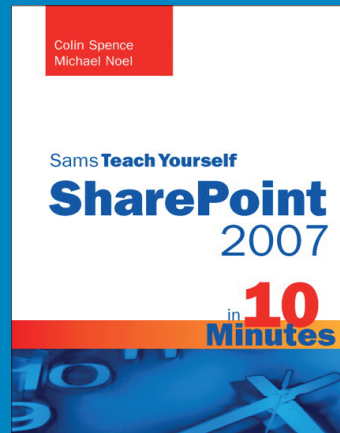
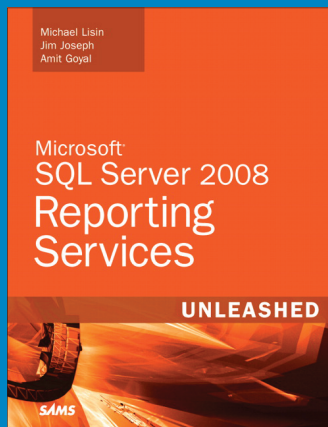
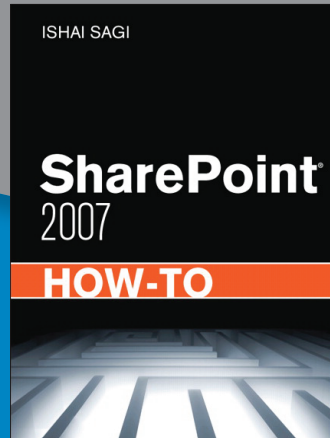
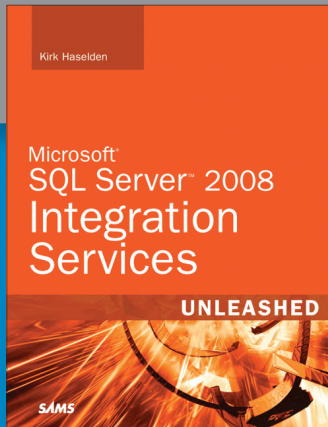


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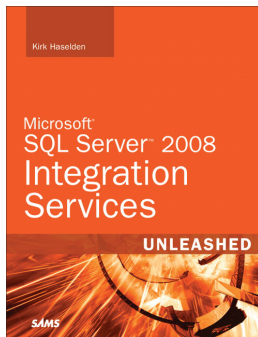
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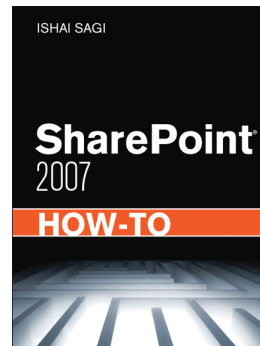


### Microsoft® SQL Server 2008 Integration Services Unleashed

9780672330322

Kirk Haselden

CHAPTER 3: What's New in  
Integration Services 2008

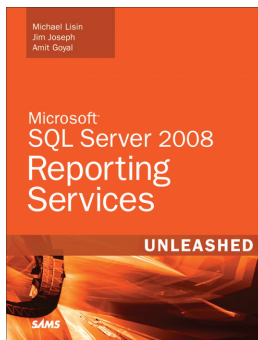


### SharePoint 2007 How-To

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Ishai Sagi

CHAPTER 3: Solutions Regarding Files,  
Documents, List Items, and Forms

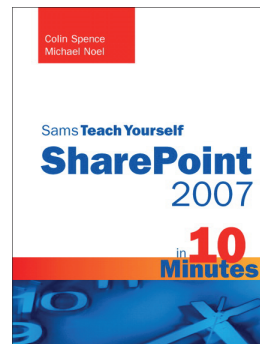


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CHAPTER 3: Understanding Sites  
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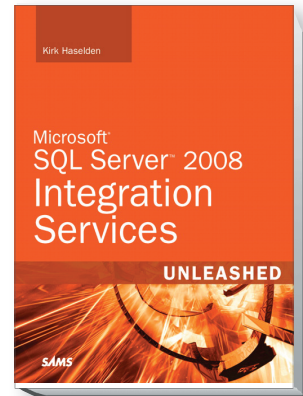
## Microsoft® SQL Server 2008 Integration Services Unleashed

Microsoft SQL Server Integration Services is Microsoft's powerful platform for building enterprise-level data integration and data transformation solutions. It's a powerful product, but it's also complex and can be confusing if you don't have a clear map for the journey. Microsoft SQL Server 2008 Integration Services Unleashed will be the only book you'll need to harness the power that Integration Services provides.


Through clear, concise explanations and samples, you'll grasp a clear understanding of working in the Integration Services environment, including how to set up stock components, how to use the various designer features, and how to gain practical knowledge on configuring, deploying, securing, and managing packages. Sample packages are provided to reinforce the discussion and quickly help you gain hands-on experience, and more complex topics such as Data Flow Task internals and tuning, advanced transformations, and writing custom components are all illustrated in easy-to-understand graphics. In addition, there are several custom tasks and transformations and two useful utilities with full source code available for you to use and study, including an ADO.NET destination, a text file encryption task, and a data profiling transform.

Detailed information on:

- Using the powerful Integration Services tools to create solutions without the need to write lines of code
- Creating packages programmatically or developing custom tasks via the Integration Services object
- Building robust packages to solve common requirements
- Securing packages for different environments
- Using often overlooked or unknown platform features
- Setting up all the stock components, including data flow components, tasks, Foreach enumerators, connection managers, and log providers
- Writing robust and useful custom tasks
- Building packages that seamlessly deploy to other environments
- Writing custom data flow adapters and transforms
- Using script tasks and components
- Easily modifying configurations for multiple packages simultaneously
- Writing a Task UI that looks just like the stock tasks
- Tapping into the power of Integration Services for accessing heterogeneous data sources
- Using expressions to make packages more responsive to the environment
- Migrating your DTS packages with no stress



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### About the Author

**Kirk Haselden** is the group program manager for the Microsoft Master Data Management product forthcoming in the next wave of Office SharePoint Services and owns the longterm strategy, vision, planning, and development of that product. Kirk has been with Microsoft for 12 years in various groups including Hardware, eHome, Connected Home, SQL Server, and Office Business Platform. He was the development manager for Integration Services and the primary designer for the runtime and many of the tasks. Prior to Microsoft, Kirk worked for several small startup companies building educational, dental, and online software. Kirk has a bachelor of arts degree in accounting and information systems from the University of Utah. He has written a number of articles for SQL Server Magazine, speaks regularly at industry events, writes profusely on his personal and MSDN blog, and holds 35 patents or patents pending. Kirk is married and the father of five wonderful children. He enjoys family time, photography, snow skiing, wake boarding, racquetball, motorcycle riding, hiking, breathing, drinking, and eating. He's always wearing hideous Hawaiian shirts, shorts, and sandals, except in the winter, when he also wears socks. He once lived in Wichita, Kansas, and thinks it's funny when people talk about themselves in third person.

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## CHAPTER 3

# What's New in Integration Services 2008

### IN THIS CHAPTER

- ▶ What's New for DTS Users
- ▶ What's New for Integration Services 2005 Users

Integration Services is the successor to Data Transformation Services (DTS), so those of you moving from DTS may notice some similarities. But because Integration Services 2005 was a complete rewrite, very little DTS code remains. In some ways, it is easier to list what is the same than to list everything that's different.

## What's New for DTS Users

If you are familiar with DTS, you'll quickly grasp the control flow concepts. In DTS, the control flow and data flow were all on the same design surface.

### Control Flow Changes

Integration Services provides a separate design surface for control flow and data flow. The separation makes it easier to understand and organize complex packages.

Integration Services still has tasks, but they have been cloistered to some extent because the package pointer is no longer passed to them, and through various mechanisms, the Integration Services runtime ensures that tasks do not access their own package during execution.

The DTS concept of a Step has been expanded to what is now called a *Taskhost*. The Step participated in the task execution scheduling. The Taskhost schedules the task execution and much, much more.

Integration Services still has the concept of precedence constraints. However, they have been made smarter by adding expressions to the precedence equation, and multiple

precedence constraints can point to the same task in an OR relationship such that if either precedence constraint is satisfied, the task will execute.

Connections still exist in Integration Services, but they are now called *connection managers*. In DTS, given certain conditions, a connection would serialize workflow. Connection managers generate a new connection every time you call `AcquireConnection`, so there is no connection conflict. Every task gets its own physical connection.

Logging still exists but has been expanded and updated. Variables are more important and flexible than their DTS counterparts, and the designer is much more comprehensive and powerful. Debugging support is now available in the form of breakpoints, watches, and call stacks. Eventing has been enhanced to make it possible to handle them inside the package with event handlers.

## Data Flow

The most extensive improvement for Integration Services was the Data Flow Task. Big gains were made in the data flow functionality. Where DTS has the Datapump, Integration Services has the Data Flow Task or Pipeline. The Datapump supported only one source, transform, and destination. DTS transformations are limited in scope, number, and performance. Integration Services Data Flow Tasks can perform extremely complex and advanced data processing within one pipeline. Placing them in a pipeline creates enormous flexibility in what can be accomplished.

Integration Services 2005 brought more than 30 different data flow components, including the lookup, merge, multicast, sort, aggregate, script, and other transforms. A number of data source and destination adapters also shipped making Integration Services a powerful enterprise-ready ETL tool.

As you can see, Integration Services carries forward, improves, and augments many of the concepts found in DTS while adding a few new tasks and many more transformations.

## What's New for Integration Services 2005 Users

Those of you familiar with Integration Services will be right at home with the new version. Little has changed with the overall experience. Most of the tasks and data flow components that you used in the 2005 version are still there. The designer and tools experience is mostly the same as well.

Here's what's different in 2008.

### Improved Data Flow Task

The Data Flow Task core processing has been improved to better utilize threads for more efficient and scalable execution trees. In certain data flow packages, the 2005 Data Flow Task could get into blocking situations or simply not utilize multiple processors as efficiently as expected. The 2008 data flow has some internal optimizations, smarter thread allocation, and other internal improvements that in many cases drastically improves overall data flow performance and eliminates thread blocking.

## Improved Scripting Experience

SQL Server 2008 scripting is built on the improved VSTA (Visual Studio Tools for Applications) rather than the VSA (Visual Studio for Applications) scripting engine. The most notable and visible advantage of VSTA is that it allows you to build scripts in C# as well as VB.NET. This task is covered in more detail in Chapter 12, "Using the Script Task."

## The Data Profiling Task

The Data Profiling Task is new in 2008 and provides a way to analyze data for discovering data issues, constraints, patterns, distributions, and other data profile characteristics. This task is covered in more detail in Chapter 11, "The Stock Tasks and Connection Managers." When you run the task, it can be tuned to look for certain anomalies or patterns in the data by row or column. The results are output to a file that can then be viewed by an included viewer application.

## Enhanced ADO.NET Support

Integration Services 2008 introduces an ADO.NET source and destination adapters. ADO.NET adapters were one of the most often requested features. These are full-featured adapters and provide the full custom UI experience. Because there are ADO.NET ODBC adapters, by nature of supporting ADO.NET, Integration Services now also supports connectivity through ODBC. These adapters are covered in more detail in Chapter 20, "The Stock Data Flow Components."

## Wizards

Integration Services 2008 introduces a new wizard called the Integration Services Connections Project Wizard that allows you to create connections, data flow, and a package as you create the project. This is a faster way to create a package that's functional from the start.

The Import/Export Wizard has been improved as well to scale better, support data conversion transformations, and to now support the new ADO.NET source and destination adapters.

While the Business Intelligence Development Studio (BIDS) automatically upgrades SSIS 2005 packages, the Package Upgrade Wizard allows you to upgrade multiple packages at the same time in bulk. It reads the packages from SQL Server, a file share, or the SSIS 2005 server and saves them to a destination you designate. The Package Upgrade Wizard is covered in more detail in Chapter 4, "Migrating to Integration Services 2008."

## Improved Data Flow Lookup Component

The new Lookup Component is perhaps the most improved of all features in 2008. It now allows you to source the reference data from just about anywhere including another data flow task. The Lookup Component also allows you to store the reference data in a cache thus drastically reducing the load times, which can be substantial for large reference sets or when the Lookup Component is in a Data Flow Task inside a loop. It now sports a new



miss-cache that stores the keys for lookups that failed to find a match in the reference set and does not attempt to find them again during the same run. Finally, the 2008 version now has a separate output for nonmatches. This should help eliminate some of the confusion and difficulty associated with having a single output for both error outputs and nonmatches. The Lookup Component is covered in more detail in Chapter 20.

## Other Improvements

Finally, there are a number of other minor changes, including enhanced diagnostics, improved logging, better error messages, and other bug fixes, that aren't covered here but represent a substantial effort on the part of the SSIS team and should improve the overall user experience.

## Known Issues

These are a few known issues that you should be aware of as you pick up the 2008 SSIS bits. None of them are serious or catastrophic, but they may leave you scratching your head for a while if you don't know about them.

### Saving Issues

When making changes to the package in the designer, be sure to save the changes before attempting to debug it. The designer may occasionally lose some editing changes to variable values or expressions, unless explicitly saved.

### Properties Pane

The Properties window doesn't update correctly, especially when a property has property expressions. This is particularly onerous when you are trying to debug a package and the issue involves property expressions.

### Variables Pane

Likewise, the value of the variable never updates in the variables pane when evaluate as expression is set to true. So, the problem is that when you look at the variable in the designer, it has one value, but when the package executes the value is different. But you never know, nor is there an easy or apparent way to find out because, and this was true in SSIS 2005 as well, the designer doesn't show the value of the variable while executing. The only way to find it is to put a watch on the variable during execution or to log the value of the variable.

### Upgrade

Script tasks don't upgrade correctly when they reference the Microsoft.SqlServer.Dts.ManagedDts assembly. If you have a script task or component that uses the SSIS runtime object model, you must ensure that this assembly is explicitly referenced. Add it by opening the Project menu and selecting Add Reference. Then select it from the .NET tab.

### Renaming Solutions

If you rename a project or solution, the most recently used project list in the main File menu doesn't reflect the rename. It still lists the project by the old name.

## Summary

Integration Services 2008 is an incremental improvement over Integration Services 2005. Many of the improvements are not visible from the outset but should become more obvious as you dig into the product and use it over time. For DTS users, there is a substantial ramp up for use and migration, and all the same challenges of upgrading to Integration Services 2005 apply. In the next chapter, Chapter 4, “Migrating to Integration Services 2008,” these topics are discussed in more detail.

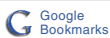
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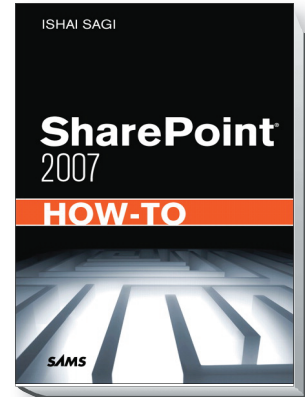


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## SharePoint 2007 How-To

With more than 100,000,000 SharePoint licenses sold, organizations ranging from the largest enterprises to the smallest mom-and-pop businesses are relying on SharePoint. Millions of people are using SharePoint to provide simple collaboration and content management, but most SharePoint books focus on enterprise-scale solutions that are far too complex for the readers who need them most. That's where **SharePoint 2007 How-To** comes in. This is the first task-focused, step-by-step guide to the core tasks the vast majority of SharePoint 2007 users and managers really need. Leading SharePoint consultant and trainer Ishai Sagi begins with end-user solutions: logging in, reading files and documents, using lists, setting up alerts, searching site content, building personal sites, and more. Next, he presents solutions for authors and content managers: everything from uploading files to using workflows. Finally, he introduces the core skills needed to manage small-scale SharePoint sites (or sub-sites within an organization's larger SharePoint site). **SharePoint 2007 How-To** provides concise explanations, easy-to-understand screen shots, quick keyboard shortcuts, and "next step" guidance that builds skills without being intrusive or distracting. Whether you are a manager or a user, this book will find the answers you need right away - and non-technical users who may eventually be asked to manage SharePoint sites will find all the skills they'll need to do so.



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### About the Author

**Ishai Sagi** is a SharePoint expert who has been working with Microsoft SharePoint since its initial release in 2001. Since then, Ishai has trained numerous end users, administrators, and developers in using Microsoft SharePoint or developing solutions for the platform. He has spoken at Microsoft conferences around the world, including in Spain, Israel, and Australia. Ishai received the Microsoft Most Valued Professional (MVP) award for Microsoft SharePoint in 2007 and 2008 as recognition for his contribution to the Microsoft SharePoint community.

Ishai also is the author of a popular SharePoint blog for developers at <http://www.sharepoint-tips.com> and manages the Canberra SharePoint User Group website at <http://www.sharepointusers.org.au/Canberra/default.aspx>.

Currently, Ishai is a SharePoint developer and a solutions architect in Canberra, Australia where he spends his spare time taking pictures of the wildlife. This might help explain the numerous pictures of kangaroos that can be seen in this book.

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## CHAPTER 3

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# **Solutions Regarding Files, Documents, List Items, and Forms**

### **IN THIS CHAPTER**

- ▶ See What Lists and Document Libraries Are in a Site
- ▶ Open a Document for Reading
- ▶ View Properties of a Document
- ▶ Send a Link to a File by Email
- ▶ View Past Versions of Documents
- ▶ View Properties of a List Item
- ▶ View a Microsoft InfoPath Form
- ▶ Change Sorting and Filtering in a List or Library
- ▶ Switch List Views in Lists and Libraries
- ▶ Use Alerts

SharePoint is most commonly used to store information in the form of either list items or files, which can be documents, forms, or any other type of file.

