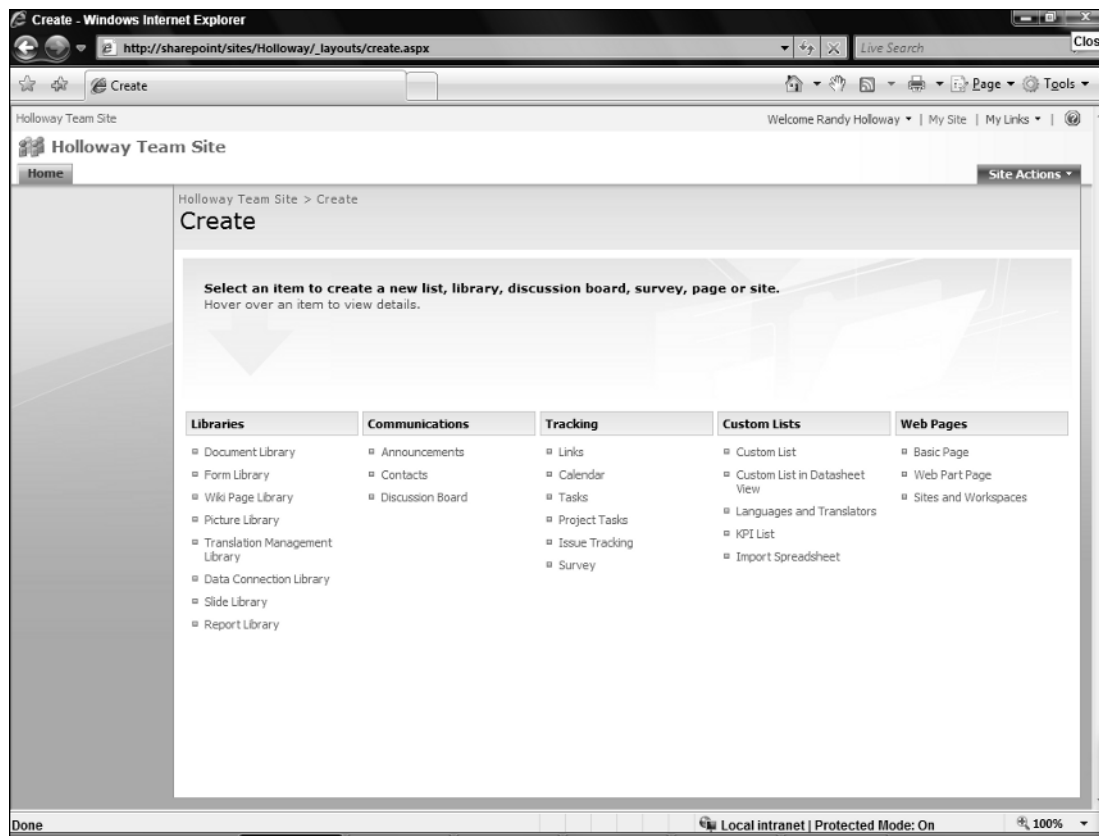


Figure 1-4

Enterprise Search

The enterprise search features have long been considered one of the most important features of the SharePoint product stack. SharePoint Portal Server 2003 Search was designed to enable searching through not only content and documents within Office SharePoint Portal Server portal sites and Windows SharePoint Services team sites, but also through external content such as Windows file shares, public Microsoft Exchange Server folders, standard web sites and other non-Microsoft products, including Lotus Notes or EMC's Documentum. Office SharePoint Server 2007 Search has been designed to give you these same features in a manner that is more performance-oriented and easier to configure. With the previous version of SharePoint technologies, Windows SharePoint Services 2.0 and SharePoint Portal Server 2003 each used a different underlying infrastructure to support indexing and searching. This created problems as companies upgraded from Windows SharePoint Services 2.0 to SharePoint Portal Server 2003. These upgrade problems have been addressed, as the Windows SharePoint Services Search service and the Office SharePoint Server Search service are now based on the same underlying

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indexing and search infrastructure, which is an improved version of what was provided by SharePoint Portal Server 2003.

What's New with Search?

In terms of significant differences in the new version of the product, consider the following:

- ❑ Microsoft Office SharePoint Server 2007 Search makes it possible to search external content across the network, such as Windows file shares and business data, whereas Windows SharePoint Services 3.0 Search is limited to searching through content and documents within the current site collection.
- ❑ Microsoft Office SharePoint Server 2007 search can be configured to run the indexing service and search service on different servers within a farm to increase scalability and throughput. Windows SharePoint Services 3.0 search is limited to running the indexing service and search service on the same physical server.
- ❑ Configuring Office SharePoint Server 2007 search is an administrative exercise in creating and configuring content sources within the scope of a particular Shared Service Provider (SSP). A content source defines a set of searchable content. When you create a new SSP, Office SharePoint Server 2007 automatically creates a content source to search through user profile data as well as the content and documents within Office SharePoint Server 2007 portal sites and Windows SharePoint Services sites within the web applications associated with the current SSP. However, the SSP administrator must explicitly create and configure additional content sources to support building indexes and searching through external content such as documents in a Windows file share or content from an intranet or public web site.
- ❑ Windows SharePoint Services 3.0 and Microsoft Office SharePoint Server 2007 provide a rich user interface for searching by adding search boxes and search result pages to each Windows SharePoint Services site and each Office SharePoint Server 2007 portal site. Microsoft Office SharePoint Server 2007 goes even further, supplying a dedicated child site named Search Center within a portal site collection that provides a specialized user interface for searching, as shown in Figure 1-5.

With all these new features, you might conclude that developers can take full advantage of Office SharePoint Server 2007 Search facilities without writing any custom code, as the product provides so many features out of the box. However, Office SharePoint Server 2007 makes it possible for you to customize how search results look by modifying the Extensible Stylesheet Language Transformations (XSLT) it uses to display search results. Office SharePoint Server 2007 also exposes its search engine through a programmable API that enables developers to extend either the Windows SharePoint Services 3.0 Search service or the Office SharePoint Server 2007 Search service using custom code. This enables you to write a server-side component such as a custom workflow that queries the Office SharePoint Server 2007 Search service through code and renders the search results in a customized site.

Additionally, you can easily integrate SharePoint Search features into a third-party web site and preserve that site's look and feel by leveraging SharePoint web services for searching as part of the implementation, returning the results to that site as XML and then applying a transformation to render the results as you'd like them to appear.

To further look at the benefits of Search in SharePoint, we want to take a deeper look at the Business Data Catalog and features to enable the integration of Search into structured application data.

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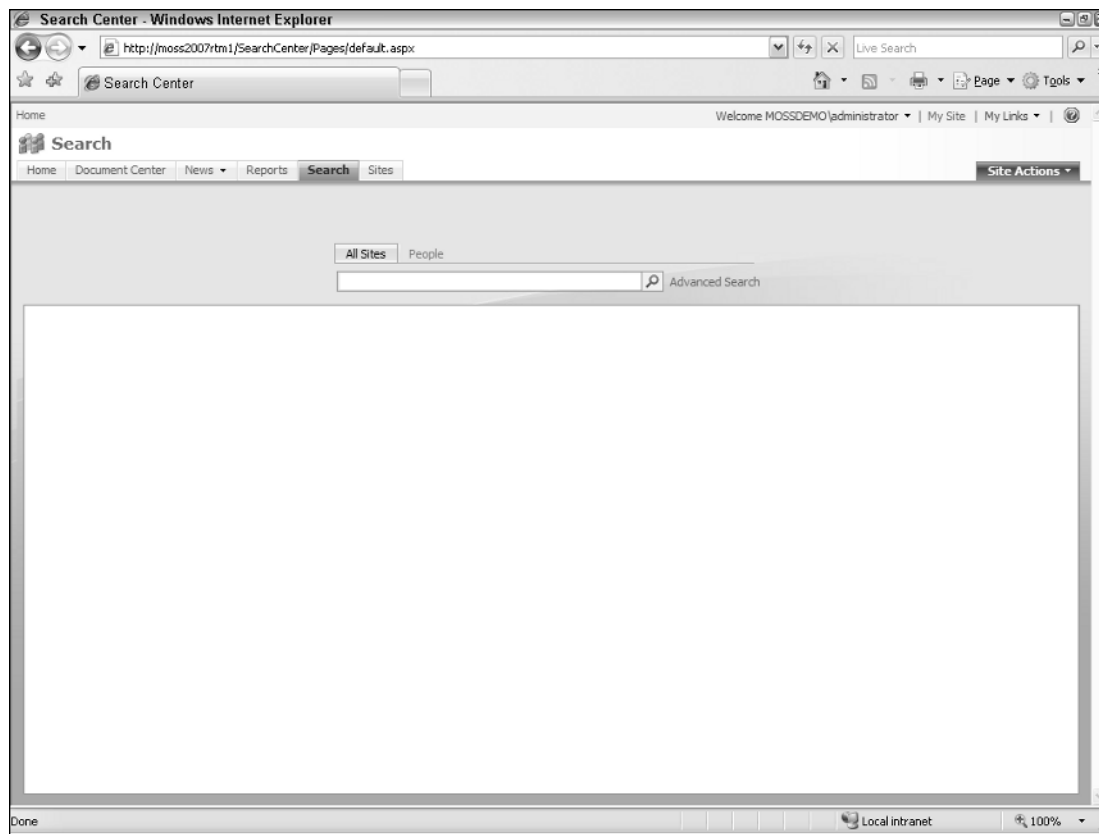


Figure 1-5

The Business Data Catalog

The Business Data Catalog (BDC) is a new framework that provides Office SharePoint Server 2007 portal sites and standard Windows SharePoint Services 3.0 sites with integration into systems such as those created by SAP, Siebel, and PeopleSoft or your custom applications for your business. The BDC additionally provides the means to integrate data directly with database systems such as SQL Server and Oracle. While SharePoint Portal Server 2003 makes it possible to integrate portal sites with back-end systems, it requires you to write custom code to manage connections to those systems and retrieve the data you need to display. Furthermore, the code you must write changes significantly as you switch between back-end systems from vendors such as SAP and PeopleSoft. The BDC is designed to make things much easier by providing a generalized layer of abstraction and some value-added functionality such as out-of-the-box Web Parts and search services for BDC data.

There are several key scenarios for extending BDC data to custom applications as well. For example, you can write a custom Web Part or a console application to display your business data. You can use the Runtime object model in a Web Part or console application to query the metadata database and display data from a back-end application. When using the Runtime object model, you can invoke methods and display business data on a page. The BDC also offers an Administration object model that you can use to create, edit, and delete metadata. The main goal of the Administration object model is to enable you to

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write tools that simplify the creation and administration of metadata. You can then use the Administration object model to support a Windows Form or a web application for managing metadata. In addition, the BDC enables you to bring data from business applications to user profiles. For example, you can add your contact information, such as an address field, from an SAP or Siebel application registered in the Business Data Catalog to the user profiles.

Integrating Back-End System Data with No Code

Fundamentally, the BDC enables you to integrate data from back-end systems without requiring you to write custom code for managing connections and retrieving data. The design of the BDC is based on standardized metadata that describes the location and format of a back-end system and the data entities defined inside. The BDC also provides an execution component capable of reading BDC metadata that is able to retrieve external data from any back-end system and return it to Office SharePoint Server 2007 in a standard format. Connectivity between the BDC and traditional line-of-business systems is achieved using standard web services. Connectivity between the BDC and database systems is achieved using ADO.NET providers.

The first step in using the BDC is to author an XML file containing the metadata to connect to a back-end system. When you author metadata for the BDC, you define the data you want to retrieve in terms of entities. For example, you might define a customer as one entity and an invoice as another entity. The BDC metadata format also enables you to define associations between entities in scenarios for which there is a one-to-many relationship, such as one that might exist between customers and invoices. The definition of a BDC entity contains identifiers, properties, and methods.

The methods define how the BDC interacts with entry points exposed by the back-end system. For a back-end system accessible through web services, methods define the names of the web service operations and the parameters required to call them. For a back-end system that is a database such as SQL Server or Oracle, methods define the names of stored procedures and SQL statements.

Entities can also define actions. A BDC action is used to dynamically parse together the URL behind a hyperlink that enables a user to navigate from a page in an Office SharePoint Server 2007 portal site to another location. For example, an action defined on a BDC customer entity could be written to redirect users to a web page in an SAP application that supports updates to customer information. Actions were designed to support scenarios in which the BDC is used to display read-only data and to bootstrap the user into another application when updating or some other type of external operation is required. The overview for this architecture is shown in Figure 1-6.

More details on the architecture of Search and the BDC are covered in Chapter 2.

Once you have authored or acquired the XML file with the required BDC metadata for a back-end system, you must import it into the BDC within the scope of a particular SSP to create a BDC application. You can accomplish this import process using the SSP administrative web pages. You can alternatively import an XML file with BDC metadata using custom code written against the BDC Administration object model. Once you have imported the required metadata to create a BDC application, there are several out-of-the-box techniques for leveraging and displaying its data within a portal site. Microsoft Office SharePoint Server 2007 ships with a set of Business Data Web Parts that can be quickly added to pages to query and display BDC data. You can also add new columns to lists and document libraries based on an entity defined in a BDC application. A user editing a column based on a BDC entity is automatically presented with a user interface, making it possible to query the back-end system. The BDC has been designed to integrate with the Office SharePoint Server 2007 Search Service as well.

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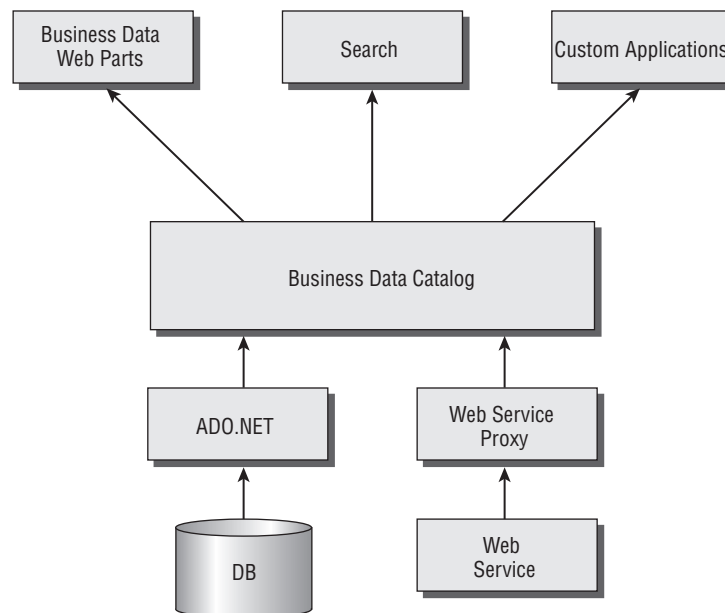


Figure 1-6

For example, a back-end system and its entities can be defined as a content source so that the Office SharePoint Server 2007 indexing service will crawl through its data and build indexes for the Office SharePoint Server 2007 Search engine. This becomes a powerful feature because it enables users to discover data from back-end systems about things such as customers and invoices when running standard search queries through both Office SharePoint Server 2007 portal sites and standard Windows SharePoint Services 3.0 sites.

The BDC provides convenient features to map data from a BDC entity to properties in a user profile and to synchronize this data at periodic intervals. For example, if your company has an SAP system that contains employee data you would like to include in user profiles, such as phone numbers or social security numbers, you can configure this type of data importing without writing any custom code.

Integrating Back-End System Data Using Custom Code

Finally, BDC entities can also be accessed programmatically using custom code written against the BDC object model. This makes it possible to write custom Web Parts as well as other server-side components and services that run their own BDC queries. One nice aspect of writing code to query BDC entities is that you don't have to worry about managing connections or whether you are accessing the back-end system through web services or ADO.NET. All those details are abstracted away by BDC metadata and the BDC execution engine.

More details about the BDC architecture and the implementation of business data services in SharePoint is provided in Chapter 2.

The main value of the Business Data Catalog is that it enables a developer to integrate existing business data through the SharePoint Search infrastructure and then use a single set of APIs to query the search engine and render results within an application.

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Document and Content Management

Developers familiar with previous SharePoint versions have offered the criticism that some key features supported with document libraries do not extend to lists. Features such as version control extended to document libraries, but lists did not have the same level of support. In Windows SharePoint Services 3.0, the functionality of lists has been extended, and they are now on a par with document libraries, supporting many of the same features, such as versioning, events, and folders. Additionally, some new features in Windows SharePoint Services 3.0 are supported by both lists and document libraries, such as exposing data through automatic RSS feeds.