This chapter explains how to perform common tasks in SharePoint; for example, it explains how to create and view list items, files, and their properties, as well as set up alerts that let you know when there are new files or list items or when specific files or list items have been modified. Most importantly, this chapter covers how to switch between list views, which allow you to see the content in a list in various ways, thus enabling you to find the content you are looking for more easily.

If you are looking for more author-oriented tasks, such as uploading files or creating new list items, skip to Chapter 6, “Creating and Managing Files, List Items, and Forms in SharePoint,” which covers these topics.

---

## See What Lists and Document Libraries Are in a Site

**Scenario/Problem:** When in a SharePoint site, you often want to see what is beyond the home page of the site—what document libraries are there to store information, what lists and surveys.

**Solution:** There are several ways to see the lists and document libraries available in a site. The following sections demonstrate how you can use these various ways to view the content in the site.

### Direct Links in the Left Navigation Bar

Site managers can use the left navigation bar to show various links in different categories. Document libraries are usually shown under the Documents header, and lists are usually under the Lists header, as shown in Figure 3.1.

### View All Lists and Libraries

Not all the document libraries and lists are shown in the navigation bar. Whether they are shown depends on how the site administrator set it up.

To see all the libraries and lists available, use the View All Site Content link in the navigation bar. This link directs you to a page with all the content in the site. The document libraries are displayed under the Document Libraries header, and the lists are displayed below the Lists header, as shown in Figure 3.2.

A Link to a Library of Documents in the Navigation  
 A Link to a List of Events in the Navigation

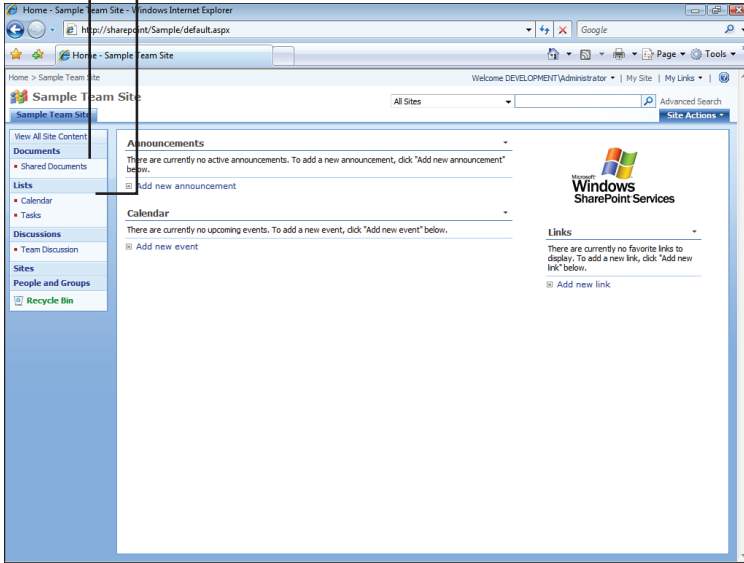
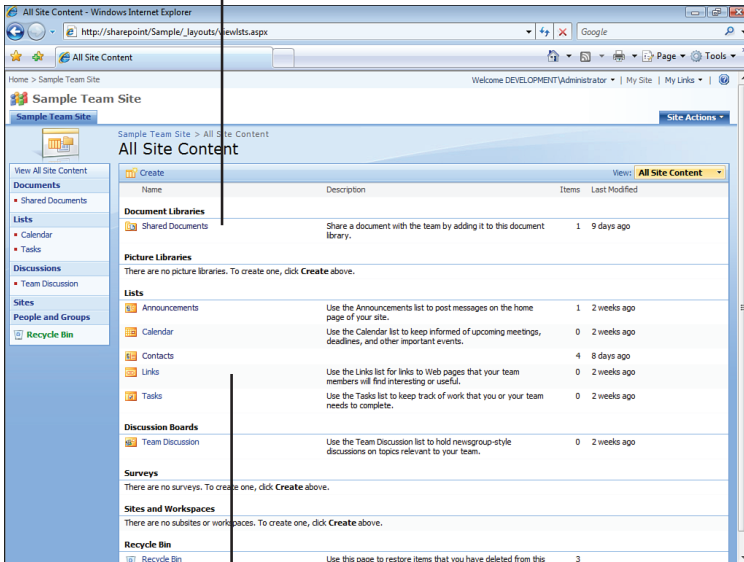


FIGURE 3.1  
 The left navigation bar with document libraries and lists.

Document libraries appear here as links.



Lists appear here as links.

FIGURE 3.2  
 The page shows all the contents of the site.

Click the link to the document library to view the documents in it or the link to a list to see the list items in it.

**TIP** If the site has been customized and the View All Site Content link isn't on the page, you can get to the same page directly by typing `_layouts/viewlists.aspx` at the end of the path to the site. For example, if your site is at `http://sharepoint/sample`, type `http://sharepoint/sample/_layouts/viewlists.aspx` in your browser to get to the all content page.

## Open a Document for Reading

**Scenario/Problem:** When viewing a document library, either in the home page or in a library view, you want to open a certain document to see its contents.

**Solution:** When in a document library, just click the link to the document you are interested in (see Figure 3.3). The document opens either in a new window or in the associated application (Word documents open in Word, Excel workbooks open in Excel, and so on), depending on your machine's configuration.

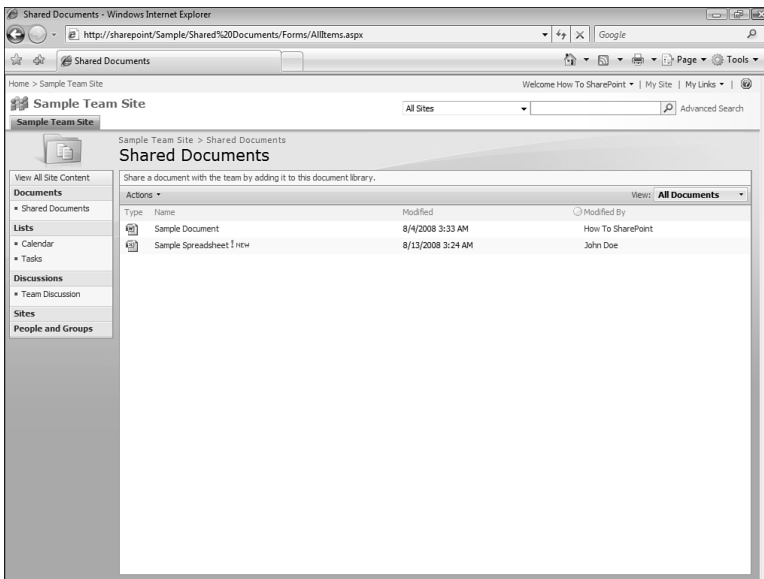


FIGURE 3.3  
Opening a document in the document library.

Also, depending on the installed applications on your machine and on the level of permissions you have, you might be prompted with a choice of how to open the file (see Figure 3.4). To read, choose Read Only and click OK.





FIGURE 3.4

Selecting how to open the file.

## View Properties of a Document

**Scenario/Problem:** When viewing a document library in either a web part on the home page or in one of the list views of that library, you want to see more details about a document before choosing what to do with it. These details might include who wrote the document, its subject, and maybe additional pieces of metadata describing the document—for example, the client it was written for or the date it expires.

**Solution:** To view the metadata of a particular file, move your mouse cursor over the link to the document. An option to open a drop-down appears (see Figure 3.5).

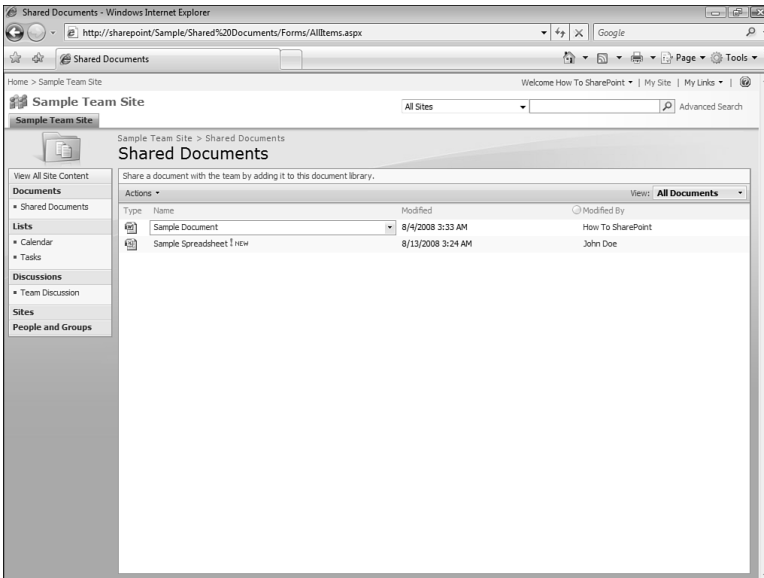


FIGURE 3.5

A drop-down menu becomes available when you move the mouse over the filename.

If you click the drop-down arrow, a menu opens. The choices in the menu are different based on the permissions you have on the file, on the applications installed on your computer, and the applications installed in SharePoint. Therefore, you might see more or fewer options than the ones in Figure 3.6, and each file may present you with a different menu.

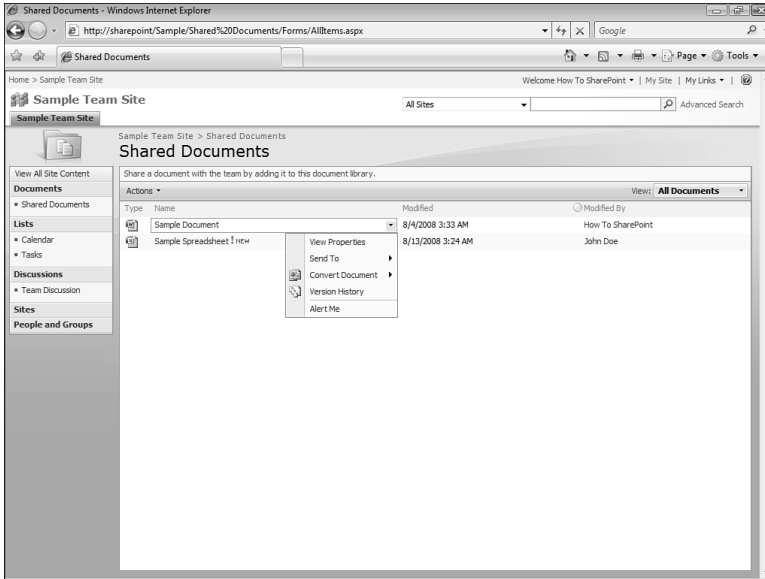


FIGURE 3.6  
Opening the drop-down menu.

Click View Properties to open the properties page. You then see all the properties that the document has.

**TIP** When you set properties on a file, the properties are copied into the file itself. And when you upload a file with properties to a document library that has properties with the same names, they are copied back. This means that if you download a file and then upload it to a different document library with the same properties, the data of the properties is retained.

## Send a Link to a File by Email

**Scenario/Problem:** When viewing a document library, you want to select a single file in that library and send a link to it to one of your colleagues via email.

**Solution:** Similar to the first step in “View Properties of a Document,” open the drop-down menu. Select Send To, E-mail a Link (see Figure 3.7).

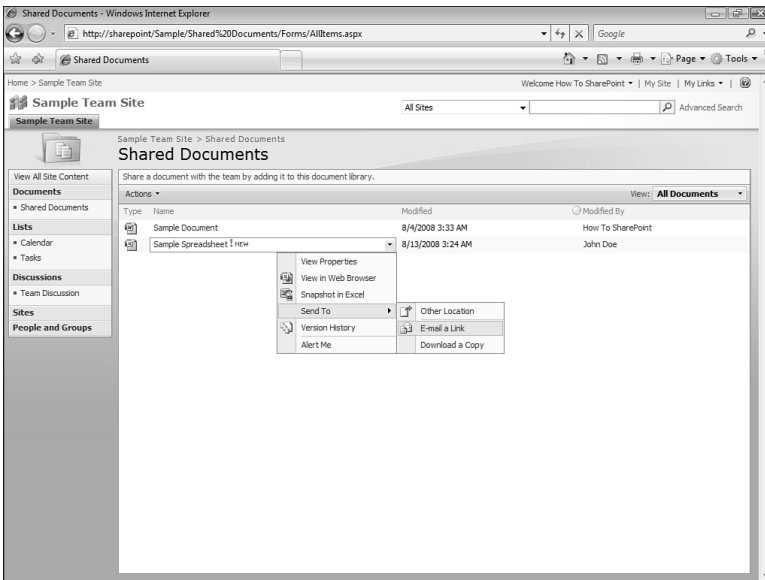


FIGURE 3.7

Selecting the options to send a link via email.

Your default email application should open with a new message containing a link to the document.

---

## View Past Versions of Documents

**Scenario/Problem:** Some document libraries support versioning, which means that every time a file in the library changes, the old version is stored. Sometimes you want to view an old version of a document without restoring it to the current version.

**Solution:** To view the past versions of a specific document, open the drop-down menu on the document and pick Version History from the options (see Figure 3.8).

The version history list opens, showing past versions of the document (see Figure 3.9).

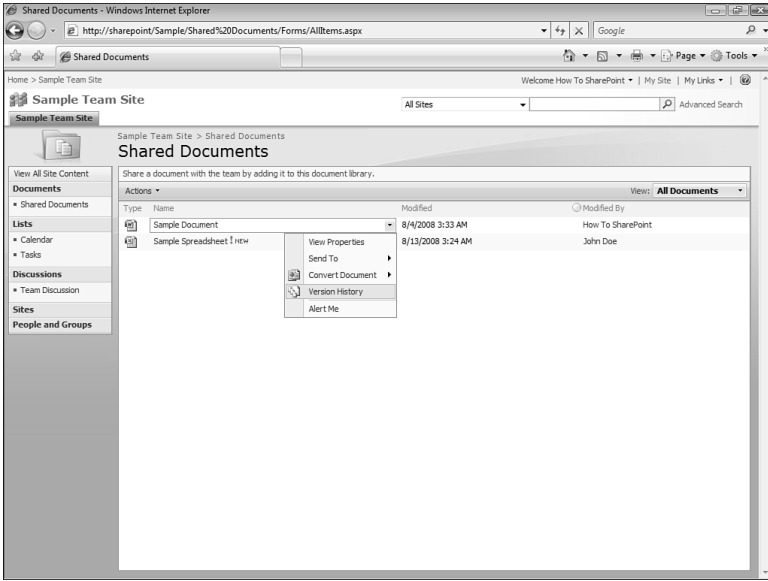
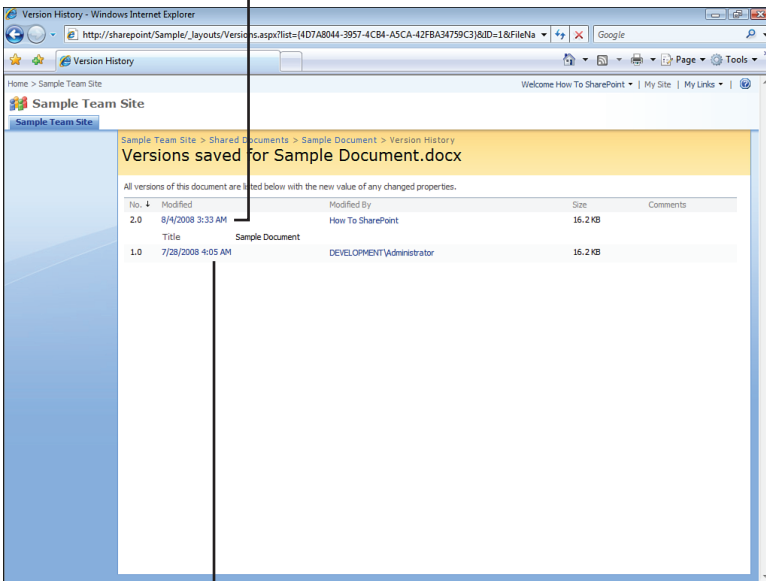


FIGURE 3.8  
Selecting to view the list of past versions of a document.

### The Second (and Final) Version of the Document



The First Version of the Document

FIGURE 3.9  
Viewing the different versions of a document.

The documents are shown as dates, representing the date the version was created. Hovering the mouse cursor over one of these dates allows you to open a menu for the document; from this menu, you can choose to view the version.

---

## View Properties of a List Item

**Scenario/Problem:** When viewing a list in either a web part on the home page or in one of the list views of that list, you want to see more details about a list item because the web parts or the list views do not show all the columns defined in the list. For example, a web part or a list view showing a contact list item might show only the contact's first and last names, and you want to see more details about the contact, such as the address, phone number, and more.

**Solution:** When viewing in a web part or list view, you either click the title of the list item to see its details, or open the drop-down menu and choose View Item (similar to viewing a document's properties), as shown in Figure 3.10.

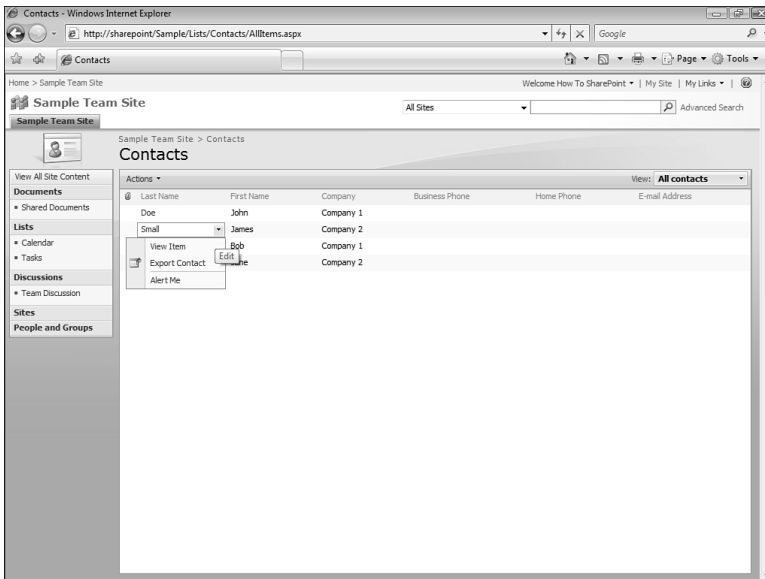


FIGURE 3.10

The drop-down menu for a list item showing actions you can perform, including View Item.

Selecting this option opens a page with the metadata of the list item—all its properties.

## View a Microsoft InfoPath Form

**Scenario/Problem:** As explained in Chapter 1, “About Microsoft SharePoint 2007,” form libraries are used to host Microsoft InfoPath forms. In many cases you want to open one of the forms in a form library to view its contents.

**Solution:** The form libraries behave much the same as document libraries, and viewing a Microsoft InfoPath form that is in a form library is very much like opening a document for reading: Just click the link that is the form name (see Figure 3.11).

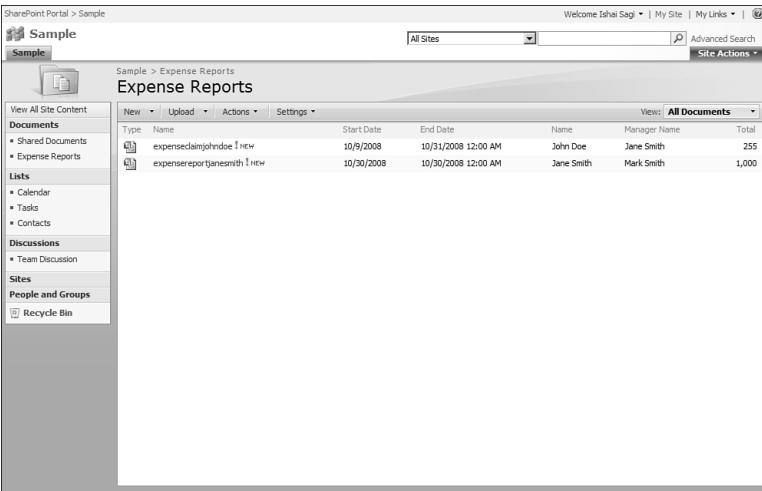


FIGURE 3.11

A form library with two forms. Click the name of the form to open it.

**TIP** Some forms are configured to allow the data in the form to be displayed as a column in the form library. This configuration enables you to preview the data in the form without opening it and can also help you find the specific form you are after more easily. In Figure 3.11, you can see that certain data from the form is displayed, such as the total of the expense claim, as well as the start and end dates for the expense claims.

If the site you are using has Microsoft Office SharePoint Server (MOSS) installed, or if the form or form library has not been configured to make forms open in the browser, clicking a form opens it using Microsoft InfoPath on your computer.

If the site uses MOSS, and the form and form library are both configured to show the form in the browser, clicking the form opens it using the browser interface.

To close the form and go back to the form library, either close the Microsoft InfoPath application (if the form was opened with the application) or click the Close link on the top of the form if it was opened in the browser.

---

## Change Sorting and Filtering in a List or Library

**Scenario/Problem:** When you're working in a large document library or list, finding the piece of information you are looking for can be tricky. To help you find what you are after, you want to sort a specific column differently from its default sorting order or filter a column on a specific value. For example, in a document library, you want to sort the documents based on the date they were changed to see the last one that was changed, or in a contacts list, you want to filter the last name column to display only people with the last name Doe.

**Solution:** When you're viewing a list or document library, there are several ways to change the view to find the specific item or document you are after.

**TIP** The changes you make are not permanent; only you will see them. When you close the browser and navigate to the list again, the default sort order and filters that the list manager has defined are applied again.

To learn how to save a sort order or filter, see Chapter 8, "Creating List Views."

### Sort

To sort a list view on a specific field, click the heading for that field. Clicking that field header causes the list to be sorted based on that field, either in an ascending or descending order. A small arrow appears to signify the sort order. Using this mechanism, you can sort based on only one field at a time.

Another way to define the sort order is to open the column's drop-down menu and click the sort order you want (see Figure 3.12).

### Filter

To filter on a column, move your mouse cursor over the heading for that column, which causes a drop-down menu to appear. Click the drop-down menu and choose the filter value from the list (see Figure 3.13).

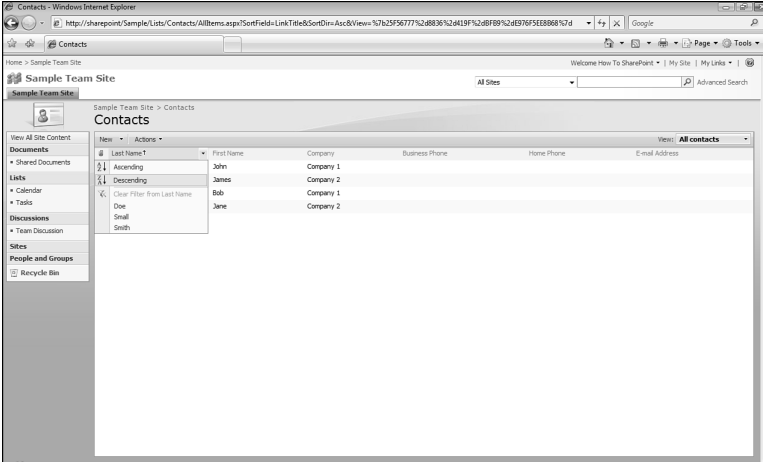


FIGURE 3.12  
Choosing the sort order from the drop-down menu.

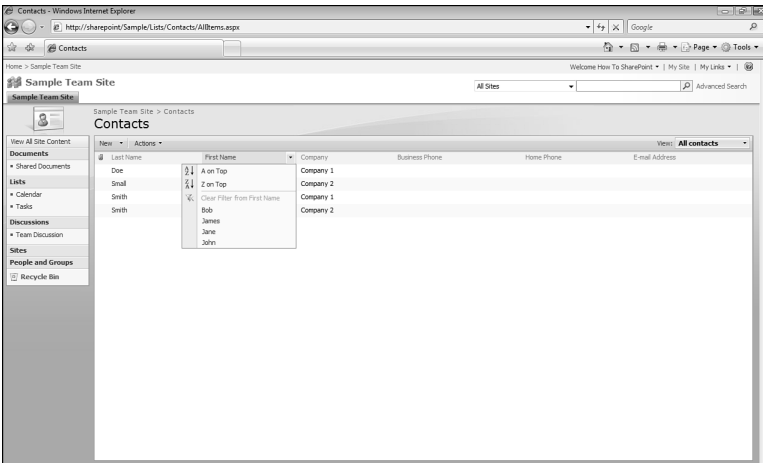


FIGURE 3.13  
Choosing the filter value from the drop-down menu.

## Switch List Views in Lists and Libraries

**Scenario/Problem:** Most lists and libraries have different list views showing different columns and applying different sort orders, filters, and styles. You want to switch to a different list view to find information more easily in the list or library.



**Solution:** To switch views, use the View menu on the top-right corner of the list. This menu shows the names of all the views available for you in the list (see Figure 3.14).

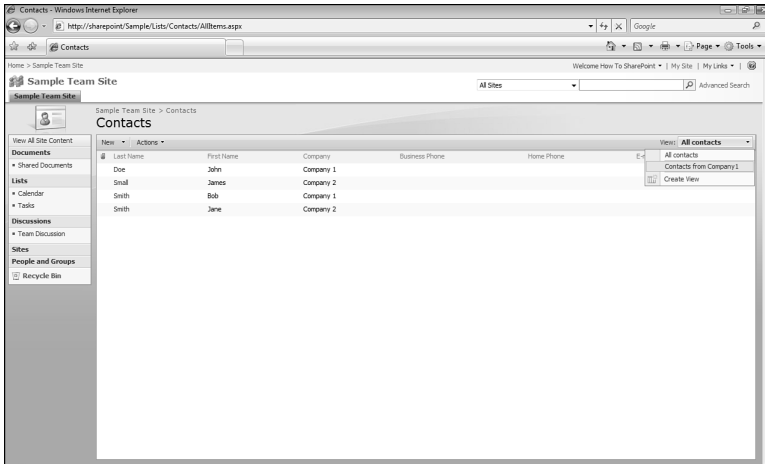


FIGURE 3.14  
Selecting the list view from the drop-down menu.

These views are either public views (that everyone sees on that list) or a private view that you have created for yourself. For more information on list views, see Chapters 1 and 8.

To switch to the view that you want, click the view name, and the view changes.

**TIP** Investigate the different views; they may be more efficient and helpful for you to quickly find data. Beyond filtering and sorting, other views can offer grouping on certain columns, show the information in different styles, and impose different item limits.

Some special instances of views have *subviews*. The subviews offer other ways to see the same view. For example, in calendar views you can switch between the daily subview, weekly subview, and monthly subview. These subviews show the information defined in the view itself (filtering the items, ordering the items) but in a different manner.

To switch between the subviews of a calendar view, use the Day, Week, and Month links at the top of the view (see Figure 3.15).

Use the links to switch between subviews.

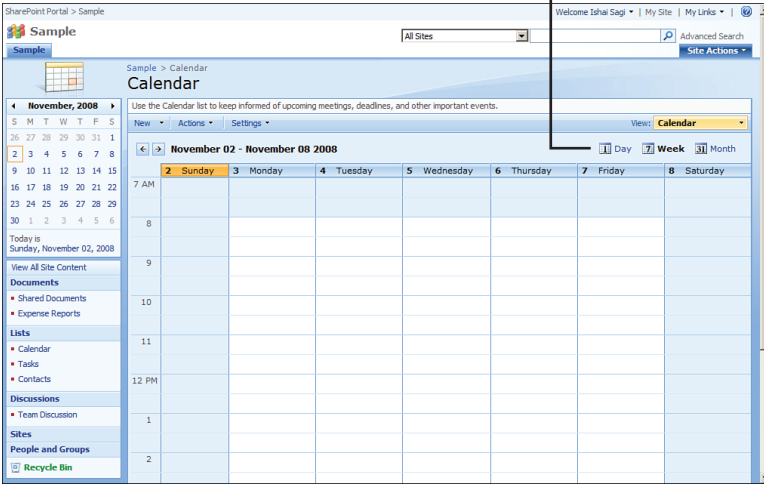


FIGURE 3.15  
The weekly subview of a calendar.

Similarly, in image libraries each view has three subviews—Details, Thumbnails, and Filmstrip—that show the same data in different ways (see Figure 3.16).

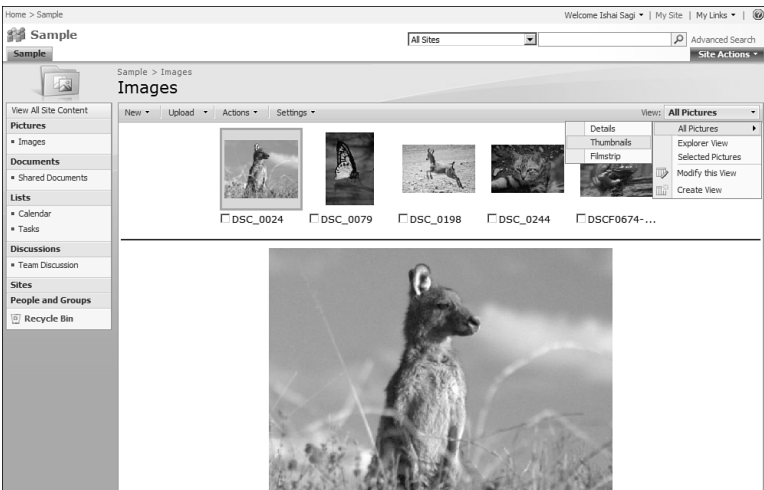


FIGURE 3.16  
Picture libraries offer subviews for each view.

## Switch to a Datasheet View

As explained in Chapter 1, the Datasheet view is a special type of view that looks like a spreadsheet. This view allows you to copy information from the list to spreadsheet applications or do some calculations on data in the list.

To switch to the Datasheet view, open the Actions menu and choose Edit in Datasheet (see Figure 3.17).

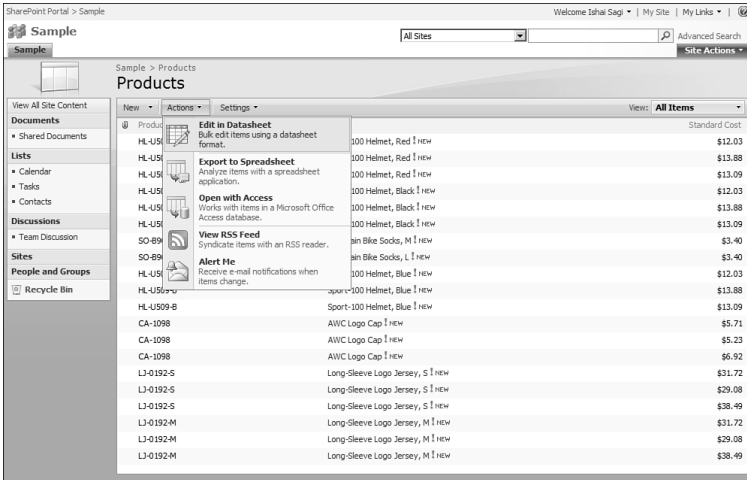


FIGURE 3.17

Open the Actions menu in a standard view to get the option to switch to the Datasheet view.

The Datasheet view displays all the columns that were on the standard view (see Figure 3.18).

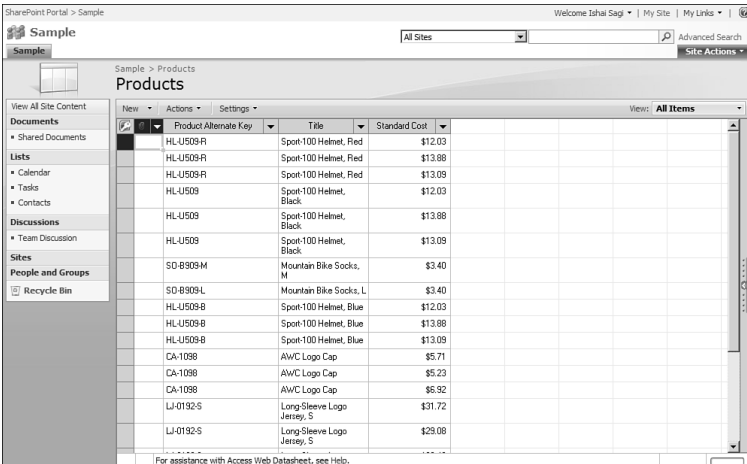


FIGURE 3.18

Viewing the columns in the Datasheet view.

## Add Totals Calculations to the Datasheet View

If you want to calculate data that is in the Datasheet view, you can add totals to the view by opening the Actions menu and selecting Totals (see Figure 3.19). Selecting this option adds a totals row to the view, with options to perform mathematical calculations on the items in the view.

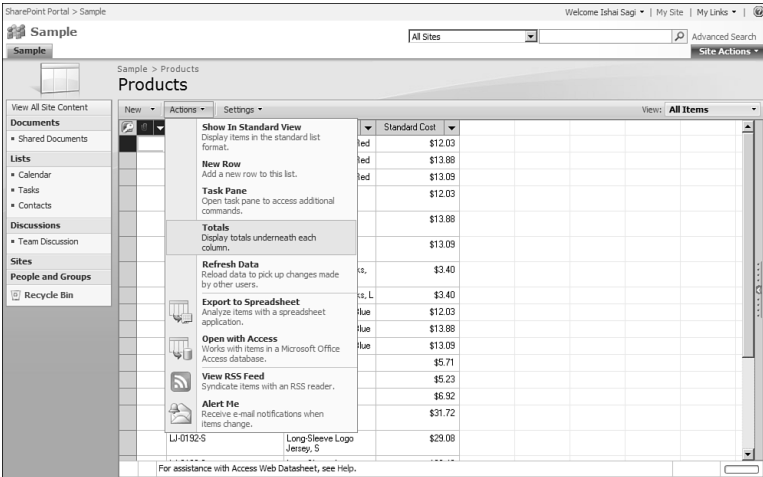


FIGURE 3.19

Open the Actions menu in a Datasheet view to get the option to add totals to the view.

After the totals row is added, any numeric column is automatically calculated with a sum so that the sum of the values in that column is displayed in the totals row (see Figure 3.20).

You can choose the type of mathematical calculation for each column by clicking the cell at the bottom of the column. For numeric columns, this includes the sum (which is displayed by default), the average (which shows the average of all the values in the view), the maximum (largest value in the view), the minimum (smallest value in the view), and more (see Figure 3.21).

SharePoint Portal > Sample

Welcome Zahai Sagi | My Site | My Links

Sample > Products

View: All Items

Product Alternate Key	Title	Standard Cost
HL-U509-R	Sport-100 Helmet, Red	\$12.03
HL-U509-R	Sport-100 Helmet, Red	\$13.88
HL-U509-R	Sport-100 Helmet, Red	\$13.09
HL-U509	Sport-100 Helmet, Black	\$12.03
HL-U509	Sport-100 Helmet, Black	\$13.88
HL-U509	Sport-100 Helmet, Black	\$13.09
SD-8909-M	Mountain Bike Socks, M	\$3.40
SD-8909-L	Mountain Bike Socks, L	\$3.40
HL-U509-B	Sport-100 Helmet, Blue	\$12.03
HL-U509-B	Sport-100 Helmet, Blue	\$13.88
HL-U509-B	Sport-100 Helmet, Blue	\$13.09
CA-1098	AWC Logo Cap	\$5.71
CA-1098	AWC Logo Cap	\$5.23
CA-1098	AWC Logo Cap	\$6.92
LJ-0192-S	Long Sleeve Logo Jersey, S	\$31.72
LJ-0192-S	Long Sleeve Logo	\$29.08
<b>Total</b>		<b>\$340.22</b>

For assistance with Access Web Datasheet, see Help.