Improved Performance with Large Lists and Document Libraries

Performance with large lists and document libraries has also been another concern with previous SharePoint versions. For example, lists often started showing degraded performance when the number of items exceeded several thousand. Document libraries have had similar performance concerns in the past, causing implementers and developers to focus on creative workarounds. Since the rule of thumb for not exceeding a few thousand documents applied to each folder within a document library, as opposed to the document library itself, schemes to partition documents across multiple folders within a document library became a popular workaround in Windows SharePoint Services 2.0 for dealing with a large number of documents. Windows SharePoint Services 3.0 introduces a new column indexing feature to help mitigate these performance issues. From a list settings page or a document library settings page, you can add an index to any column. Doing this does not actually create a physical index in SQL Server. Instead, it creates a table with the integer ID of the list item or document and the value of the indexed column. Windows SharePoint Services then uses this table to improve the performance of data returned from views, especially a view with a filter based on the indexed column.

Extensible Field Types

Many developers have expressed a desire to work with Windows SharePoint Services fields at a lower level to obtain more control over field rendering and validation, features that are important when building business applications on top of the SharePoint infrastructure. As a result, the product has been enhanced with the addition of extensible field types in Windows SharePoint Services 3.0. You can create an extensible field type by writing a class in C# or Visual Basic .NET that inherits from one of the built-in Windows SharePoint Services field types, such as `SPFieldText`, `SPFieldNumber`, or `SPFieldUser`. An extensible field type can also utilize an ASP.NET user control that contains your favorite web controls. This enables you to use the same techniques for control initialization and validation that you have used in ASP.NET applications.

Custom Site Columns

Another feature added to Windows SharePoint Services 3.0 is custom site columns. A *site column* is a reusable definition that can be used across multiple lists. A site column defines the name for a column, its underlying field type, and other characteristics such as its default value, formatting, and validation. Once you have defined a site column, you can then use it as you define the structure of your user-defined lists. An obvious advantage is that you can update the site column in a single place and have that update affect all the lists where the site column has been used.

A site column is defined within the scope of a single site, yet it is visible to all child sites below the site in which it has been defined. Therefore, you can create a site column that is usable across an entire site collection by defining it in the top-level site.

One convenient technique made available with the introduction of site columns is the ability to perform field lookups across sites. For example, you can create a site column in a top-level site that performs a

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lookup on a list in the same site. Then you can create other lists within child sites that use this site column to perform lookups on the list in the top-level site. In Windows SharePoint Services 2.0, you had no way to accomplish this task short of writing custom code.

Content Types

Imagine you want to store several different types of documents in the same document library — for example, if you needed to store presentations, sales proposals, and customer activity reports, and each of these document types had its own unique set of custom columns and its own unique event handlers. In Windows SharePoint Services 2.0, you can add extra columns and event handlers only to the document library itself, which always affects every document in that document library. In addition, a Windows SharePoint Services 2.0 document library can have only one associated document template. Windows SharePoint Services 3.0 introduces a powerful new storage mechanism known as *content types* to solve this problem. A content type is a flexible and reusable Windows SharePoint Services type that defines the shape and behavior for an item in a list or a document in a document library.

For example, you can create a content type for a presentation document with a unique set of columns, an event handler, and its own document template. You can create a second content type for a sales proposal document with a different set of columns, a workflow, and a different document template. Then you can create a new document library and configure it to support both of these content types. The introduction of content types is significant to Windows SharePoint Services 3.0 because it provides a capability that did not exist in Windows SharePoint Services 2.0 — the capability to deal with different types of content in lists and document libraries.

Web Content Management

In the past, Microsoft customers have been forced to choose between Content Management Server (CMS) and SharePoint Portal Server 2003 for Web Content Management solutions based on web site design requirements, authoring and editing processes for a web site, and other factors. While there is a connector that provides a degree of integration between CMS and SharePoint Portal Server 2003, these two products are built on very different architectures. This has resulted in frustration because you cannot build a site that fully benefits from both the CMS Web Content Management features and the SharePoint Portal Server 2003 portal features.

To address this problem of a lack of integration in these key products, the Microsoft product teams supporting SharePoint and CMS ultimately merged the functionality of the products and built the new Web Content Management infrastructure on top of Office SharePoint Server 2007. While this impacts customers who have already become familiar with CMS development, the good news is that Microsoft's Web Content Management strategy is now built on Windows SharePoint Services 3.0 and Microsoft Office SharePoint Server 2007. Now you can mix Web Content Management features with the portal features in an Office SharePoint Server 2007 portal site to provide a richer web experience as a web site developer, with much more functionality available through out-of-the-box templates than in previous versions.

For those familiar with the previous CMS product, the infrastructure has been designed using basic Windows SharePoint Services 3.0 building blocks such as child sites, page templates, content types, document libraries, and security groups. This approach lends itself to building custom solutions that extend the basic Web Content Management infrastructure using standard Windows SharePoint Services components

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such as custom event handlers and workflows. When you need to brand an Office SharePoint Server 2007 portal site, you can modify a single ASP.NET master page to customize the basic look and feel of the entire web site, just as you would in a standard Windows SharePoint Services 3.0 site collection. However, Office SharePoint Server 2007 extends Windows SharePoint Services 3.0 by introducing a publishing scheme based on page layouts. A *page layout* provides a structured approach to collecting content from content authors and displaying it on a page within a portal site, as shown in Figure 1-7. Page layouts are designed to make it fairly straightforward to add and modify content from within the browser.

Microsoft Office SharePoint Server 2007 provides a toolbar within the browser to give content authors and approvers a convenient way to move content pages through the editing and approval processes. Each page layout is based on a Windows SharePoint Services 3.0 content type and an associated .aspx page template. By layering page layouts on top of content types, Office SharePoint Server 2007 makes it possible to add custom fields for storing different types of structured content such as HTML, links, and images. Once a custom field is defined inside the content type associated with a page layout, it can be data-bound to the associated .aspx page template using another new Office SharePoint Server 2007 component known as a *field control*.

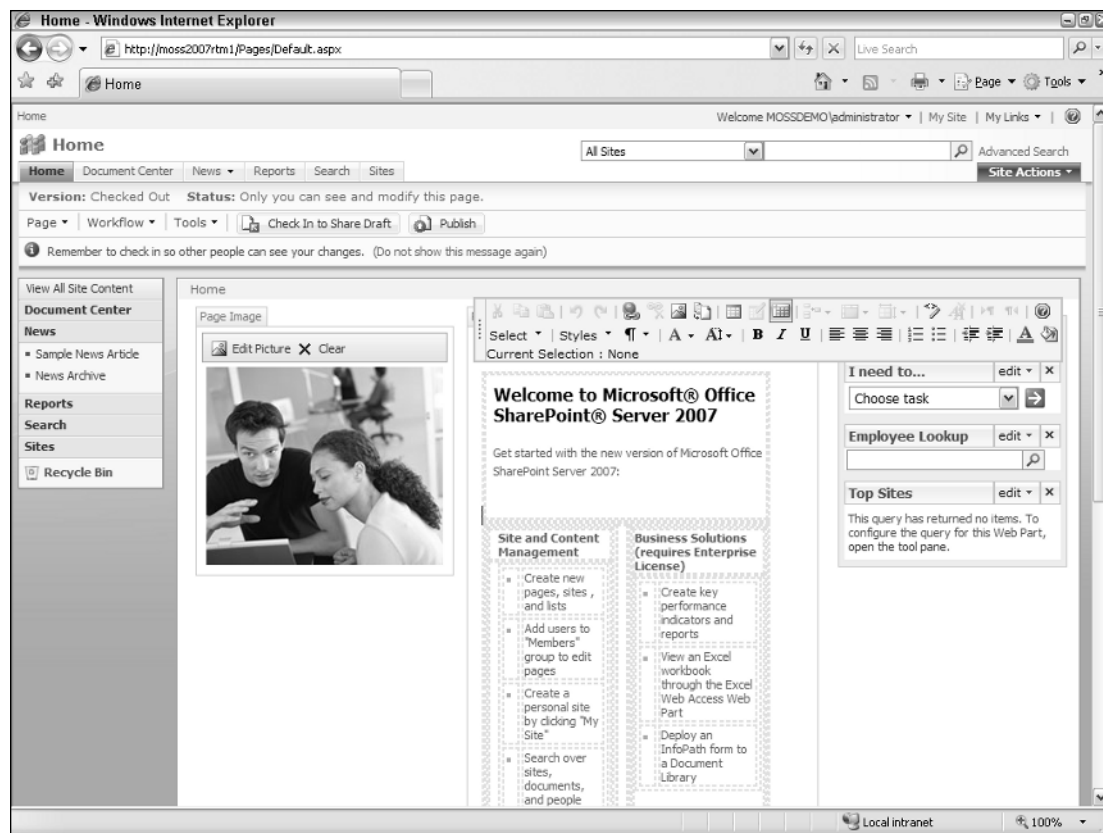


Figure 1-7

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Combining these page layout and content delivery features with the workflow-driven approval (see Figure 1-8), the ability to automatically convert Office document formats into web-based content, multi-lingual and site synchronization support, and the ability to leverage Web Parts makes the Web Content Management features of Microsoft Office SharePoint Server 2007 compelling for many web site development efforts, both internal to organizations (for example, corporate portal) and for Internet-facing web sites.