FIGURE 3.20

By default, only numeric columns have totals.

SharePoint Portal > Sample

Welcome Zahai Sagi | My Site | My Links

Sample > Products

View: All Items

Product Alternate Key	Title	Standard Cost
HL-U509-R	Sport-100 Helmet, Red	\$12.03
HL-U509-R	Sport-100 Helmet, Red	\$13.88
HL-U509-R	Sport-100 Helmet, Red	\$13.09
HL-U509	Sport-100 Helmet, Black	\$12.03
HL-U509	Sport-100 Helmet, Black	\$13.88
HL-U509	Sport-100 Helmet, Black	\$13.09
SD-8909-M	Mountain Bike Socks, M	\$3.40
SD-8909-L	Mountain Bike Socks, L	\$3.40
HL-U509-B	Sport-100 Helmet, Blue	\$12.03
HL-U509-B	Sport-100 Helmet, Blue	\$13.88
HL-U509-B	Sport-100 Helmet, Blue	\$13.88
CA-1098	AWC Logo Cap	
CA-1098	AWC Logo Cap	
CA-1098	AWC Logo Cap	
LJ-0192-S	Long Sleeve Logo Jersey, S	
LJ-0192-S	Long Sleeve Logo	
<b>Total</b>		<b>\$340.22</b>

Sum

- None
- Average
- Count
- Maximum
- Minimum
- Sum
- Standard Deviation
- Variance

FIGURE 3.21

Numeric columns can do many different calculations.

For nonnumeric columns, you can choose the Count calculation (see Figure 3.22). This calculation shows how many values there are (see Figure 3.22). If you have 20 list items in the view, the count shows 20 as the total.

SharePoint Portal > Sample

Welcome Ishai Sag | My Site | My Links | [Advanced Search](#)

Sample > Products

Products

View: All Items

Product Alternate Key	Title	Standard Cost
HL-U509-R	Sport-100 Helmet, Red	\$12.03
HL-U509-R	Sport-100 Helmet, Red	\$13.88
HL-U509-R	Sport-100 Helmet, Red	\$13.09
HL-U509	Sport-100 Helmet, Black	\$12.03
HL-U509	Sport-100 Helmet, Black	\$13.88
HL-U509	Sport-100 Helmet, Black	\$13.09
SD-B909-M	Mountain Bike Socks, M	\$3.40
SD-B909-L	Mountain Bike Socks, L	\$3.40
HL-U509-B	Sport-100 Helmet, Blue	\$12.03
HL-U509-B	Sport-100 Helmet, Blue	\$13.88
HL-U509-B	Sport-100 Helmet, Blue	\$13.09
CA-1098	AWC Logo Cap	\$5.71
CA-1098	AWC Logo Cap	\$5.23
CA-1098	AWC Logo Cap	\$6.92
LJ-0192-S	Long-Sleeve Logo Jersey, S	\$31.72
LJ-0192-S	Long-Sleeve Logo Jersey, S	\$29.08
LJ-0192-S	Long-Sleeve Logo Jersey, S	\$38.49
LJ-0192-M	Long-Sleeve Logo Jersey, M	\$31.72
<b>Total</b>	<b>Count</b>	<b>\$340.22</b>

For assistance with Access Web, see [Help](#).

FIGURE 3.22  
Nonnumeric columns can have only the Count total.

Sample > Products

Products

View: All Items

Product Alternate Key	Title	Standard Cost
HL-U509-R	Sport-100 Helmet, Red	\$12.03
HL-U509-R	Sport-100 Helmet, Red	\$13.88
HL-U509-R	Sport-100 Helmet, Red	\$13.09
HL-U509	Sport-100 Helmet, Black	\$12.03
HL-U509	Sport-100 Helmet, Black	\$13.88
HL-U509	Sport-100 Helmet, Black	\$13.09
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CA-1098	AWC Logo Cap	\$5.23
CA-1098	AWC Logo Cap	\$6.92
LJ-0192-S	Long-Sleeve Logo Jersey, S	\$31.72
LJ-0192-S	Long-Sleeve Logo Jersey, S	\$29.08
LJ-0192-S	Long-Sleeve Logo Jersey, S	\$38.49
LJ-0192-M	Long-Sleeve Logo Jersey, M	\$31.72
<b>Total</b>	<b>20</b>	<b>\$340.22</b>

For assistance with Access Web Datasheet, see [Help](#).

FIGURE 3.23  
The Count total shows how many items there are.

## Use Alerts

**Scenario/Problem:** Information in sites keeps changing; lists and libraries are updated with new items or files, and existing items and files are updated or deleted. Often, you need to know whenever something important to you is changed or updated. For example, if a document containing a policy that heavily impacts your work is updated, you want to know immediately. Or if a new list item is entered into a contacts list used to track potential customers, you want to know about it so that you can call the customer.

**Solution:** Alerts are useful mechanisms that notify you when some changes are made in SharePoint document libraries or lists or on single items. When you create an alert, you are asking the system to send you an email when a specific change occurs. The following sections explain how you can create alerts on different kinds of data and how to manage your alerts.

### Create an Alert on a File or List Item

Setting up an alert on a document or list item makes SharePoint email you when changes are made to that document or item. To create the alert, open the drop-down menu of that document or list item and select Alert Me from the menu (see Figure 3.24).

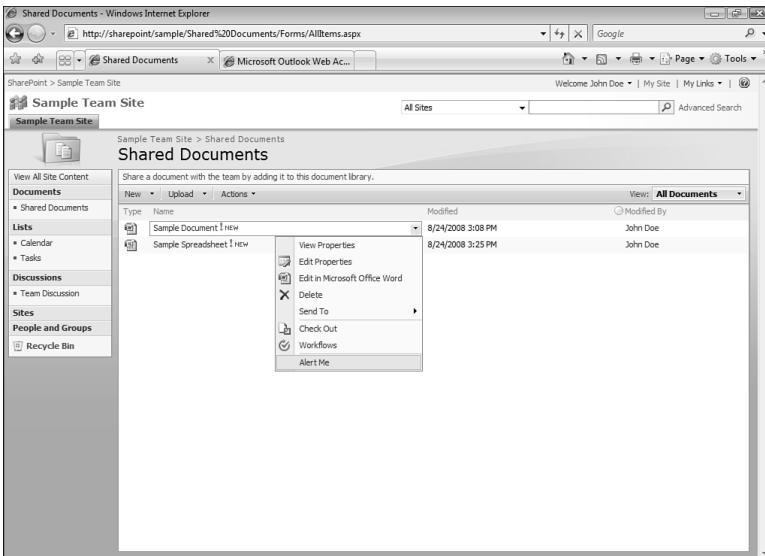


FIGURE 3.24

Selecting the option to set up an alert on a file or list item.

Selecting this option opens a screen where you can define what sort of alert you want to get on the item (see Figure 3.25).

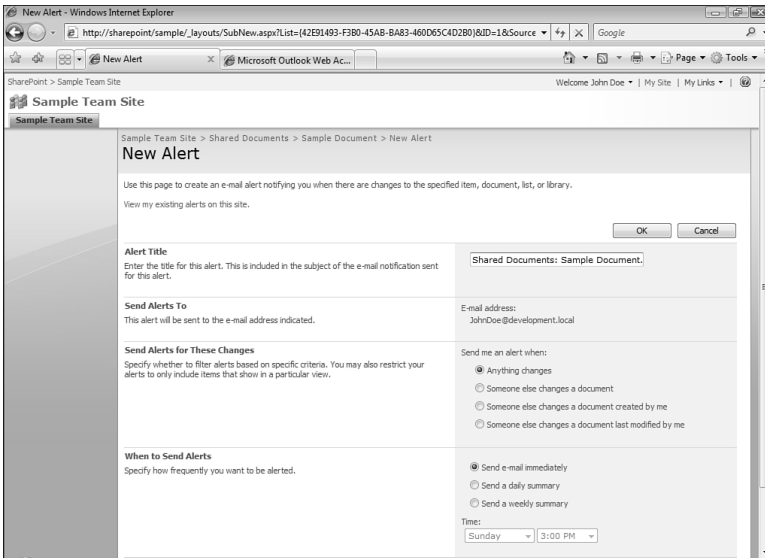


FIGURE 3.25  
Selecting the settings for your alert.

Under the Send Alert for These Changes section, you can choose to be notified just when someone else changes the item or whenever the item is changed (even when you are the one who changed it). The other options in this section are not relevant for alerts on documents and items.

**NOTE** If you are a site manager, you will also see a box allowing you to enter the email address for the alert. Thus, you can configure alerts for other users.

Under the When to Send Alerts section, you can define when the email for a change will be sent. If you choose immediately, an email will be sent to you whenever someone changes the document—one email per change. However, selecting a daily or weekly summary will reduce the number of emails and will send you a summary email of all the changes.

After you select the options you want, a confirmation email is sent to you, telling you that the alert has been set up. This process may take a few minutes, and the email should look similar to the one in Figure 3.26. When someone changes the item, an alert email is sent to you.



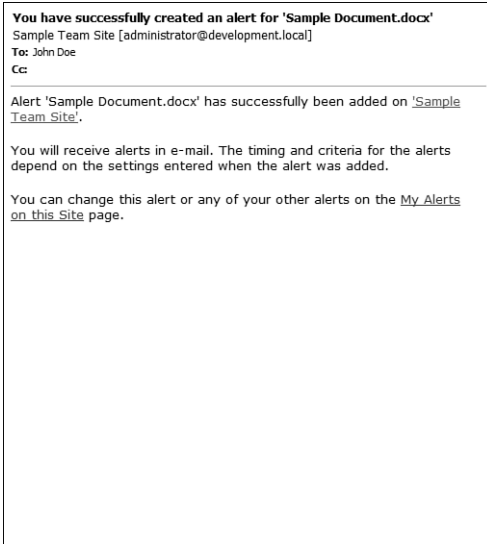


FIGURE 3.26

An email confirming that your alert has been set up.

## Create an Alert on a List or a Library

Setting up an alert on a list or library makes SharePoint email you when changes are made (when items are added, removed, or changed).

To create the alert, click the Actions menu of the list or library and select Alert Me from the drop-down options (see Figure 3.27).

Selecting this option opens the settings screen for the alert (refer to Figure 3.25). Here, you can specify what you want to be alerted on.

Under the Change Type section, you can choose what kind of change you want to be alerted on. For example, you can select to be alerted only when new items are added, only when items are deleted, or when anything happens (all changes).

Similar to setting up an alert on a list item, you can choose when the alert will be sent (either immediately or as a daily or weekly summary).

After you create the alert, a confirmation email is sent to you. Alert emails for lists look exactly the same as alerts on list items.

**CAUTION** Don't forget that alerts can be annoying if you get too many emails. Creating an alert on a busy document library and setting it to email you immediately on every change can overload your mailbox. Consider the daily or weekly email options unless you really need to know about new documents or changes in existing ones.

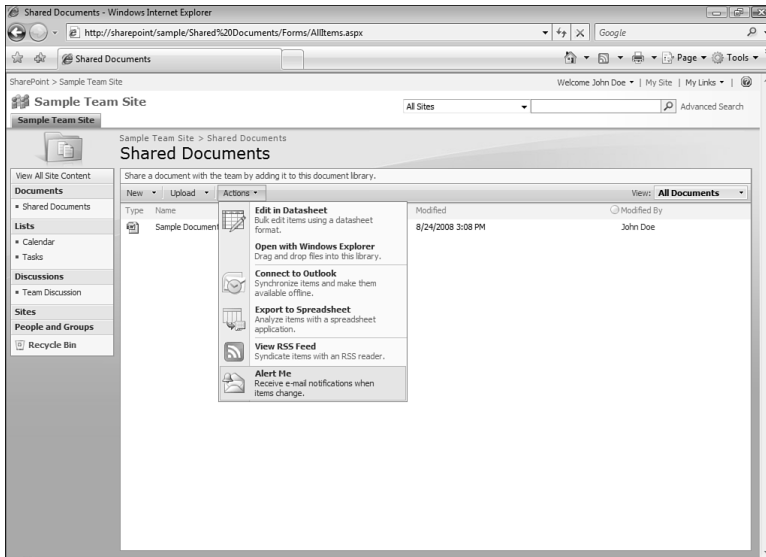


FIGURE 3.27

Selecting the option to set up an alert on a list or library.

## Modify or Remove an Alert

To modify or remove an alert, click the [Modify My Alert Settings](#) link that was sent to you by that alert. Doing so opens the site where that alert was created, in the alert management screen.

On this screen, shown in Figure 3.28, you can either click an alert to change its settings (such as when it should send the email or what changes it should alert on) or select the alert and delete it using the [Delete Selected Alerts](#) button.

## Manage My Alerts in a Site

To see what alerts you have in a site and manage them, open the site and click the [Welcome \[your name\]](#) button at the top. Select the [My Settings](#) option from the drop-down menu (see Figure 3.29).

Selecting this option shows you your user information. Click [My Alerts](#) in the toolbar to open the alert management screen for that site, where you can modify or delete alerts.

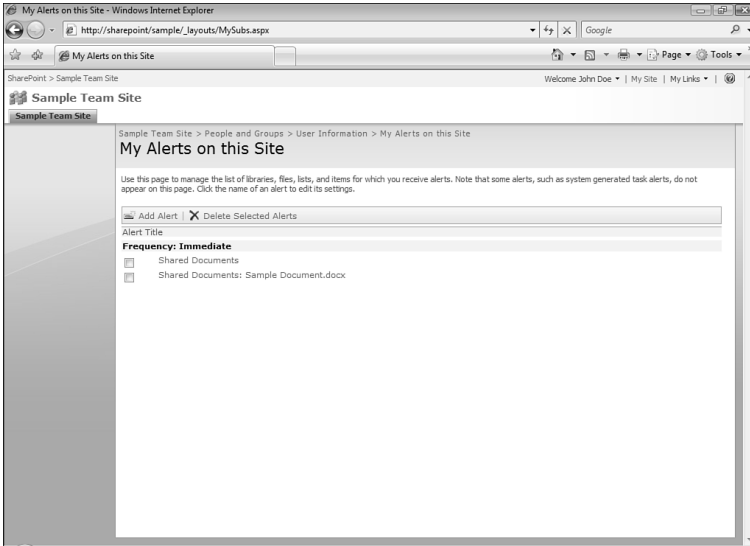


FIGURE 3.28  
Managing your alerts in a site

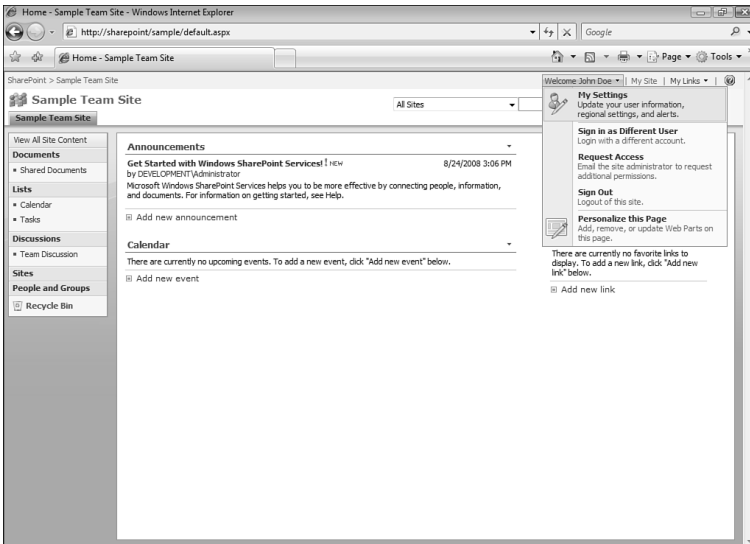


FIGURE 3.29  
Selecting the My Settings option to manage your alerts.

**TIP** A quick way to get to the manage alerts page is to add `_layouts/mysubs.aspx` to the path to the site where the alerts are set. For example, if the site containing your alert is `http://sharepoint/sample`, type `http://sharepoint/sample/_layouts/mysubs.aspx` to get to the alerts page.

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Amit Goyal

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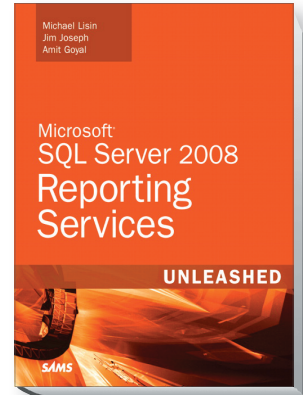
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**Amit Goyal** (Sammamish, WA), Lead Program Manager for Microsoft's Reporting Services team, has extensive insider's knowledge of SQL Server 2008 Reporting Services.