Additional information about the SharePoint Web Content Management features and integration with the Office client applications is provided in Chapters 9 and 10.

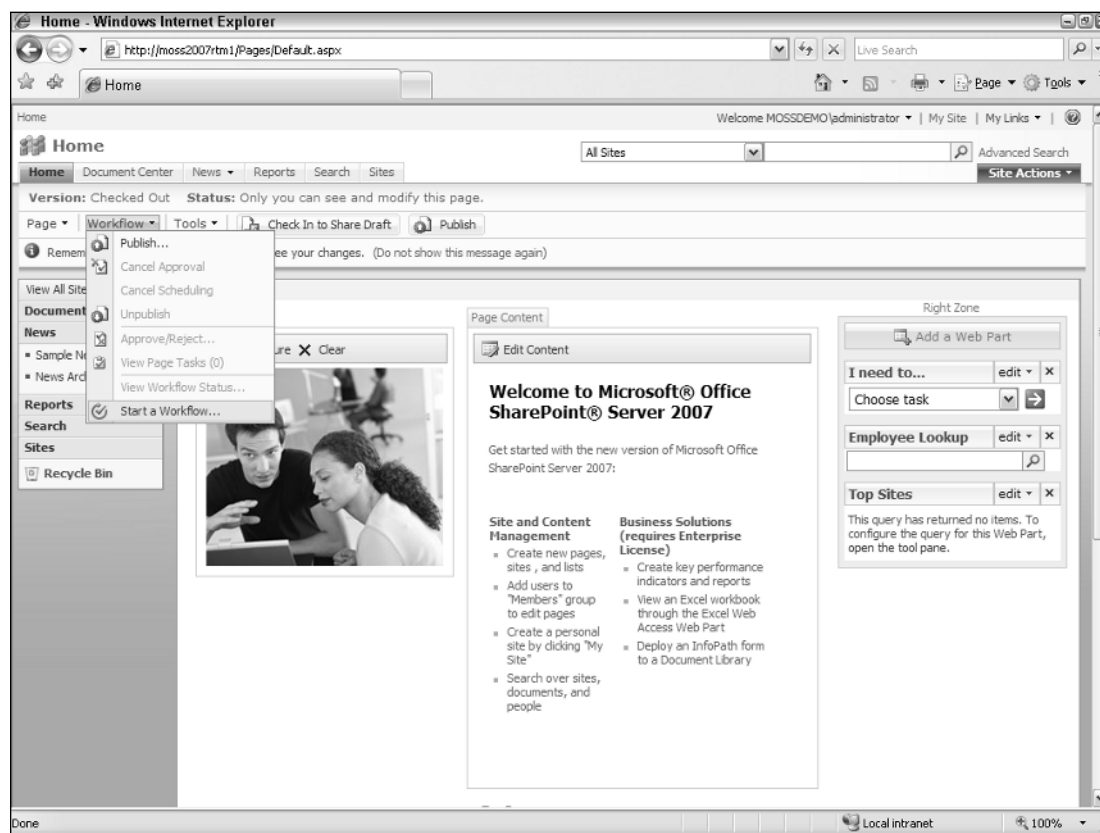


Figure 1-8

Workflow Services

Workflow applications are some of the most challenging for developers, who often need to work across systems and provide business users with functionality without a lot of constant application and code maintenance. Microsoft's approach to solving workflow has been to develop and deploy workflow as a platform-level service that can be used across applications as part of the .NET Framework 3.0. The Microsoft workflow capabilities, named the Windows Workflow Foundation (WF), add a complete infrastructure for building workflow-enabled applications.

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The WF infrastructure includes a workflow engine, pluggable components to persist workflow state, and a Visual Studio designer that makes it easy to create custom workflows by dragging components known as *activities* onto a workflow design surface. Windows SharePoint Services 3.0 builds on WF to provide a foundation for attaching business logic to list items and documents. Windows SharePoint Services 3.0 extends the basic workflow model of .NET 3.0 by associating a task list and history list with each workflow. Windows SharePoint Services 3.0's extensions add a degree of responsibility and accountability to workflows that are human-oriented in nature, such as a workflow for reviewing or approving a document. This provides the basis for a significant amount of functionality for workflow between Office applications and SharePoint.

Both Windows SharePoint Services 3.0 and Office SharePoint Server 2007 ship with workflows that are installed and ready to use out of the box. Windows SharePoint Services 3.0 includes some simple routing workflows for tasks such as moderation and approval. Office SharePoint Server 2007 supplies workflows that are more complex and are used to support features such as its Web Content Management approval process.

The creation of custom workflows represents an obvious extensibility feature for developers creating business solutions with Windows SharePoint Services 3.0 and Office SharePoint Server 2007. In addition to the standard support of the Visual Studio Extensions for WF, Microsoft provides a Windows SharePoint Services workflow SDK and a workflow starter kit, including Visual Studio project templates for creating custom workflows targeted at Windows SharePoint Services 3.0 sites. Office SharePoint Designer 2007 also provides support for creating custom workflows in SharePoint sites. This support is designed more for power users than developers because it provides a wizard to attach ad hoc business logic to list items and documents in a production Windows SharePoint Services 3.0 site.

For more in-depth coverage of workflow in SharePoint, see Chapter 8.

Integration with Office 2007

One of the major advantages of SharePoint and Office is the integration of the Office client tools with the back-end SharePoint services. Going forward, developers have the opportunity to build applications both in SharePoint and in Office that seamlessly work across environments. For example, you can build a custom workflow that is hosted in SharePoint and surfaced through Office documents to enable users to use their browser or just work within the Office client application to move the process along to the next step. Throughout this book, we'll point to some key examples where SharePoint and Office working together provide a great set of capabilities, and demonstrate how Office can be an integral part of the development platform.

Document Formats

In past versions of Microsoft Office Word, Excel, and PowerPoint, Microsoft has relied on a default file structure that is based on binary files written in a proprietary format. These formats have been very hard to read and modify unless you go through the object model of the hosting Office application such as Word or Excel. As a result, companies have tried to run Office desktop applications on the server, which poses serious problems with scalability and robustness. In many cases, these applications simply do not work due to concurrency issues. Office 2000 and Office 2003 added some limited capabilities for creating Excel spreadsheets and Word documents using XML. In the 2007 Microsoft Office system, Microsoft has taken this idea much further by adopting the Open XML Formats for Word, Excel, and PowerPoint documents.

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The Open XML Formats is a new file standard for creating composite documents containing multiple inner XML files that factor out content from other aspects of the document, such as formatting instructions, data, and code.

The top-level file in the Open XML Formats is known as a *package*, and it is structured using standard ZIP file technology (see Figure 1-9). The internal files contained within a package are known as *parts*. Many parts within Word, Excel, and PowerPoint files contain XML structured in accordance with published XML schemas. Other parts within a package can consist of binary files for items such as graphics, audio clips, and videos. The Open XML Formats provide a standard approach for reading, manipulating, and generating documents in server-side scenarios where the automation of a desktop application such as Word or Excel isn't a viable option. Consider a scenario in an Office SharePoint Server 2007 portal site when you have created and configured an event handler, triggered whenever someone uploads a new Word document. The new Open XML Formats make it significantly easier to extract data or to perform hygiene such as removing comments and personal information from the document.

You can also leverage Open XML Formats to develop server-side components that generate Office documents using data pulled from content sources such as a Windows SharePoint Services list or the Business Data Catalog. To get started working with the Open XML Formats, you need to learn about the *Package* class under the *System.IO.Packaging* namespace in .NET Framework 3.0. This is the API to use when opening and creating packages. By leveraging these open formats, you can more effectively build applications to integrate Office content into your business processes.

For more detail on the Open XML Formats and how to apply them when building your applications to bind to data formats and extend the user interface in Office applications, see Chapters 4 and 5.