**SAMS**

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## Supervisor Engine Configuration

See the following sections for configuration information about these topics:

- **3-1: Prompts and Banners:**Describes the method for configuring prompts and banners for switch identification
- **3-2: IP Addressing and Services:**Explains how to configure IP addressing and services for switch management using the TCP/IP protocol
- **3-3: Passwords and Password Recovery:**Covers the processes that set passwords for switches and the methods that recover lost and unknown passwords
- **3-4: Managing Modules:**Describes how to control power to a module, reset a module, and manage the configuration of individual modules for modular switches
- **3-5: File Management and Booting:**Explains the process for management of configuration and system files and how to control the boot process
- **3-6: Redundant Supervisors:**Explains the feature by which redundant Supervisor modules synchronize their configurations and how to manage this feature
- **3-7: Cisco Discovery Protocol:**Describes the interaction of the *Cisco Discovery Protocol (CDP)* with other Cisco devices and how to control CDP functions for switch ports
- **3-8: Time and Calendar:**Presents the basic steps needed to configure date and time information on the switch using both manual configuration techniques and *Network Time Protocol (NTP)*

### Prompts and Banners

- Switch prompts help users identify the device they are managing by providing a useful name at each command-line entry point.

- System banners both identify switches and provide information about security policies and monitoring procedures.
- The configuration of prompts and banners is optional.

## Configuration of Prompt

1. *(Optional)* Configure the prompt.

- a. Configure a prompt by setting a device name:

```
(global) hostname string
```

By default, the hostname for an IOS device is Switch or Router, depending on the function (Layer 2 or Layer 3) of the switch.

- b. Specifically configure a prompt:

```
(global) prompt string
```

By default, the hostname for an IOS device is Switch or Router, depending on the function (Layer 2 or Layer 3) of the switch.

## Configuration of Banner

1. *(Optional)* Configure a *Message of the Day (MOTD)* banner.

MOTD banners are not required to make any system operational; however, they are extremely useful for identifying any security policies pertaining to accessing network devices.

- a. Configure an MOTD banner:

```
(global) banner motd & string &
```

The banner text is typed in between delimiting characters (in the table, the ampersand [&]). The delimiting character is typed at the beginning and end of the banner, which can include multiple lines, line breaks, and words. The delimiting character can be any character that is not part of the banner text.

**Note** Banners are limited in size by device and operating system. There is no consistent number or limitation.

## Feature Example

This example shows a typical configuration for setting the system name, prompt, and banner.

An example of the Supervisor IOS configuration follows:

```
Switch(config)# hostname Core_Switch1  
Core_Switch1(config)# banner motd *
```

```

This is Core_Switch1 for the XYZ corporation.
You have accessed a restricted device, unauthorized logins are prohibited.
*
Core_Switch1(config)# end
Core_Switch1# copy running-config startup-config

```

## IP Addressing and Services

- Switches use IP addresses and services for management purposes.
- IP addresses can be set or obtained using *Dynamic Host Configuration Protocol (DHCP)*, *BOOTstrap Protocol (BOOTP)*, or *Reverse Address Resolution Protocol (RARP)*.
- Gateways, routes to networks, and default routes are established to allow communications with devices that are not local to the management network.
- Static entries or DNS servers can be used to resolve computer names.
- HTTP services are available for some switches to provide a configuration interface.
- *Simple Network Management Protocol (SNMP)* service allows for switch configuration and management.

### Configuring an IP Management Address

IP addresses are used in Layer 2 switches for management purposes only. This step is not required to make the switch operational. If you do not configure an IP address, however, the only way to manage the switch is by using the console connection.

1. (Optional; recommended) Configure the IP address.
  - a. Configure the IP address manually:

```

(global) interface vlan vlannumber
(interface or subinterface) ip address address mask
(interface or subinterface) management

```

Catalyst switches can have an active management address in only one VLAN. The management command on the Layer 2 IOS switches specifies which VLAN is active. VLAN 1 is the default management VLAN for IOS. On a Layer 2 IOS switch, if VLAN 1 is not the management VLAN, the prompt reads “subinterface.”

To view the IP configuration, use the **show interface vlan n** (where *n* is your VLAN number) command.

**Note** This addressing section deals exclusively with Layer 2 management addresses and interfaces only. Layer 3 interfaces are discussed in Chapter 5, “Layer 3 Interface Configuration.”



- b. *(Not recommended)* Automatically obtain an IP address.

You can have the switch request an address from a service, such as RARP, BOOTP, or DHCP. This is not recommended because it is conceivable that the address could change for DHCP unless the lease is permanent or static (meaning that the lease never expires or a specific IP address is reserved for the switch MAC). This also means that a change of hardware could create a problem with BOOTP and the static DHCP address.

For Layer 2 switches, you can obtain an address via DHCP/BOOTP if you have configured the device for autoconfig. The command **service config** enables autoconfig. If automatic configuration is enabled, the switch ignores any manual IP configuration parameters:

```
(global) service config
(privileged exec)reload
```

**Note** Service configuration loads a complete configuration for the switch automatically. It is referred to as *autoinstall* in the router community. Autoconfig also requires that a configuration file be available on a TFTP server for a full configuration. For more details on autoconfig, consult the Cisco web site at <http://www.tinyurl.com/akvdx8>.

## Configuring a Default Gateway

To access the switch from IP subnets other than the subnet in the management address, you need to configure a default gateway. This provides the switch with the minimum information that it needs to provide remote connectivity.

1. *(Optional; recommended)* Configure the default gateway:

```
(global) ip default-gateway gatewayaddress
```

The gateway address is the IP address of the Layer 3 interface that acts as a router for traffic generated by the switch. To view your default gateways, use the **show ip route default** command.

## Setting Up DNS Services or Host Tables

Each Catalyst switch can resolve common names, such as URLs or fully qualified domain names, into IP addresses if the proper IP service is configured. This service is a *Domain Name System (DNS)* server or a local host table. By default, DNS services are enabled on Catalyst switches, but the server is not specified. To configure the switch for DNS operation, use the following guidelines.

1. *(Optional)* Enable the DNS service on the switch:

```
(global) ip domain-lookup
```

This command enables the switch to use DNS for name lookups. The default is for **ip domain-lookup** to be enabled.

**Tip** If you are not going to use DNS, it is recommended that you disable DNS lookups with the global configuration command **no ip domain-lookup**. This command prevents the switch from trying to resolve mistyped commands.

2. *(Optional)* Define the address of the DNS server:

```
(global) ip name-server serveraddress1 [serveraddress2 . . . serveraddress6]
```

Use this command to specify the addresses of one or more DNS servers. You can specify up to six addresses on a single command-line entry. In IOS switches, the first address configured is the first address DNS queries are sent for resolution. Subsequent addresses are used only if the first address times out or returns a negative acknowledgment.

-or-

*(Optional)* Specify host entries for name resolution:

```
(global) ip host name address
```

By specifying the name and address of the device on the switch, the name is resolved in the local table. DNS can be enabled or disabled when using local host-names; locally configured hosts are searched before a request is sent to DNS.

## Configuring HTTP Services

You can enable an HTTP server so that the switch can be managed using a web browser. The web-based GUI is a straightforward management option that gives users another configuration option.

1. *(Optional)* Configure HTTP service for switch configuration:

```
(global) [no] ip http server
```

The command **ip http server** is enabled by default. You can choose to disable it with the **no** command.

## Feature Example

This example shows a typical configuration for setting the IP address, gateway, and DNS servers for a switch in an administrative VLAN 986. This example disables the HTTP server service:

```
Switch(config)# interface vlan 986
Switch(config-subif)# ip address 10.1.1.5 255.255.255.0
Switch(config-subif)# management
Switch(config-subif)# ip default-gateway 10.1.1.1
Switch(config)# ip name-server 10.1.1.254
Switch(config)# no ip http server

Switch(config)# end
Switch# copy running-config startup-config
```

## Passwords and Password Recovery

- Passwords provide a layer of protection for the switch to prevent unauthorized use.
- Catalyst switches have two levels of password protection (user level and privileged level).
- Privileged passwords are encrypted for tighter security.
- If a password is lost, IOS offers a password recovery process to gain access to the device.

### Configuration of Passwords

1. *(Optional; highly recommended)* Configure a user-level password:

```
(line) login
(line) password password
```

The user-level password prevents anyone who is not authorized from accessing the *command-line interface (CLI)* from Telnet or console sessions. The command **login** and a **password** must be configured on each line (**con0** or **vtty**). To enable password checking at login, use the **login** command. The vty lines are often referred to as Telnet. You can SSH into vty lines.

**Note** On a switch, you can configure a different user-level password for any line, such as Telnet or console connections.

2. *(Optional; highly recommended)* Configure a privileged-level password:

```
(global) enable secret password
```

The privileged password prevents anyone who is not authorized from gaining access to privileged level, where configuration changes can be made to the switch and other features. The **enable secret** command followed by the password is used to configure the password.

**Note** Only the secret, privileged password is encrypted by default. You can use the **service password-encryption** command to prevent the console and vty passwords from being stored in clear text.

### Feature Example

This example shows a typical configuration for setting the user and privileged passwords:

```
Switch(config)# enable secret san-fran
Switch(config)# line vty 0 4
Switch(config-line)# password cisco
```

```
Switch(config-line)# line con 0
Switch(config-line)# login
Switch(config-line)# password cisco
Switch(config-line)# end
Switch1# copy running-config startup-config
```

## Password Recovery: Procedure 1

Password recovery procedure 1 covers the Cisco Catalyst Layer 2 fixed configuration switches 2900XL/3500XL, 2940, 2950/2955, 2960, and 2970 Series, and the Cisco Catalyst Layer 3 fixed configuration switches 3550, 3560, and 3750 series. If you have lost or forgotten your passwords, or if you want to bypass the configuration file, you can use this recovery process to gain access to the device.

To recover from a lost password, you have to stop the boot process and then direct the switch to not use the configuration file. When the switch loads without a file, you have no passwords and can enter into privileged mode. From there, you can copy the configuration file into active memory and then change and save the passwords. To complete the recovery process, follow these steps:

1. Attach a device to the console of the switch. Make sure you have connectivity and then unplug the power cord from the switch.
2. Press and hold down the mode button while plugging the switch back in. Release the mode button after the LED above port 1x has been on for at least 2 seconds.
3. You receive some information indicating that the Flash initialization has been interrupted. After you receive this information, at the prompt type the command **flash\_init**.
4. Next type the command **load\_helper**.
5. You need to get a listing of the Flash image with the command **dir flash:** (the colon [:] is required).
6. Rename the file to **config.text** with the command **rename flash:config.text flash:config.old**.
7. Continue the boot process with the command **boot**.
8. Answer **n** to the question about entering the setup mode.
9. Press **Enter** to access the user mode and enter into privileged mode with the command **enable**.
10. Rename the configuration file back to **config.text** with the command **rename flash:config.old flash:config.text**.
11. Copy the configuration file into active memory with the command **copy flash:config.text system:running-config**.
12. Enter configuration mode with the command **configure terminal**.
13. Change the line and secret passwords as covered previously in this section.
14. Save the configuration.

**Tip** You can find additional information about the password recovery procedure for Cisco Catalyst Layer 2 fixed configuration switches at <http://www.tinyurl.com/4jmw4>.

## Feature Example

This example shows a typical password recovery procedure 1 for IOS switches.

The system has been interrupted prior to initializing the Flash file system. The following commands initialize the Flash file system and finish loading the operating system software:

```
switch: flash_init
Initializing Flash...
flashfs[0]: 143 files, 4 directories
flashfs[0]: 0 orphaned files, 0 orphaned directories
flashfs[0]: Total bytes: 3612672
flashfs[0]: Bytes used: 2729472
flashfs[0]: Bytes available: 883200
flashfs[0]: flashfs fsck took 86 seconds
...done Initializing Flash.
Boot Sector Filesystem (bs:) installed, fsid: 3
Parameter Block Filesystem (pb:) installed, fsid: 4
switch: load_helper
switch: dir flash:
  Directory of flash:
2 -rwx 843947 Mar 01 1993 00:02:18 C2900XL-ms-12.2.8.bin
4 drwx 3776 Mar 01 1993 01:23:24 html
66 -rwx 130 Jan 01 1970 00:01:19 env_vars
68 -rwx 1296 Mar 01 1993 06:55:51 config.text
1728000 bytes total (456704 bytes free)
rename flash:config.text flash:config.old
boot
Continue with the configuration dialog? [yes/no] : N
Switch>enable
Switch# rename flash:config.old flash:config.text
Switch# copy flash:config.text system:running-config
Switch# configure terminal
Switch(config)# enable secret newpassword
Switch(config)# line vty 0 4
Switch(config-line)# password newpassword
Switch(config)# line con 0
Switch(config-line)# password newpassword
Switch#(config-line)# end
Switch# copy running-config startup-config
```

## Password Recovery on IOS Devices: Procedure 2

Password recovery procedure 2 covers the 6000 series switch. If you have lost or forgotten your passwords, or if you want to bypass the configuration file, you can use this recovery process.

To recover from a lost password, you must stop the boot process of the route processor and then direct the switch to not use the configuration file. When the switch loads without a file, you have no passwords and can enter into privileged mode. From there you can copy the configuration file into active memory and then change and save the passwords. To complete the recovery process, follow these steps:

1. Attach a device to the console of the switch and power cycle the device.
2. Watch the console output. When you see the message “%OIR-6-CONSOLE: Changing console ownership to route processor,” initiate the break sequence from your terminal emulator (typically **Ctrl-Break**).
3. You should see a `rommon1>` prompt. At this prompt, type `confreg 0x2142` to tell the switch to ignore the current configuration.
4. Now type `reset` at the `rommon2>` prompt to reset the switch and restart to boot process.
5. Answer **no** to the question about entering setup.
6. Press **Enter** to gain access to the `Router>` prompt and enter the command `enable` to access privileged mode.
7. At the `Router#` prompt, copy the startup configuration into the running configuration with the command `copy startup-config running-config`.
8. Enter global configuration mode with the command `configure terminal`.
9. Change the line and secret passwords as covered previously in this section.
10. Reset the configuration register with the command `config-register 0x2102`.
11. Exit setup mode with the command `end`.
12. Save the configuration with the command `copy running-config startup-config`.

## Feature Example

This example shows a typical password-recovery procedure 2 for switches:

```
%OIR-6-CONSOLE: Changing console ownership to route processor
issue break
rommon>confreg 0x2142
rommon>reset
! switch output omitted
Continue with the configuration dialog? [yes/no] : N
Router>enable
Router# copy startup-config running-config
Router# configure terminal
Router(config)# enable secret newpassword
```

```

Router(config)# line vty 0 4
Router(config-line)# password newpassword
Router(config)# line con 0
Router(config-line)# password newpassword
Router# config-register 0x2102
Router#(config-line)# end
Router# copy running-config startup-config

```

## Managing Modules

- Many devices have multiple blades or modules used for switching services.
- Some of these modules have their own operating systems and can be accessed directly for configuration.
- Most modules can be power-cycled or reset individually.
- For some switches, it is possible to power down a module.

## Viewing Modules

You can use modular switches to effect a more flexible switch configuration. To view the modules installed on a switch, use one of the following commands:

Supervisor IOS	(privileged) <b>show module all</b>
L2 IOS	(privileged) <b>show hardware</b> or <b>show version</b>

These commands show the hardware or module information for the switches.

## Accessing Modules

Most modules and ports are configured through the main CLI for the switch. However, a handful of modules, such as the services modules that are placed in the Catalyst 6500, contain their own independent operating system and CLI. To access these interfaces, use the **session** command:

```
(privileged) session slot#
```

The *slot#* or *mod#* indicates in which slot or module that the switch card occupies.

## Resetting Modules

You can reset modules on an individual basis. Therefore, you can jumpstart a group of ports without having to reset the entire switch:

```
(privileged) power cycle module slot
```

The `reset` command causes an entire module to be powered down and then back up, and forces the module to go through *Power-On Self-Test (POST)* as it reloads. Some switches do not offer this option. For those switches, you can reset a port with the `shutdown` and `no shutdown` commands.

## Powering Modules Up and Down

For modular switches, you can power down a module. Powering down disables the module and all its ports. If the switch is reset or power-cycled, the module remains in a powered-down state. This state can be useful for troubleshooting a boot problem or if the power supply cannot handle the complete switch power load:

```
(global) no power enable module slot
```

This command disables the modules. None of the module's configuration are saved; and if the switch is reset, all the configuration entries for that module are lost. To reenble the modules, use the following command:

```
(global)power enable module slot
```

## File Management and Boot Parameters

- Cisco operating systems have many files and file systems that require management.
- File management consists of managing configuration files and operating system files.
- File system commands replace many older file management commands.
- File system commands enable you to view and classify all files, including files on remote servers.
- File system commands enable you to copy files with complete path information to eliminate the need for system prompting.
- Cisco platforms support various Flash and ATA file system types.
- When copying various files into Flash memory, it is important to configure the switch to boot the proper file with boot parameters.

**Note** Switches have a set of file system commands that facilitate file management. Cisco refers to the file system as the *IFS* or *IOS file system*. This file system provides an extremely powerful way to manage files within the switch devices and on remote systems. To provide backward compatibility, many aliases map to older commands for file management. See Table 3-3 at the end of this section for a listing of the older commands and the IFS equivalent.



## Navigating File Systems

1. View the available file system devices:

(privileged) **show file systems**

This command gives a listing of the file systems available on the device and the total size and the amount of free space on the file system in bytes, the type of file system, the flags for the file system, and the alias name used to access the file system. File system types include Flash, *nonvolatile random-access memory (NVRAM)*, and network (and some others, such as ROM file systems, that contain microcode). Table 3-1 lists some of the available file systems. Note that not all file systems are available on all platforms.