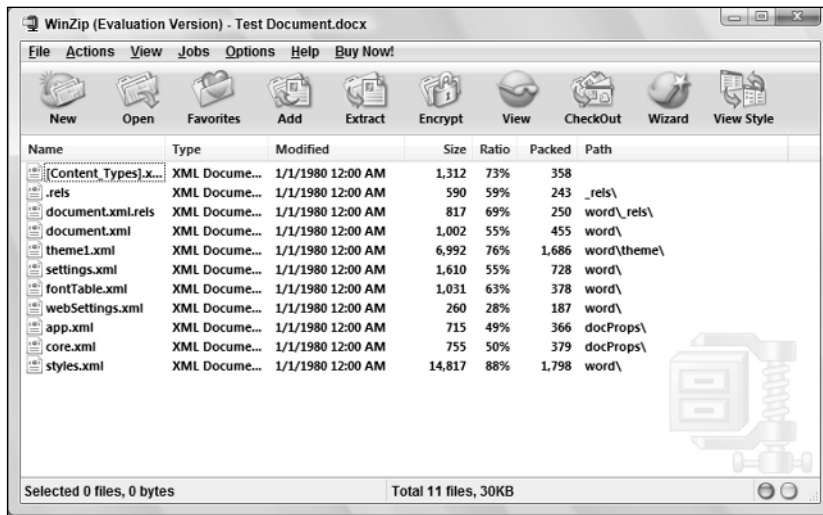


Figure 1-9

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InfoPath Forms Services

Since Microsoft Office InfoPath's introduction with Microsoft Office 2003, many companies have found that it provides a quick and efficient solution for creating electronic forms to collect data from business users. The InfoPath 2003 forms designer provides a high level of productivity because it significantly reduces or eliminates the need to write custom code when developing forms, but can be extended to connect with web services or databases fairly easily. InfoPath also creates a very reliable way to collect data because InfoPath forms are built on top of XML schemas, enabling them to automatically validate the user's input and the structure of the document for processing.

InfoPath 2003 provides a convenient integration point with Windows SharePoint Services 2.0 whereby a form designer can publish an InfoPath form on a Windows SharePoint Services site, creating what is known as a forms library. A *forms library* is a hybrid Windows SharePoint Services document library that uses an InfoPath form template as its underlying document template and acts as a repository for XML documents containing form data entered by users.

A major limitation of InfoPath 2003 and its integration with previous versions of SharePoint is that it requires a full version of InfoPath to be installed on the user's desktop. This is true not only for those designing forms, but also for any users who need to read or modify data in an InfoPath form. The problem is that the features of InfoPath 2003 do not extend to users for whom deploying Office 2003 on their desktop isn't an available option. This is a common occurrence when forms need to be extended to users outside of your company or when the forms applications need to be accessed from computers that do not have Microsoft Office installed. To solve this issue, Microsoft Office SharePoint Server 2007 introduces InfoPath Forms Services. This functionality is also available in a standalone server product named Microsoft Office Forms Server 2007.

InfoPath Forms Services has been designed to render InfoPath forms within the browser to reach users who are not running InfoPath. In fact, InfoPath Forms Services doesn't even require users to be running a version of Microsoft Internet Explorer or the Windows operating system. Microsoft has tested InfoPath Forms Services for compatibility with browsers such as Firefox, Safari, and Netscape as well as several other HTML-enabled mobile devices.

You can use the Office InfoPath 2007 forms designer to create web-enabled forms, which can then be deployed to Office Forms Server 2007. This forms designer provides a compatibility checker to ensure that your forms contain only controls and elements that are compatible with what Office Forms Server 2007 can render to the browser. While it is a bit tricky to do, it's also possible to create and deploy InfoPath forms intended for dual use. Such a form is downloaded to the desktop and loaded into the rich client environment when InfoPath is available on the desktop or otherwise rendered through the browser when necessary. This provides a solid, rapid application tool to help quickly build and deploy data collection applications or forms to front-end existing web services or other exposed business APIs.

Examples of InfoPath Forms Services applications are included in Chapter 6.

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Enterprise Content Management

Government agencies and other regulatory organizations have placed increasingly restrictive requirements on companies that generate and store large numbers of documents. In industries that aren't heavily regulated, a company's policies related to dealing with intellectual property and managing information assets can be a significant driver for advanced information management requirements. This inevitably impacts developers and IT professionals who build and manage the business systems that retain the company's information. The Sarbanes-Oxley Act and emerging privacy laws within the U.S. have made it much harder for companies to stay within acceptable levels of compliance, and these concerns are growing as the amount of information that companies are managing is increasing at a staggering pace. Microsoft Office SharePoint Server 2007 provides several enterprise content management features to address these challenges.

Many of the Office SharePoint Server 2007 features for enterprise content management are built on top of the new information management policy features. An *information management policy* is a SharePoint component that can be enabled and configured within the scope of a list or document library. Examples of information policies that ship with Office SharePoint Server 2007 include those for document expiration, auditing, and the automatic generation of bar code labels to identify physical documents and associate them with electronic copies maintained in a document library. The bar code and labeling policies can employ either descriptive labels based on underlying metadata or unique identifiers that are automatically generated for each document.

The SharePoint framework for information management policies was designed with extensibility in mind. For example, you can create a custom policy that checks the integrity of a digital signature on every document within a document library. You can create another policy that promotes document hygiene and privacy by removing all the comments and personal information from documents as they are uploaded to a document library. Other scenarios might include limitations of document printing to "high security" printers or print queues to help prevent dissemination of document content that must be printed out as part of its life cycle.

Another important feature of content management is the integration of the document authoring tools with the content management system. Often in document management systems the end users are required to enter metadata related to their documents. In Office 2007, the concept of a *Document Information Panel* has been introduced to facilitate this integration between Office and SharePoint. The Document Information Panel is designed to enable users to specify all the properties on a document at once, in one place, at any point when they are working with that document. The Document Information Panel is essentially an InfoPath form displayed within the client application that contains fields for the document metadata. The Document Information Panel enables users to enter metadata related to a file directly from the Office application. For files stored in Windows SharePoint Services 3.0 document libraries, the document information maps to the columns of the content type assigned to that particular document. The Document Information Panel displays a field for each content type property, or column, the user can edit.

Users can edit document column values either at the SharePoint document library level or from the Office client application. The metadata values are stored in the document itself as well as in SharePoint. If the user updates the document metadata in the document, the new values are saved in SharePoint when the document is saved back to its document library. Conversely, if the user updates the content type column values in the SharePoint site user interface, those values are saved in the document.

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For more information about how documents can leverage the Document Information Panel to support advanced content management, see a document and web content management scenario described in Chapter 10.

Microsoft Office SharePoint Server 2007 provides a dedicated site template named the Records Center to assist with records management, as shown in Figure 1-10. A Records Center site provides archiving support for companies that are required to keep certain types of business documents as official records of the company's activities. While archiving requirements vary across different regulated industries, keeping records is required to provide evidence of a company's activities in the event of a litigation dispute or an audit. While these features are not necessarily compelling to developers directly, they do provide a foundation on which applications that are subject to these requirements can be based.

Numerous reports can be generated automatically from a Records Center site to help information managers track the status of various types of content being retained in a company. For an example of how the Records Center site can be used in an application, see Chapter 6.