**Table 3-1** *Cisco File Systems*

Prefix	File System
<i>system:</i>	Contains the system memory, including the running configuration.
<i>nvr:</i>	Nonvolatile RAM. This contains the startup configuration.
<i>flash:</i>	Flash memory. Typically the location of the IOS image. This is the default or starting file system for file system navigation. The prefix <i>flash:</i> is available on all platforms. For platforms that do not have a device named <i>flash:</i> , the prefix <i>flash:</i> is aliased to <i>slot0:</i> . Therefore, you can use the prefix <i>flash:</i> to refer to the main Flash memory storage area on all platforms.
<i>bootflash:</i>	Boot flash memory. Typical location for Rxboot IOS image.
<i>Sup-bootflash:</i>	The boot flash for the Supervisor module is the <i>switch processor (SP)</i> . This is where IOS is loaded.
<i>Slot0:</i>	First PCMCIA Flash memory card.
<i>Disk0:</i>	Available for CompactFlash Type II cards that provide additional storage.
<i>Disk1:</i>	Available for CompactFlash Type II cards that provide additional storage.
<i>Tftp:</i>	Trivial File Transfer Protocol network server.
<i>ftp:</i>	FTP network server.
<i>slave-nvr:</i>	NVRAM on a redundant Supervisor module running native IOS.
<i>slave-sup-bootflash:</i>	The boot flash for the Supervisor SP on a redundant Supervisor module.
<i>slave-bootflash:</i>	Internal Flash memory on a redundant MSFC running native IOS.
<i>slave-slot0:</i>	First PCMCIA card on a redundant Supervisor module.

**Table 3-1** *Cisco File Systems*

Prefix	File System
<i>null:</i>	Null destination for copies. You can copy a remote file to null to determine its size.
<i>rcp:</i>	<i>Remote Copy Protocol (RCP)</i> network server.

**2.** Change the default file system directory:

```
(privileged) cd [filesystem:]
```

Use this command to move to a specific file system or directory within that file system. By moving to a specific file location, you can use file system commands without having to specify the *file system:* option. If you do a **dir** command without specifying the *file system:*, for example, it uses the directory that has been specified by the default directory or the **cd** command. The default file system directory is Flash.

**3.** List the current directory:

```
(privileged) pwd
```

This command prints or displays the name of the working directory to the screen. This command enables you to determine the default file system directory. Use this command to verify that you have moved into the appropriate directory when using **cd** command.

**4.** Display information about the files:

```
(privileged) dir [/all] [filesystem:][path/filename]
```

This command displays a directory of the default directory structure as specified by the **cd** command. The option */all* enables you to see all files, including those that have been deleted but not permanently removed from a file system. You can also specify a file system by using the *filesystem:* or *device:* option. If you want to view a single file, provide the path and filename, too. You can use an asterisk (\*) as a wildcard to display a group of files with common starting characters. Use this command to get a list of files off of any available local file system:

```
(privileged) show filesystem:
```

**Note** With ATA disk devices you no longer need to use the **squeeze** command because it deletes the file upon entering the **delete** keyword; **squeeze** was only relevant in flash devices.

This command displays the contents of a file system. It is similar to the **dir** command, but the output is formatted differently. This command does not enable you to display individual files or remote file systems.

- View the information about a local or remote file:  
(privileged) **show file information** *filesystem:path*

This command enables you to view information about a file on a remote or local file system. The output displays the image type and size.

- View the contents of a local or remote file:  
(privileged) **more** [/ascii | /binary | /ebcdic] *filesystem:path*

Use this command to view the contents of a remote or local file. The options **ascii**, **binary**, and **ebcdic** enable you to specify the type of format in which you want to have the file presented. If you specify **dump**, it shows the file in binary format. The *filesystem:path* options enable you to specify a particular file on a valid file system. For example, **more /ascii flash:myconfig.txt** displays the file myconfig.txt in ASCII format located in the current Flash device.

## Deleting Files from Flash

Cisco switch platforms have three different classifications of file systems. Each of these file systems deals differently with deleting and permanently removing files from the Flash file system. Table 3-2 shows the three types of file systems and the platforms that use these file systems.

**Table 3-2** *Switch File System Types*

File System Type	Platforms
Class A	Catalyst 6500, 4500, 4848, 4900M
Class B	Catalyst 3560-E, 3750-E
Class C	Catalyst 2940, 2960

- Delete a file from Flash memory:  
(privileged) **delete** [*filesystem:*] *filename*

This command deletes a file from Flash on any of the three classifications of file systems. For Class A and B file systems, the file is marked as deleted and shows up only if the command **dir /all** is used. You can restore files that are marked as deleted by using the **undelete** command. For Class C file systems, the **delete** command permanently removes the file from the system. The file system must be a Flash file system.

- Restore a deleted file:  
(privileged) **undelete** *index* [*filesystem:*]

For a Class A file system, if a file has been deleted, you can restore the file by using the **undelete** command. You must provide the *index* number of the file listed by using the **dir /all** command. If the file is not located in your working directory, determined by the **pwd** command, you can specify the *filesystem:* option.

3. Permanently remove a file from Class A Flash memory:

```
(privileged) squeeze filesystem
```

If you want to permanently remove a file that has been deleted from a Class A file system, you must **squeeze** the file system. This command permanently removes any file on the file system that has been marked as deleted.

4. Remove a file from Class B Flash memory or NVRAM:

```
(privileged) delete [flash:/filename | bootflash:/filename | nvram:/filename]
```

To remove a file on a Class B Flash device, use the **delete** command. When you delete a file from a Class B Flash device, it remains in Flash memory and retains the memory space used. To permanently remove a file from a Class B file system, you must reformat the file system. Because this removes all files, you should save OS files and copy them back to memory after you reformat the device:

```
(privileged) format filesystem:
```

For Class A and Class C devices, you can also remove all the files and reformat the device by using the **format** command.

## Copying System Files

Like on most computer systems, it is important to move the files from one location to another. To move system files, you can use the **copy** command. This command, along with path parameters, moves the system files. The results of some file system moves are unique; for example, when a file is copied into the `system:running-configuration` file, the result is a file merge. This section discusses some common **copy** commands and the results. On the whole, however, you can move files into file systems that enable you to write to the system. The command structure for **copy** commands is **copy** [*/erase*] *source-location destination-location*. The source location and destination location can be any writable file system and path. By using the */erase* option, you can always erase the destination of a writable file system. The source location can be any file system that contains files that need to be moved. With all these commands, you can specify the address and filename, or you can leave them out and the system will prompt you for information.

1. Save the active configuration file to be used for startup:

```
(privileged) copy system:running-config nvram:startup-config
```

This command copies the system's current active configuration into the startup configuration file. When anything is copied into the location `nvr`am:`startup-configuration`, it is a complete overwrite; that is, any information that was in that file is completely lost and overwritten with the source file. The startup configuration file is loaded at startup.

2. Copy a file into active configuration:

```
(privileged) copy source system:running-config
```

This command copies a file into the current running configuration. The source or device can be any location that contains a text file that has configuration parameters framed in the appropriate syntax. When files are copied into the running configuration, they are merged with the current configuration. That is, if a configuration parameter (such as an address) exists in both places, such as the running configuration and the source configuration, the running configuration will be changed by the parameter that is copied from the source location. If the configuration parameter exists only in the source location, it is added to the running configuration. In the case that a parameter exists in the running configuration, but is not modified in the source configuration, there is no change to the running configuration. The source location can be a file in any location, including a file on a TFTP server, FTP server, or a text file that has been written to Flash memory.

**3.** Save a file to a TFTP server:

```
(privileged) copy source tftp://address/filename
```

This command enables you to save any readable file from an IFS source location to a TFTP server specified in the address of the destination parameter. If you do not supply a filename and address, the system prompts for this information.

**4.** Save a file to Flash memory:

```
(privileged) copy source flash-filesystem://path/filename
```

You can copy a file into any Flash file system of a router with the **copy** commands. Some writeable file systems, such as a Class A file system, enable you to create and write to directories and files. This **copy** command enables you to move files into a Flash file system. Files that are moved into Flash are usually IOS files; however, you can use Flash to store any file if you have room to place the file. In fact, after a file has been placed into Flash memory, the router can be configured as a TFTP server and can then serve that file to other devices. Refer to the related commands portion of section “1-1: Cisco Internetwork Operating System (IOS) Software,” in Chapter 1, “CLI Usage,” for more information about configuring your router to act as a TFTP server.

## File System Boot Parameters

**1.** Specify an OS image to boot from in a Flash file system:

```
(global) boot system flash flash-filesystem:/directory/filename
```

By default, switches boot the first valid image in the default Flash location. If you have more than one file in Flash memory and you do not want to boot the first file, you must specify which file is to be used as the IOS image.

**2.** Change the configuration file environmental parameter for Class A file systems:

```
(global) boot config device:directory/filename
```

For a Class A file system, you can copy configuration files to the Flash file system. You can also specify that some switches need to load a configuration from Flash instead of the startup configuration file located in NVRAM. To do this, you must

first copy the active configuration into the Flash file system, and then in global configuration, use the **boot config** parameter followed by the file system name and file location and name. After you save this configuration, the router attempts to load the configuration from the specified location.

## Alias Commands

Because the new file system functionality is the third generation of file management systems for Cisco IOS, alias commands have been established to provide backward compatibility for commands that existed in previous operating systems. This backward compatibility enables you to use file management commands that you might have learned in previous releases without having to relearn the new command structure. Table 3-3 shows the alias commands and the IFS equivalent command.

**Table 3-3** *File Management Alias Commands*

<b>Cisco IOS Software Release 10.2 and Earlier Command</b>	<b>Cisco IOS Software Release 10.3 to 11.3 Command</b>	<b>Cisco IOS Software Release 12.0 and Later (IFS) Command</b>
write terminal	show running-config	show system:running-config or more system:running-config
show config	show startup-config	show system:startup-config or more system:startup-config
write memory	copy running-config startup-config	copy system:running-config nvram:startup-config
write erase	erase startup-config	erase nvram:
write network	copy running-config tftp:	copy system:running-config tftp://address/filename
config memory	copy startup-config running-config	copy nvram:startup-config system:running-config
config network	copy tftp running-config	copy tftp://address/filename system:running-config
config overwrite	copy tftp startup-config	copy tftp://address/filename nvram:startup-config

## Redundant Supervisors

- When identical Supervisor hardware is placed in slots 5 and 5 of a Catalyst 6500 series switches, one Supervisor is active and the other is in standby mode.
- If a failure occurs, the redundant Supervisor takes over switch functionality.
- Configuration files and operating system files are synchronized between switches.
- Layer 2 tables are synchronized between the supervisors for quick transitions between modules.
- Parameters such as the Layer 2 synchronization and operating system synchronization can be managed for the modules.
- Catalyst 6500 series switches provide both Layer 2 and Layer 3 synchronization within the same operating system and configuration.

By placing identical Supervisor hardware and software in slots 5 and 5 of a Catalyst 6500 series switch, you have activated system redundancy. No parameters enable you to activate this feature. The first Supervisor to come online is active, and the second one is in standby mode. The standby Supervisor has an orange system light, and the console port is not active. However, the interfaces on the module are active.

You can remove or insert Supervisor cards while the switch is powered on. If a second Supervisor is added or a standby Supervisor is replaced, the card inserted into the switch goes through the power-on diagnostics but does not test the backplane (because this would interrupt traffic flow) and then goes into standby mode. The standby Supervisor becomes active if there is a failure in the primary Supervisor or if you force a change by resetting the primary Supervisor.

The Supervisor and MSFC are each responsible for different functions and protocols (Layer 2 versus Layer 3). However, the system is dependent on both engines being available for proper operation. Failure of either the Supervisor or the MSFC in RPR/RPR+/SSO mode causes a switchover from the active Supervisor to the standby Supervisor/MSFC.

- **RPR:**The first redundancy mode of operation introduced in Cisco IOS Software. In RPR mode, the startup configuration and boot registers are synchronized between the active and standby supervisors; the standby is not fully initialized; and images between the active and standby supervisors do not need to be the same. Upon switchover, the standby Supervisor becomes active automatically, but it must complete the boot process. In addition, all line cards are reloaded, and the hardware is reprogrammed. The RPR switchover time is 2 or more minutes.
- **RPR+:**An enhancement to RPR in which the standby Supervisor is completely booted and line cards do not reload upon switchover. The running configuration is synchronized between the active and the standby supervisors. All synchronization activities inherited from RPR are also performed. The synchronization is done before the

switchover, and the information synchronized to the standby is used when the standby becomes active to minimize the downtime. No link layer or control-plane information is synchronized between the active and the standby Supervisors. Interfaces can bounce after switchover, and the hardware contents need to be reprogrammed. The RPR+ switchover time is 30 or more seconds. The actual failover time is dependent on the size and complexity of the configuration.

- **NSF/SSO:** Cisco IOS Software supports NSF with SSO. The key differentiators apply in where and how these features are applied with the more advanced forms of these features deployed first in Cisco IOS. SSO expands the RPR+ capabilities to provide transparent failover of Layer 2 protocols when a supervisor failure occurs. SSO is stateful for Layer 2 protocols. The PFC and Distributed Forwarding Card (DFC) hardware tables are maintained across a switchover. This allows for transparent failover at Layer 2 and Layer 4. NSF works in conjunction with SSO to ensure Layer 3 integrity after a switchover. It allows a router that experiences the failure of an active Supervisor to continue forwarding data packets along known routes, while the routing protocol information is recovered and validated. This forwarding can continue to take place by the leverage of restart mechanisms that allow peering arrangements to recover upon failover. This avoids unnecessary route flaps and network instability. The failover time is 0 to 3 seconds with NSF/SSO.
- **SRM/SSO:** When the switch is powered on, SRM with SSO runs between the two Supervisor engines. The Supervisor engine that boots first becomes the active Supervisor engine. The MSFC and PFC become fully operational. The configuration of the redundant Supervisor engine and MSFC is exactly the same as the active Supervisor engine and MSFC. Processes, such as routing protocols, are created on both the active MSFC and the redundant MSFC. The redundant Supervisor engine is fully initialized and configured, which shortens the switchover time. The active Supervisor engine checks the image version of the redundant Supervisor engine when the redundant Supervisor engine comes online. If the image on the redundant Supervisor engine does not match the image on the active Supervisor ENGINE, RPR mode is used. If the active Supervisor engine or MSFC fails, the redundant Supervisor engine and MSFC become active. SRM with SSO supports a switchover time of 0 to 3 seconds for Layer 2 unicast traffic.

**Note** SRM with SSO is supported only on Supervisor Engine 720 and Supervisor Engine 32.

## Forcing a Change to the Standby Supervisor

To reset the active Supervisor engine, enter the following command:

```
(privileged) reload
```



**Note** The **reload** command reloads the switch. If you want to have Supervisor redundancy, use the **redundancy force-switchover** command, which conducts a manual switchover to the redundant Supervisor engine. The redundant Supervisor engine becomes the new active Supervisor engine running the new Cisco IOS image.

Catalyst 6500 native IOS switches do not automatically synchronize images. Therefore, to have redundancy operational, you must have the same images on both the active and redundant Supervisor modules. To manually synchronize the images, make sure you have IOS on both Supervisor modules and then copy the image from the active Supervisor to the “slave” Supervisor.

## Synchronizing IOS Images

To manually synchronize the images for IOS Supervisor modules, the required command is as follows:

```
(privileged) # copy source_device:source_filename
destination_device:target_filename
```

The destination device can be one of the following:

- **slaveslot0**:The PCMCIA card on the redundant Supervisor
- **slave-supbootflash**:The Supervisor boot flash on the redundant Supervisor
- **slave-bootflash**:The MSFC boot flash on the redundant Supervisor
- **Disk0**:Available for CompactFlash Type II cards that provide additional storage
- **Disk1**:Available for CompactFlash Type II cards that provide additional storage

As each Supervisor boots, it checks the configuration register to determine how the device is to boot and where to look for the image. Typically the image is specified in a flash location using boot variable parameters. For Cisco IOS devices, the configuration registers are synchronized by default, but the boot variables are not automatically synchronized.

It is important that both modules have configuration parameters that enable them to automatically boot the same image before redundancy actually takes place. By default the configuration registers of both operating systems use boot system commands to load the OS. Therefore, they are correctly configured. The IOS devices synchronize the configuration register by default. If you change the boot parameters, however, saving the configuration on the active Supervisor will not change to boot variables on the standby Supervisor.

## Synchronizing Boot Parameters

1. Synchronization of the configuration register is automatic and requires no further configuration.
2. *(Required)* Synchronize the location of the boot image:

```
(global) redundancy
(redundancy) main-cpu
(redundancy-maincpu) auto-sync bootvar
(redundancy-maincpu) end
(privileged) copy running-config startup-config
```

After you have redundant Supervisors operational, you can check the status with the command **show module all** to verify that one Supervisor is active and the other in standby mode.

Catalyst 6500 Series switches allow a redundant Supervisor engine to take over if the primary Supervisor engine fails to support fault resistance. Redundant Supervisor engines must be of the same type with the same model feature card to support redundancy. When you install two Supervisor engines, the first one to come online becomes the active module. The second Supervisor engine goes into standby mode. All administrative and network management functions, such as Simple Network Management Protocol (SNMP), command-line interface (CLI) console, Telnet, Spanning Tree Protocol (STP), Cisco Discovery Protocol (CDP), and VLAN Trunking Protocol (VTP) are processed on the active Supervisor engine. On the standby Supervisor engine, the console port is inactive. Redundant Supervisor engines are not swappable. The system continues to operate with the same configuration after it switches over to the redundant Supervisor engine.

**Note** Redundancy is always enabled and cannot be disabled. Redundancy is enabled any time the switch has two Supervisor engines installed on it and the switch decides which specific redundancy mode to use in accordance to the type of images it has.