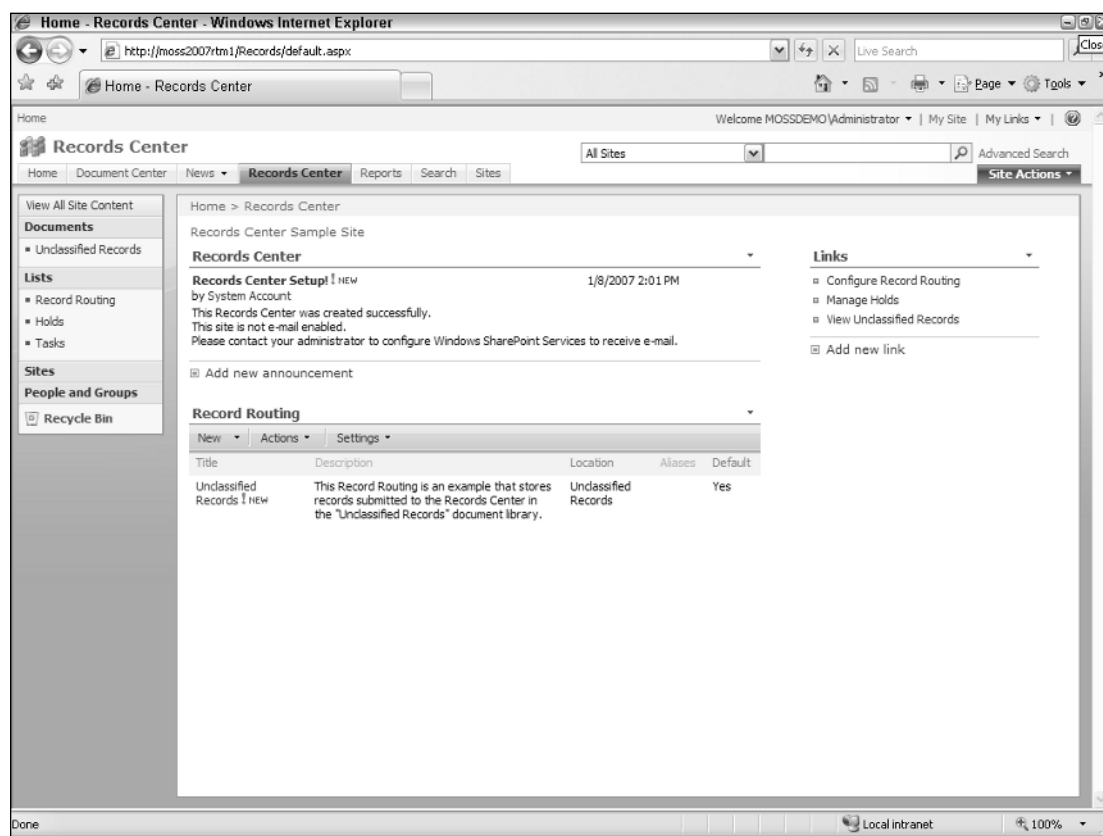


Figure 1-10

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SharePoint and Office Development in Visual Studio

Of greatest importance to developers when considering using SharePoint and Office platforms in their applications is whether or not the tools that they use to develop software can effectively be leveraged with these platforms. For developers who have been doing SharePoint development for a while, many have recognized the limitations of the developer tools and have been frustrated by those limitations. For those looking to build applications in Office, the situation was even worse. In the last couple of years, however, Microsoft has committed to making Office applications “first class” from a developer perspective. Part of this effort includes the revamped design application for SharePoint, now the SharePoint Designer instead of FrontPage (see Figure 1-11). The next sections take a look at a few of the key developer features that make Office and SharePoint 2007 viable for custom applications.

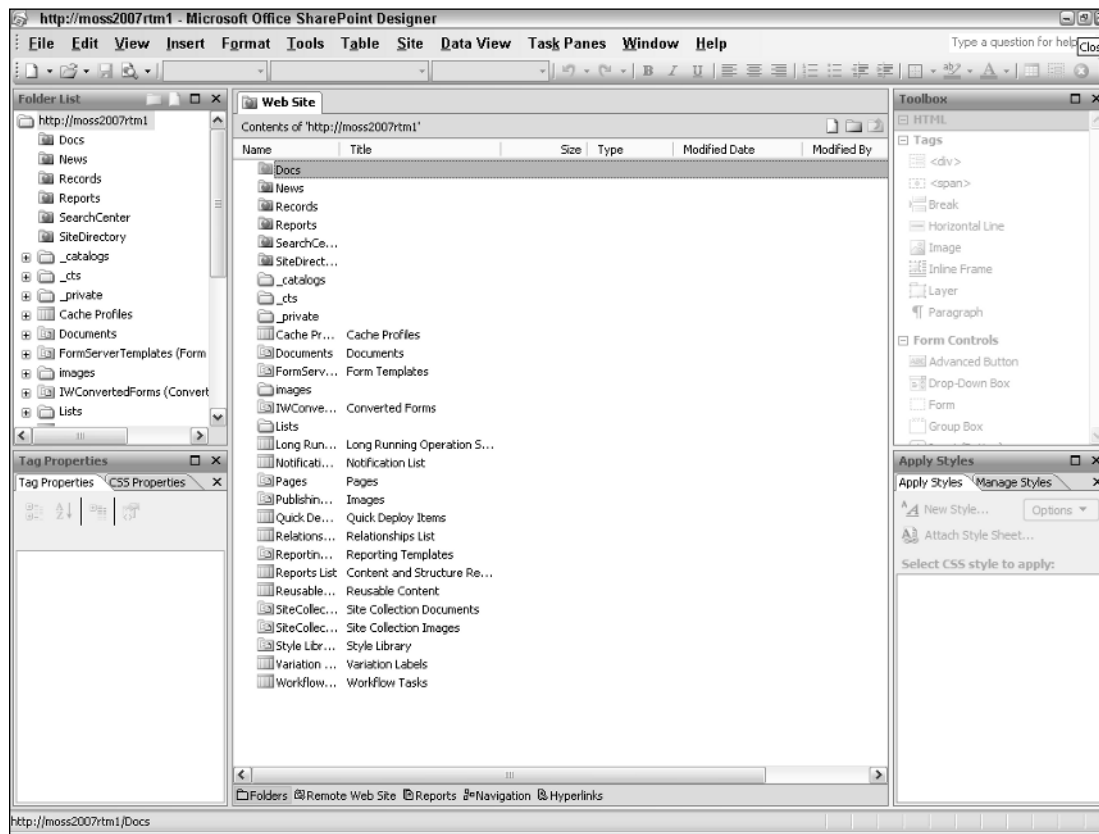


Figure 1-11

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Web Part Development

One of the most popular ways for developers to extend Windows SharePoint Services 2.0 sites has been to create custom Web Parts. Web Parts are great because they add the extra dimensions of user customization and personalization. As a consequence, many teams at Microsoft, and third-party companies, have built custom Windows SharePoint Services 2.0 solutions using Web Parts. Because of the popularity of Web Parts in Windows SharePoint Services 2.0, Microsoft decided to add support for custom Web Part development to ASP.NET 2.0. The goal to reach a wider audience of developers was reached by creating a new Web Part infrastructure for ASP.NET 2.0 that is similar to the Web Part infrastructure created for Windows SharePoint Services 2.0. As a result, there are now two different styles of Web Parts. The older WSS-style Web Parts depend on `Microsoft.SharePoint.dll` and must inherit from the `WebPart` base class defined by Windows SharePoint Services 2.0 in the `Microsoft.SharePoint.WebPartPages` namespace. The newer ASP-style Web Parts depend on `System.Web.dll` and must inherit from a different base class, also named `WebPart`, defined by the ASP.NET 2.0 team in the `System.Web.UI.WebControls.WebParts` namespace. In this book, we focus on the development of Web Parts based on the `System.Web.UI.WebControls.WebParts` namespace.

It was important for Windows SharePoint Services 3.0 to run both the older WSS-style Web Parts as well as the newer ASP-style Web Parts because not all Web Parts will be upgraded by the original developers. This was accomplished by building the Windows SharePoint Services 3.0 support for Web Parts on top of the ASP.NET Web Part infrastructure, and then making changes to `Microsoft.SharePoint.dll` so that WSS-style Web Parts written for the Windows SharePoint Services 2.0 environment would be forwardly compatible with the Windows SharePoint Services 3.0 runtime environment.

In addition to the Web Parts compatibility across SharePoint environments, Web Parts targeted toward the ASP.NET 2.0 architecture can also be supported by SharePoint. The development of Web Parts is a key requirement to enable users to have flexible and dynamic web sites that are composed of the key business data elements and system interaction features that they need.

We go into much greater detail about Web Part development in Chapter 5.

Business Intelligence Features

Microsoft provided developers and IT professionals with business intelligence (BI) features in SharePoint Portal Server 2003, the Office 2003 Web Parts and Components Add-in, and Microsoft Office Business Scorecard Manager 2005. While these products had a wide range of capabilities, the mix of products and technologies was often hard to grasp and effectively implement. Over the past few years, many developers have used these BI products as a platform for building dashboard-style applications that provide business managers with current data that reflects the health of a business and flags potential problems in a timely matter.

Even products such as Microsoft's BizTalk Server have offered extended functionality to support this kind of business activity monitoring capability, delivering customer portals and web tools to provide visibility to the end users and IT administrators. Leveraging the previous experience with these earlier BI components, Microsoft has designed Office SharePoint Server 2007 to include a platform for building dashboards

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and integrating with other technologies in the broader Microsoft BI landscape, such as Microsoft Office Excel 2007, Microsoft SQL Server Reporting Services, and Microsoft SQL Server Analysis Services. As with all other aspects of Microsoft Office SharePoint Server 2007, its BI platform builds on top of ASP.NET and Windows SharePoint Services 3.0 and provides many opportunities for extending what is provided out of the box.

Excel Services

Microsoft has received extensive customer feedback telling them that a large percentage of corporations maintain a significant amount of business logic in Excel spreadsheets and that this business logic has been hard to leverage and reuse across a large organization. This feedback led Microsoft to create Excel Services for Office SharePoint Server 2007.

Excel Services represents a server-side version of the traditional Excel calculation engine that has been rewritten for SharePoint. Excel Services doesn't suffer from the same types of scalability problems that occur when you run the desktop version of Microsoft Excel on the server. Excel Services also provides a server-side rendering engine that can display spreadsheets in the browser as HTML. That means a company can store all its Excel spreadsheets in a centralized document library and make them viewable by users who don't even have Excel installed on their desktop. In addition, consumers of this data can see the numbers displayed by a spreadsheet within the browser without having any access to the business logic behind it that represents a company's intellectual property. This prevents users from gaining access to proprietary formulas or calculations, and it can also prevent users from accidentally modifying key data elements or formulas in a spreadsheet, which often leads to "multiple versions of the truth" within a company that relies heavily on Excel reporting for key business metrics.

A key observation is that the Microsoft Office 2007 system introduces a new paradigm, one that recognizes that companies maintain business logic within Excel spreadsheets just as they maintain business logic within managed code inside compiled assemblies and within stored procedures in a SQL Server database. To support this new paradigm, Microsoft has added many new features to Office 2007 products designed to expose and update this business logic as well as to protect its intellectual property from users that should not have access to sensitive information but need access to the data rendered by Excel to do their jobs.

The new desktop version of Office Excel 2007 has been enhanced to allow information workers with Excel expertise to publish and update their spreadsheets in a document library on an Office SharePoint Server 2007 portal site or a Windows SharePoint Services team site (see Figure 1-12). Users running a version of Excel can view these spreadsheets through a rich client experience, while other users can rely on Excel Services to view the same spreadsheet inside the browser. Note that this new spreadsheet publishing metaphor enables a company to maintain a single master copy of its critical spreadsheets. It also enables the spreadsheet author to post updates without the need to involve the development staff or the IT staff.

It's important to note that the use of Excel Services isn't restricted to the browser. You can create a Windows Forms application that leverages the server-side Excel calculation engine but doesn't use the rendering engine. For example, a Windows Forms application can use standard web services from Excel Services to load a spreadsheet on the server, enter input data, perform calculations, and return a result. This example extends the analogy that Excel Services exposes the business logic defined in a spreadsheet just as SQL Server exposes the business logic defined in a stored procedure. This enables developers to truly leverage these assets as an enterprise-level application infrastructure component and to build systems around the data and calculations stored in Excel Services.

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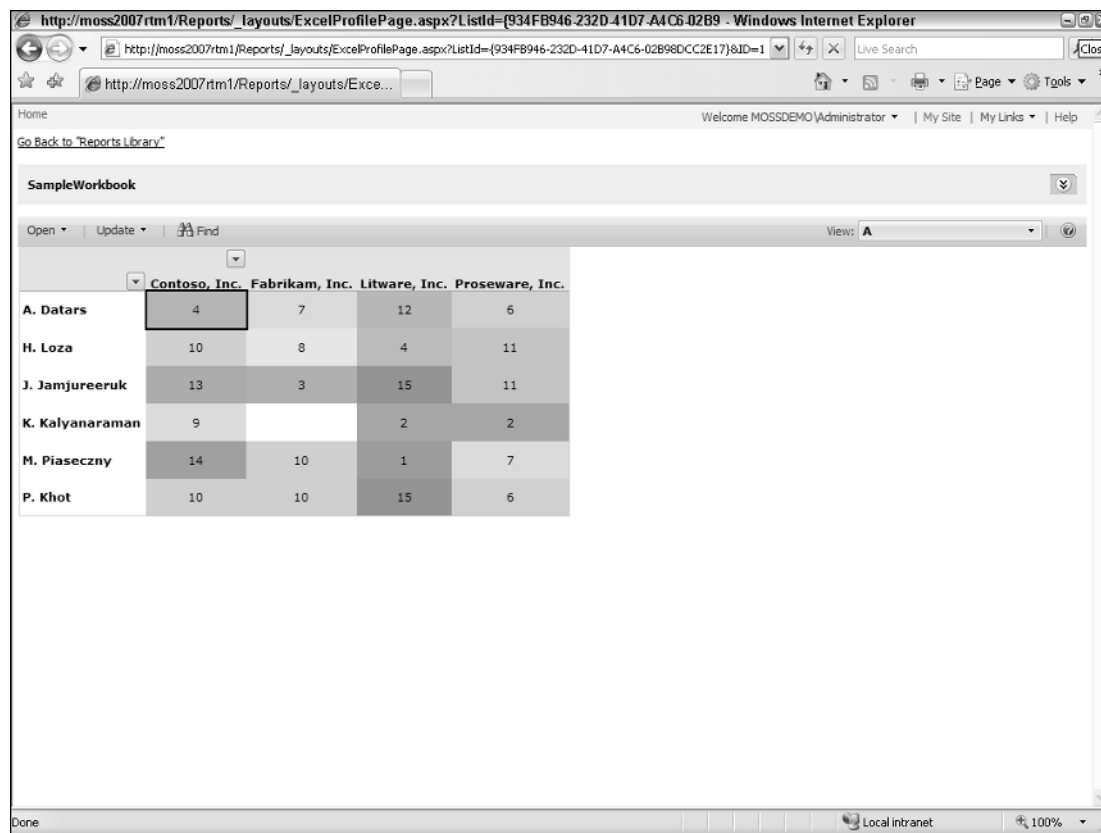


Figure 1-12

Report Center

Office SharePoint Server 2007 provides a special site template named Report Center, shown in Figure 1-13, for companies that want to build dashboard-style applications. Report Center was designed to make the new BI features of Office SharePoint Server 2007 easy to discover and use in the SharePoint paradigm. A Report Center site contains a document library named Reports Library that is designed to store and display BI reports such as Excel spreadsheets and reports built for SQL Reporting Services.

Another important aspect of Report Center is the built-in support it offers for creating and importing Key Performance Indicators (KPIs). A KPI is a common term used in the BI world to describe a visual indicator that tells a manager how some aspect of the business is doing. For example, the KPI for a product inventory level might display a green light when there is enough inventory to supply all the orders for the coming week. The light might turn from green to yellow when the inventory level drops below some predefined threshold, such as the amount of inventory required to supply orders for the next four days. The light then might change from yellow to red when the inventory level drops to a point where it will run out within the next 48 hours. In other words, a KPI flags aspects of a business that require immediate attention, alerting the appropriate users to take some action. Providing the capabilities to enable users to perform the banding and assignment of KPIs to the particular dashboards they want to monitor is critical to extending BI features to the broadest set of users and not just a few senior managers in an organization.

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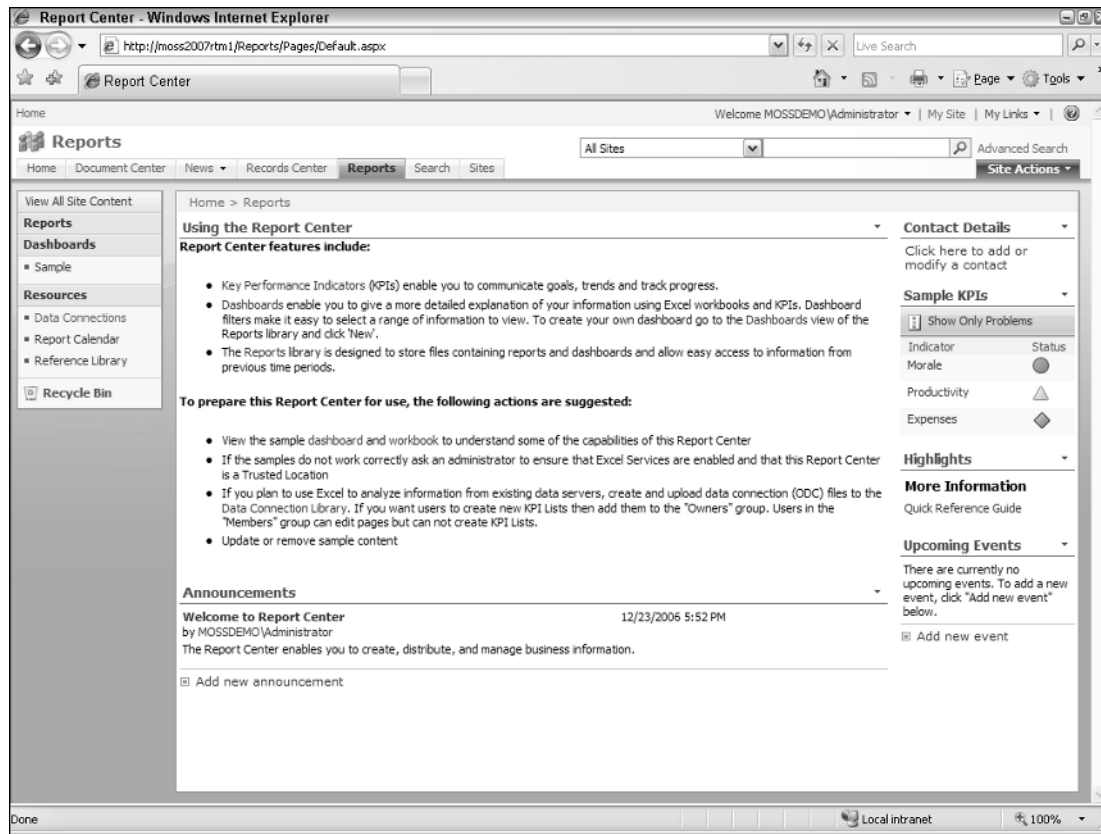