Cisco IOS Software on the Catalyst 6500 supports RPR, also known as Enhanced High System Availability (EHSA), RPR+, NSF/SSO, and single router mode with stateful switchover (SRM/SSO). In this operational model, one Supervisor/MSFC pair is fully operational, and the other pair is in standby mode. The **show module** command lists the active and standby Supervisors. There are heartbeat messages between two pairs to ensure rapid failure detection. There is no stateful protocol redundancy between Supervisor engines with RPR or RPR+. The SSO redundancy mode provides the stateful protocol redundancy between Supervisor engines.

## Cisco Discovery Protocol

- CDP identifies directly connected Cisco devices.
- CDP is enabled on all Cisco devices.
- CDP identifies neighbor address, operating system, VLAN, *VLAN Trunking Protocol (VTP)* domain, and duplex information between Cisco switches.
- CDP can be disabled globally or on a per-port (interface) basis.

### Configuration of CDP

1. *(Default)* Enable CDP globally:

```
(global) cdp run
```

CDP is enabled by default. To disable CDP for the entire device, use the command **no cdp run**.

2. *(Optional)* Set the update time for CDP advertisements:

```
(global) cdp timer interval
```

CDP sends advertisements every 60 seconds by default. Use these commands to change the update interval in seconds. Keep in mind that the update interval must be less than the holdtime.

3. *(Optional)* Specify the holdtime of CDP information:

```
(global) cdp holdtime interval
```

If CDP does not hear an update for the specified amount of time in the holdtime interval in seconds, that information is purged from the CDP table. Use these commands to change the holdtime. The holdtime should be greater than the advertisement (usually three times the value of the update timer).

4. *(Default)* Set the CDP version send parameters for the switch:

```
(global) cdp {advertise-v2 | advertise-v1}
```

CDP has two versions (v1 and v2). These versions are compatible, but version 2 has enhanced *type-length-values* (TLV) that support VTP domain name, native VLAN, and duplex information. This information is important in the operation of switch ports. If you receive CDP mismatch messages, the errors are not fatal, but they can indicate a problem.

5. *(Optional)* Disable CDP on an interface or port:

```
(interface)no cdp enable
```

CDP is enabled by default on every port. For ports that are not connected to Cisco devices, it makes no sense to have CDP running. Use the commands in Step 2 to disable CDP on a port-by-port basis. To reenable CDP, use the command **cdp enable**.

The command **show cdp** displays global information about CDP configuration on both operating systems. Use the commands **show cdp neighbors** for both operating

systems to view neighbor information. The command **show cdp interface type mod/port** or **show cdp port mod/port** displays port-specific information about CDP.

## Feature Example

This example shows a switch with the CDP timers altered so that the holdtime is 480 seconds and the update time is 120 seconds. It also shows Fast Ethernet ports 1 to 12 on an IOS switch:

```
Switch(config)# cdp timer 120
Switch(config)# cdp holdtime 480
Switch(config)# interface fastethernet 0/1
Switch(config)# no cdp enable
Switch(config)# interface fastethernet 0/2
Switch(config)# no cdp enable
Switch(config)# interface fastethernet 0/3
Switch(config)# no cdp enable
Switch(config)# interface fastethernet 0/4
Switch(config)# no cdp enable
Switch(config)# interface fastethernet 0/5
Switch(config)# no cdp enable
Switch(config)# interface fastethernet 0/6
Switch(config)# no cdp enable
Switch(config)# end
Switch# copy running-config startup-config
```

## Time and Calendar

- System time is maintained by the software. When a switch is initialized, the system time is set from a hardware time clock (system calendar) in the switch.
- An accurate system clock is important to maintain, especially when you need to compare the output of logging and debugging features. A switch timestamps these messages, giving you a frame of reference.
- System time is maintained as *coordinated universal time* (UTC, also known as *Greenwich mean time*, or GMT). The format of time as it is displayed can be configured with operating system commands.
- System time can be set manually or by *Network Time Protocol* (NTP). In addition, the hardware time clock in a switch can be updated by NTP if desired.
- NTP uses a concept of *stratum* to determine how close an NTP speaker is to an authoritative time source (an atomic or radio clock). Stratum 1 means that an NTP server is directly connected to an authoritative time source. NTP also compares the times reported from all configured NTP peers and will not listen to a peer that has a significantly different time.

- NTP associations with other NTP peers can be protected through an encrypted authentication.

NTP version 3 is based on RFC 1305 and uses UDP port 123. You can find information about public NTP servers and other NTP subjects at <http://www.ntp.org/htdig/search.html> or <http://www.eecis.udel.edu/~mills/database/rfc/rfc1769.txt>.

**Note** Catalyst 4500 and 6500 series switches running native IOS switches can also be configured as NTP authoritative time sources. For configuration information on these devices, check out the Cisco Network Time Protocol: Best Practices White Paper at <http://www.tinyurl.com/4r3ow> or refer to Cisco Field Manual: Router Configuration by David Hucaby and Steve McQuerry, Cisco Press, ISBN 1-58705-024-2.

## System Time Configuration

You can set the system time using two different ways:

- Manually
- Using the NTP

For manual configuration, you set the time and date on the router along with the time zone and whether to observe summer hours. With manual configuration, the router has no way to preserve the time settings and cannot ensure that time remains accurate. NTP is defined by RFC 1305 and provides a mechanism for the devices in the network to get their time from an NTP server. With NTP, all the devices would be synchronized and keep accurate time.

### Setting the System Time Manually

1. Set the time zone:

```
(global) clock timezone zone hrs-offset min-offset
```

The time zone is set to the abbreviated name *zone* (that is, EST, PST, CET). This name is used only for display purposes and can be any common zone name. The actual displayed time is defined by an offset in hours (*hrs-offset*) and minutes (*min-offset*) from UTC.

2. (Optional) Configure daylight savings time (DST):

```
(global) clock summer-time zone recurring [week day month hh:mm week day month hh:mm [offset]]
```

```
(global) clock summer-time zone date [date month | month date] year hh:mm [date month | month date] year hh:mm [offset]
```

If DST begins and ends on a certain day and week of a month, use the command with the **recurring** keyword. To start and stop DST, you can give the *week* number

(including the words “first” and “last”), the name of the *day*, the name of the *month*, and time *hh:mm* in a 24-hour format. If no arguments are given, the U.S. standard of beginning at 2:00 a.m. on the first Sunday in April, and ending at 2:00 a.m. on the last Sunday in October is used. The *offset* value can be given to set the number of minutes that are added during DST (default 60 minutes).

Otherwise, you can use the **date** keyword to specify the exact date and time that DST begins and ends in a given year.

3. (Optional) Set the system clock (IOS clock):

```
(exec) clock set hh:mm:ss [day month | month day] year
```

The clock is set when this command is executed. The time is given in a 24-hour format; *day* is the day number, *month* is the name of the month, and *year* is the full four-digit year.

4. (Optional) Set the system calendar (hardware clock):

```
(exec) calendar set hh:mm:ss [day month | month day] year
```

The hardware clock is set to the given time (24-hour format) and date. The *month* is the name of the month, *day* is the day number, and *year* is the full four-digit year. As an alternative, you can set the system calendar from the system clock using the (EXEC) **clock update-calendar** command.

## Setting the System Time Through NTP

1. Define one or more NTP peer associations:

```
(global) ntp peer ip-address [version number] [key keyid] [source interface]
[prefer]
```

The NTP peer is identified at *ip-address*. The NTP version can be given with the **version** keyword (1 to 3, default is version 3). If NTP authentication is used, the **key** keyword identifies the authentication key to use (see Step 3b in this section). If desired, you can take the source address used in NTP packets from an interface by using the **source** keyword. Otherwise, the router uses the source address from the outbound interface. The **preferred** keyword forces the local router to provide time synchronization, if contention exists between peers.

2. (Optional) Configure the NTP broadcast service:

```
(global) ntp broadcast client
(global) ntp broadcastdelay microseconds
```

By default, NTP sends and receives unicast packets with peers. Broadcasts can be used instead, if several NTP peers are located on a common network. The **ntp broadcast** command enables sending broadcast packets. The **ntp broadcast client** command enables the reception of broadcast packets. The **ntp broadcastdelay** command sets the round-trip delay for receiving client broadcasts (1 to 999,999 microseconds; default is 3000 microseconds).

**3.** *(Optional)* Restrict access to NTP using authentication.

**a.** Enable NTP authentication:

```
(global) ntp authenticate
```

**b.** Define an authentication key:

```
(global) ntp authentication-key key-number md5 value
```

An MD5 authentication key numbered *key-number* is created. The key is given a text-string *value* of up to eight clear-text characters. After the configuration has been written to NVRAM, the key value displays in its encrypted form.

**c.** Apply one or more key numbers to NTP:

```
(global) ntp trusted-key key-number
```

Remote NTP peers must authenticate themselves using the authentication key numbered *key-number*. You can use this command multiple times to apply all desired keys to NTP.

## Example

This example shows a switch that is configured for the U.S. eastern time zone and daylight savings time. The time is manually set.

```
Switch(config)# clock timezone EST -5
Switch(config)# clock summer-time EST recurring 1 sunday april 2:00
    last sunday october 2:00
Switch(config)# end
Switch# clock set 15:30:00 August 11 1990
Switch# copy running-config startup-config
```

In the configuration that follows, NTP is enabled and NTP is configured for authentication:

```
Switch(config)# ntp authenticate
Switch(config)# ntp authentication-key 1 md5 sourceA
Switch(config)# ntp authentication-key 2 md5 sourceB
Switch(config)# ntp trusted-key 1
Switch(config)# ntp trusted-key 2
Switch(config)# ntp peer 172.17.76.247 key 1
Switch(config)# ntp peer 172.31.31.1 key 2
```

One key, source1key, authenticates a peer at 172.17.76.247, whereas another key, source2key, authenticates a peer at 172.31.31.1.

## Further Reading

Refer to the following recommended sources for further information about the topics covered in this chapter.

Hucaby, Dave. CCNP BCMSN Official Exam Certification Guide, Fourth Edition. Cisco Press, ISBN 1-58720-171-2.

Hucaby, Dave and Steve McQuerry. Cisco Field Manual: Router Configuration. Cisco Press, ISBN 1-58705-024-2.



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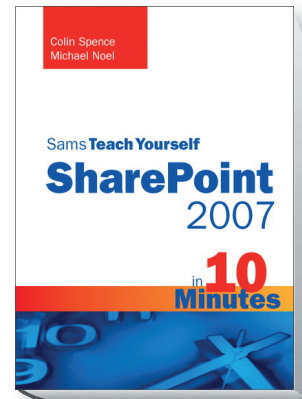
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DUE TO PUBLISH IN AUGUST 2009

Please note that the text in this chapter has not yet been proofread or copyedited and may contain grammatical errors. The inclusion of this text is to show an example of what is included in this book.



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**Colin Spence** (San Francisco, CA), MCP, is a senior consultant, project manager, and technical writer specializing in the design, implementation, and support of SharePoint and related solutions. He co-authored the best-sellers **Microsoft SharePoint 2003 Unleashed** and **Sams Teach Yourself Microsoft SharePoint 2003 in 10 Minutes**.

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# LESSON 3

## Understanding Sites and Workspaces

*In this lesson you will learn about site collections and their main components—top-level sites and subsites—and about document and meeting workspaces. Web Parts are also introduced at a high level in terms of what they can do, and how they can be configured.*

### Sites and Workspaces Defined

Although the average SharePoint user may not have the rights to create sites, document workspaces, or meeting workspaces, it is important to understand what each of these items is, because they are confusing to many new users. This information will also aid you in understanding the overall structure of the SharePoint environment and in building on the skills covered in Lesson 2, “Accessing SharePoint Sites,” when navigating a SharePoint environment.

Figure 3.1 shows the All Site Content page on the subsite “Test1” that was accessed by clicking on the **Sites** link (circled in Figure 3.1) in the Quick Launch area. “Test1” is a subsite of the top level site that appears in the breadcrumb navigation as “Portal Home.” The top-level site and all of its subsites makes up a site collection. The top-level site of a site collection provides additional management tools to the site administrator over and above the tools provided to a subsite administrator. These tools will be described throughout the book, primarily in Part 3.

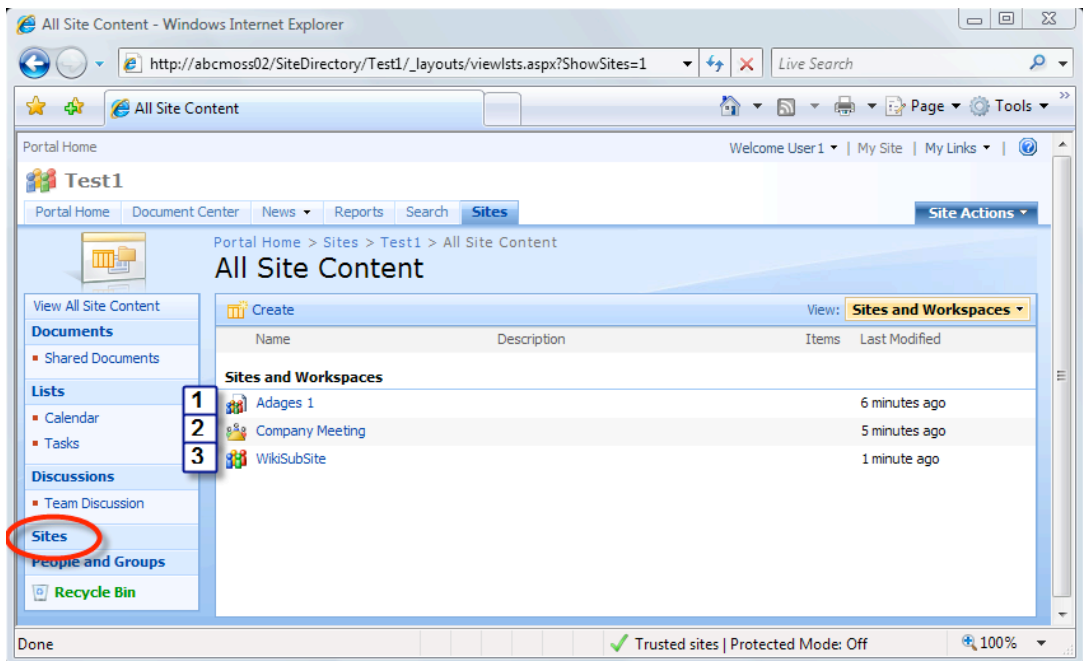


Figure 3.1 The All Site Content view of Sites and Workspaces.

The list of Sites and Workspaces in Figure 3.1 contains three items: a document workspace titled “Adages1,” a meeting workspace titled “Company Meeting,” and a subsite titled “WikiSubSite.” Each of these items can contain lists, libraries and may have subsites beneath them. Lists and libraries will be covered in more detail in future chapters.

**NOTE** Let’s clarify the difference between document libraries and lists: Document libraries contain documents (of any type that is allowed to be uploaded to a SharePoint library) and lists contain tabular information organized in columns and rows, similar to an Excel spreadsheet. Document libraries can have additional columns added to them by administrators that will store “metadata” about the document. Lists are essentially all metadata values.

A document workspace is intended to be created as a collaborative space where users can share a document and track and store information related to that document. For example, if a complex proposal needs to be created as a collaborative effort, a document workspace can be created that will contain a copy of the proposal document, and can also have reference documents stored in it, and have a team discussion list for the authors to share thoughts. A meeting workspace is intended to perform a similar function, but is based around a calendar item, and can have libraries and lists within it that could contain agenda items, lists of attendees and other relevant information. A site, such as the WikiSubSite is generally also created with a specific purpose in mind, such as for housing Wiki pages, or for a specific project, or other focused purposes.

**Note** It is important for the organization to think through the design of the SharePoint environment to ensure that the right site collections, sites, subsites and workspaces are created for the user community. There needs to be a good combination of features and functionality so that top-level sites are available for the appropriate departments, committees, or groups and that the appropriate subsites are created, while ensuring that the SharePoint environment is navigable and manageable.

## Creating a Subsite

If an administrator or user with the right to Create Subsites clicks the **Create** link in the **Site Settings** menu a fairly long list of options will be displayed (as shown in Figure 3.2) which includes the categories Libraries, Communications, Tracking, Custom Lists, and Web pages. A number of choices are provided in the Libraries column, including the all-important document library, and picture library, and the often used lists accountments, contacts, calendar, tasks, and issue tracking are available.

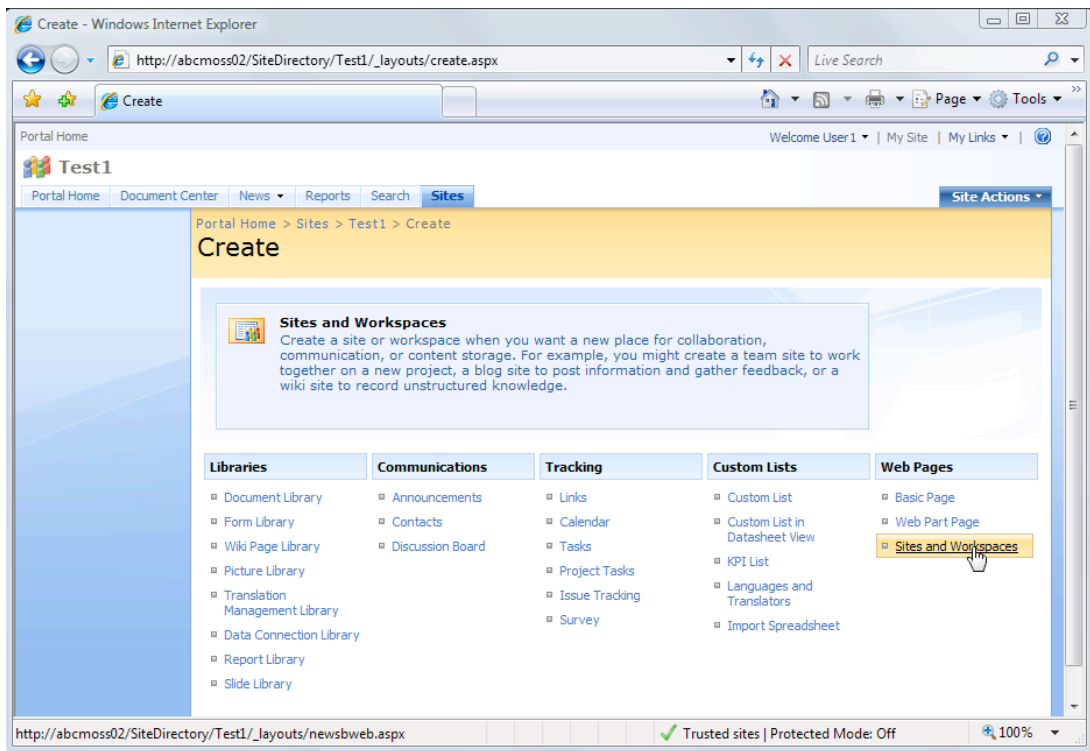


Figure 3.2 The Create page.