Figure 1-13

Office SharePoint Server 2007 provides support for creating several different types of KPIs. For example, you can create a KPI whose indicator changes automatically depending on data it dynamically reads from a Windows SharePoint Services list or an Excel spreadsheet (see Figure 1-14).

Office SharePoint Server 2007 also provides integration support for KPI in SQL Server 2005. That is, if you have already created KPIs with SQL Server Analysis Services, you can import and display them on a Report Center site along with other types of supported KPIs.

Another key feature of Report Center is the built-in framework it provides for filtering data before it is shown to the user. This is a key component of the Office SharePoint Server 2007 dashboard framework because it makes dashboard pages more relevant to the user. When a manager visits a Report Center site, the experience is enriched if the dashboard views have been customized with data that is relevant for that user. For example, a sales manager for the Eastern region of the United States can be presented with a different view of sales figures than the sales manager for the Western region of the United States might see.

Furthermore, managers like to be able to see high-level data at first and then be able to drill down into more specific categories on demand. Filtering support is built into Office SharePoint Server 2007 dashboards at the page level using Web Part connections. Office SharePoint Server 2007 supplies Web Parts

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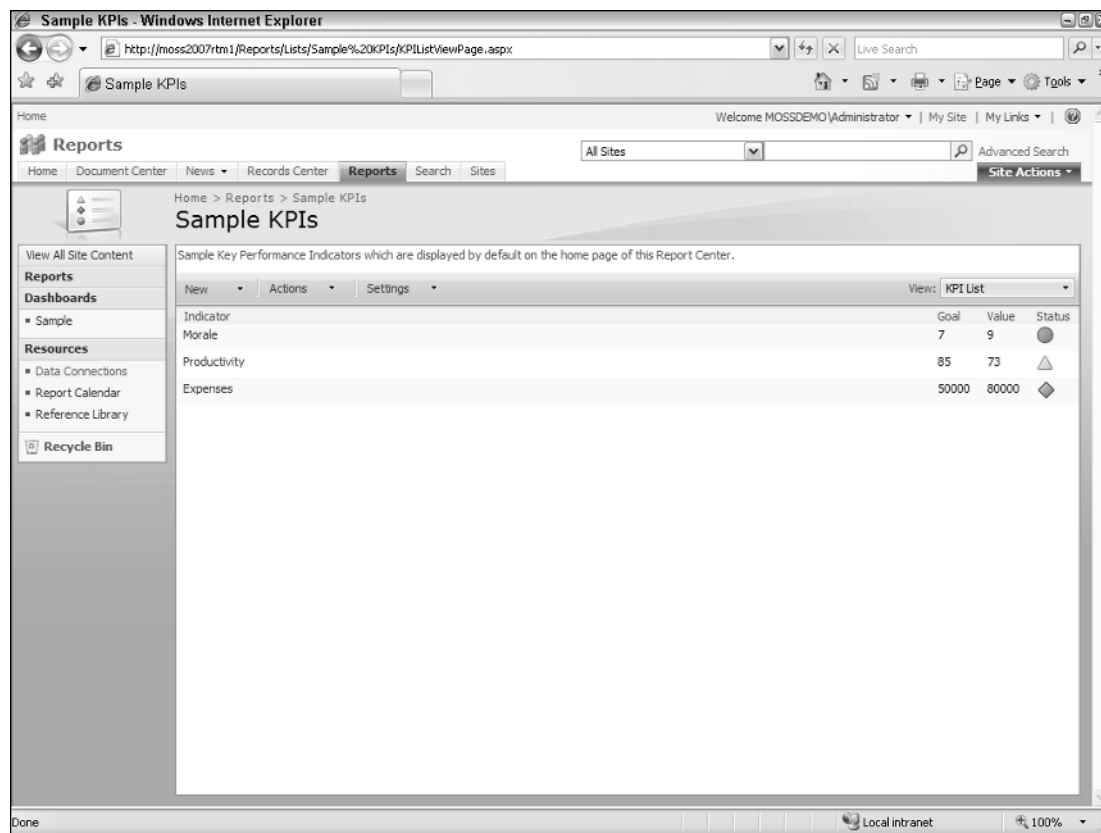


Figure 1-14

out of the box that enable page designers and users alike to specify criteria such as the name of the current user, a date range, or a product category. You also have many out-of-the-box Web Parts that can be configured to consume the filtering criteria supplied by other Web Parts, such as the standard Windows SharePoint Services List View Web Part and the Web Parts designed for use with the Business Data Catalog, Excel Services, SQL Server Reporting Services, and SQL Server Analysis Services.

Integrating the Desktop with Enterprise Systems

The key paradigm shift developers are facing is how to integrate rich desktop applications with enterprise systems, including Enterprise Resource Planning (ERP), manufacturing, Customer Relationship Management (CRM) and other repositories of business rules and critical business data. The trend toward service-oriented applications has been an important one, but one of the missing components has been integration of the standard desktop software that the average end users spend a lot of time working with.

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Until Office 2003 there was no simple way to integrate a web service into an Office application. Most people needing to leverage Office would have to go back and forth between applications or systems, or perhaps some clever software developers would write code to generate the Office documentation required for a business process. Once Office 2003 implemented support for the Information Bridge Framework, this kind of integration became a bit easier, but even then, end-to-end scenarios involving workflow, document routing, and approvals across applications, along with the ability to integrate with third-party systems, just wasn't there.

In the most recent wave of Office and SharePoint releases, the scenarios for enterprise integration are becoming much richer. In the Office client, the new file formats and support for web services mappings and extensibility are driving the development of increasingly rich UI applications tied to business applications based on Office products such as Excel, Word, or InfoPath. In the case of SharePoint, the Business Data Catalog (BDC) provides a metadata mapping layer to enable the integration of business application data into enterprise search, SharePoint Web Parts, and other custom applications. As developers start leveraging these features in their applications, the convergence of Office client functionality and SharePoint functionality can lead to fully featured business applications, integrated with the back-end ERP systems, all driven by user interaction with their desktop installation of Office.

The Office 2007 system of applications and SharePoint technologies are designed to provide a rich set of integrated features for document-centric work as well as business processes that involve the exchange of documents, workflow that integrates with external systems, and the capability to search across the company's information assets; and the technologies provide all of these features in a very small number of tools and corresponding user interfaces. As you read this book, consider the possibilities of better integrating applications with standard desktop tools so that end users can more easily access information and get their work done; and so that as a developer you can focus on solving hard technical problems, not rebuilding and repurposing a significant amount of code to support basic business processes. This represents a significant shift in paradigm for many developers, but one that can lead to strong productivity improvement and faster time to market for both end users and developers focused on building new business processes and automating them to support efficient business operations.

Summary

This chapter has provided a broad survey of the most significant services and features targeted at software developers in Microsoft Office 2007, Microsoft Office SharePoint Server 2007, and Windows SharePoint Services 3.0. In the subsequent chapters, we'll take a deeper look at the architecture of the SharePoint product to understand what level of customization is possible within the product and which APIs and development techniques can be harnessed to extend the product. The focus in these chapters is the developer's ability to leverage APIs for Office and SharePoint features that support both automation and integration with other systems, along with the developer's ability to customize and extend these platforms for use in business applications.

In addition, new technical features that are supported out of the box, including new file formats for Office, content types within SharePoint to support document management, new site templates in SharePoint for Search, Business Intelligence, and Records Management among other product features, will be reviewed in detail.