If the **Sites and Workspaces** link is clicked, the user or administrator will then need to enter some information about the site, including

- Title
- Description (this is optional and can be left blank)
- The URL name (shorter is better here, and in general avoid spaces)
- A site template needs to be chosen from the list (these include standard site templates that ship with SharePoint or can include customized templates that the organization has created and made available to site administrators)
- User Permissions (can be the same as the parent site, or can be unique to the new site)
- Use the top link bar from the parent site (to “brand” the subsite or workspace with the navigational tabs from the top level site)
- Finally, if SharePoint Server 2007 is being used and a site directory exists, the user can opt to include this new site in the site directory, and select divisional and regional information.

The template options for WSS 3.0 include:

- Team Site
- Blank Site
- Document Workspace
- Wiki Site
- Blog

- Basic Meeting Workspace
- Blank Meeting Workspace
- Decision Meeting Workspace
- Social Meeting Workspace
- Multipage Meeting Workspace

The template options in SharePoint Server 2007 include these same items and:

- Document Center
- Records Center
- Personalization Site
- Site Directory
- Report Center
- Search Center with Tabs
- Search Center
- Publishing Site
- Publishing Site with Workflow
- News Site

With this number of choices, each of which offers slightly different features, tools and components, it is beyond the scope of this chapter to delve into their functions. It should be obvious that there are a wide range of templates available to WSS administrators and even more available to SPS 2007 administrators and some experimentation will be required to figure out which one is best suited for which situation.

TIP In general, the Team Site template is a “catch all” template that is great to start with when creating a departmental site or a project oriented site. The Team Site template includes the following lists and libraries: Shared Documents document library, Announcements list, Calendar list, Links list, Tasks list and Team Discussion list.

## Dissecting a Team Site

A great way to understand the components that are included in a site, and what makes it tick, is to quickly examine the **View All Site Content** link on the home page of a site. By clicking on this link you will see all of the different lists and libraries contained in the site, as well as any site and workspaces that exist within its structure.

Another tool that site administrators will have access to, but users with reduced privileges will not, is the **Edit Page** link under the **Site Actions** menu. If this is clicked on a site created using the team site template, you’ll see something similar to Figure 3.3. In this edit mode, it becomes clear that there are certain sections of the page that can be modified, which are called web part zones, which in this example are titled “Left” and “Right.” Each web part zone can contain one or more web parts, and the administrator or designer can then fine tune how each web part is configured, its size and what information it displays. In this example, the web part titled Announcements is displaying a portion of the data contained in an item stored in the Announcements list, so in a sense offers a view into the data that the list contains. The administrator or designer can add a new web part to the page by clicking **Add a Web Part** in the appropriate zone in edit mode.

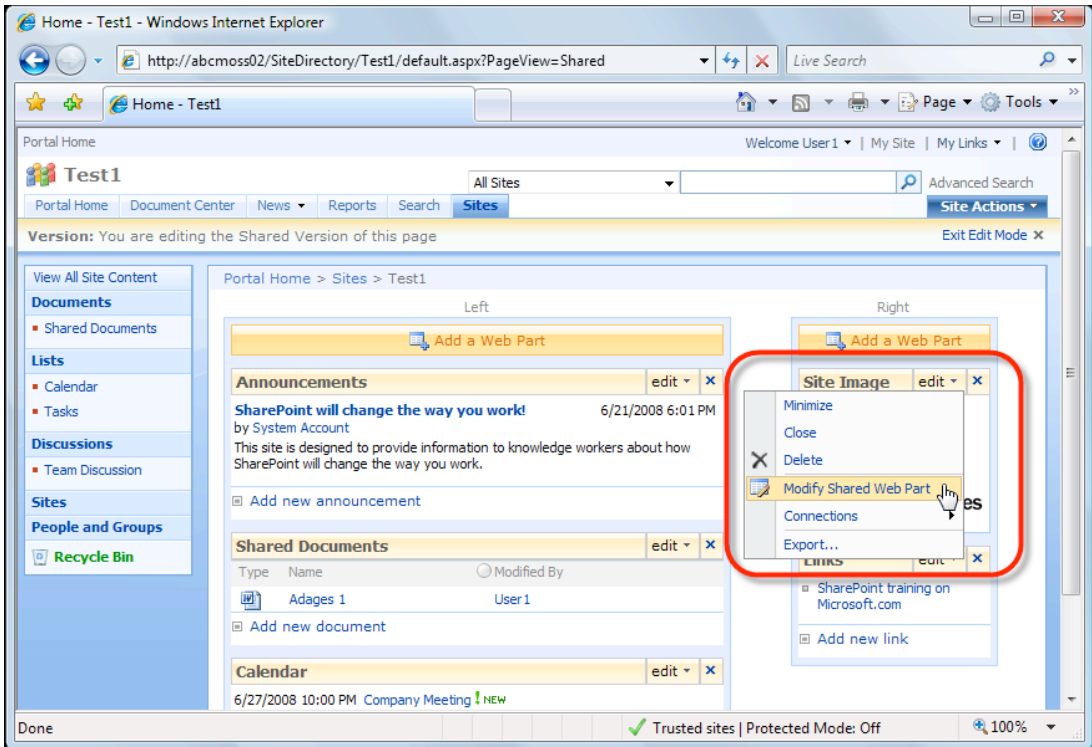


Figure 3.3 A team site home page in Edit Mode.

### What Is a Web Part?

Without getting too technical, a Web Part is a modular unit of code that has a specific purpose and that forms the basic building block of a SharePoint page. Web Parts are stored in a web part gallery at the top level site of the site collection, and can be added to a page by a site administrator or designer. Web parts generally have the extensions .dwp or .webpart and can be organized into “Quick Add Groups” to make it easier for administrators and designers to find them.

Web Parts can technically perform just about any action possible on a website because they can contain programming code as well as provide access to data. The most commonly used Web Parts in SharePoint display data stored in document libraries and lists.

Figure 3.3 shows the edit menu for the Site Image web part, and the basic options are visible, and include: Minimize, Close, Delete, Modify Shared Web Part, Connections and Export. These tools will be reviewed in more detail in Part 2: SharePoint for the Site Administrator, but a take away for this chapter is that the components that comprise the look, feel and functionality of the home page (or other pages) can be customized easily by users with sufficient rights. This means that the owners and managers of sites (or workspaces) have a great deal of control over the environment which is quite different from many other document management tools (such as a standard file share) or intranet tools (where only a few elite web designers can change anything visually).

# Workspaces Explained

A workspace is essentially just another subsite that is created by a user or administrator with the Create Subsites right using a workspace template. A sample document workspace is shown in Figure 3.4. In this case it was created from within a document library so it already contains a document in the document library (“Adages 1”) and keeps the document’s name as its title. In other respects this site looks very similar to a regular site, with the same navigational elements, Quick Launch area, and lists such as Announcements, Tasks and Links.

Note that there is a Members web part which shows the users that have access to this workspace. Clicking on the **Add new user** link allows the workspace owner to add additional users to the site, as shown in Figure 3.5. On the Add Users page, you can add one or more user or groups to the workspace, and then determine which permissions the users have in the workspace. In Figure 3.5 “User2” is being given **Contribute – Can view, add, update and delete** permissions. This process is a key one, and is used throughout the SharePoint product line to grant permissions to items, lists, libraries, sites, site collections and even to administrative web sites (the Central Administration Console for example).

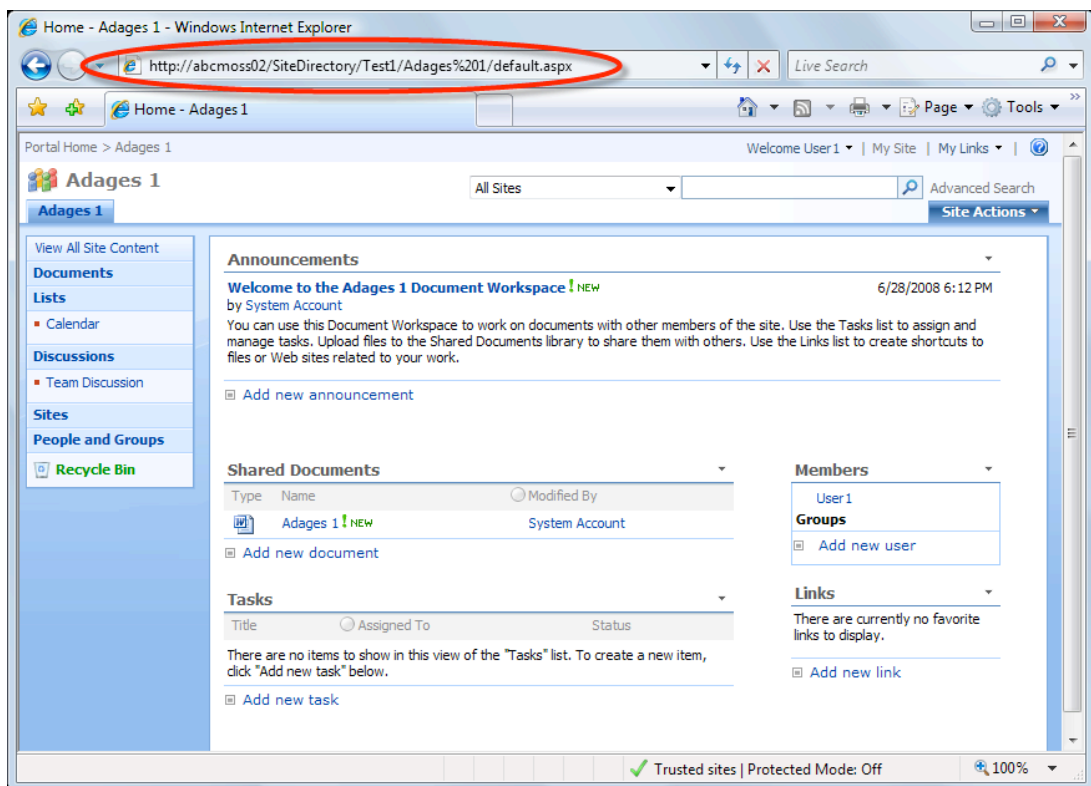


FIGURE 3.4 Document Workspace home page.



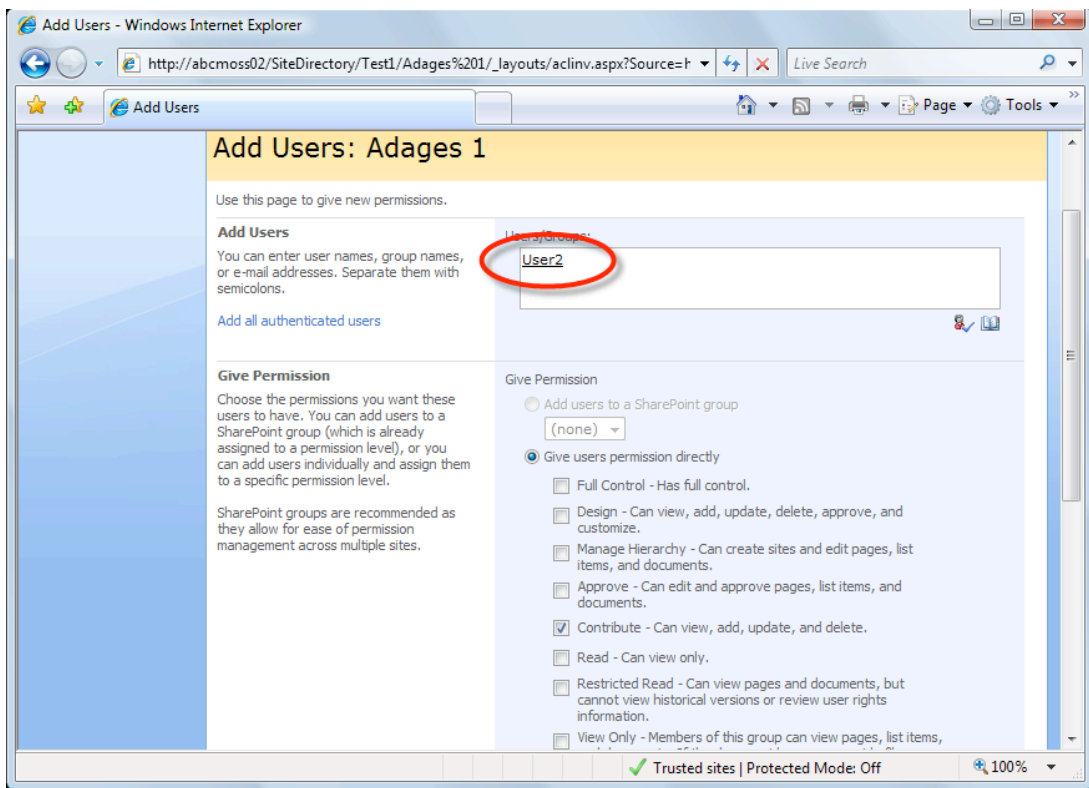


Figure 3.5 The Add Users Page for a Document Workspace.

There are a couple of key things to understand about workspaces when trying to determine when and where they should be used. First of all workspaces require administration, as seen in the previous step where a new user was given permission to access at a contributor level. This means that users who are creating workspaces should have a basic understanding of the administration tools available to them (as covered in later chapters in this book). Secondly, as time goes by, these sites can proliferate and make navigation more complex, so a policy of periodically reviewing workspaces and archiving or deleting ones that are no longer in use should be implemented. Archiving is generally a better idea since work product in the workspaces might need to be accessed at a later date. Thirdly, a document workspace that was created from within a document library based on a source document contains a copy of that documents, so now there will be two copies of the document, and the final version of the document should be published to the source location by selecting the edit menu for the item and then selecting **Send To**, and then **Publish to source location**. The editing features and tools will be covered more in Chapter 4: Document Library Basics.

## Meeting Workspaces Explained

Meeting workspaces can be created from Calendars when a new item is being added, or can be created from Outlook when a new meeting request is sent, or as mentioned earlier in this chapter, created from the Create page. There are a variety of meeting workspace templates that can be selected, as summarized previously in this chapter shows a sample meeting workspace that was created using the Social Meeting Workspace template. This workspace contains several tabs (Home, Discussion, Photos) an Attendees list, Directions list, Discussion Board, Picture library and Things to Bring list.

Similar cautions should be mentioned that are similar to those provided for the document workspaces. Meeting workspaces are fully featured sites, with a variety of lists and libraries that require management so training should be given to users who are creating them. Some thought is recommended prior to creating a meeting workspace, since they can accumulate, and if they aren't named descriptively, it can be hard for users to find the right one.

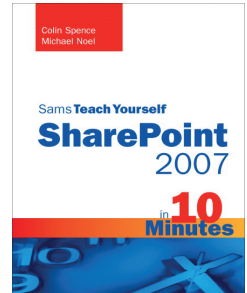
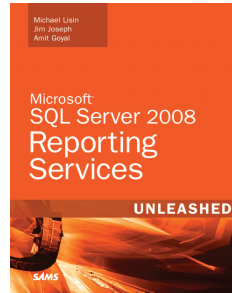
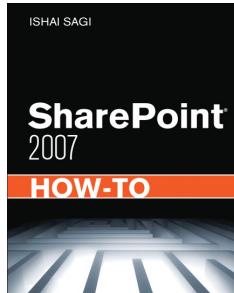
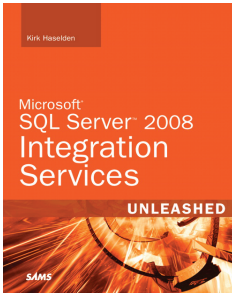
Many SharePoint users do find that meeting workspaces are very handy for recurring meetings. These will be covered more in **Chapter XX: Using the Calendar List**. Along the left hand side of the home page there is a list of the different instances of the meeting, which makes it very handy to review notes from previous meetings or add agenda items to future meetings. Note that this meeting workspace has different lists and libraries included in it as apparent from the home page. It has an Objectives list, Attendees list, Agenda list and Document Library. So as mentioned earlier, it does take some experimentation to become familiar with the different lists and libraries provided in the different templates.

## Summary

This chapter described the building blocks of SharePoint site collections which are sites and workspaces, and summarizes the different templates that are available. Sites and workspaces share many of the same features, as they can all have lists and libraries within them, and all need to be fine tuned and managed to be useful. A brief look was given as to how the home page of a site or workspace can be edited, and some of the differences between document workspaces and meeting workspaces were reviewed. Hopefully you now have a better understanding of the different types of building blocks that make up SharePoint.

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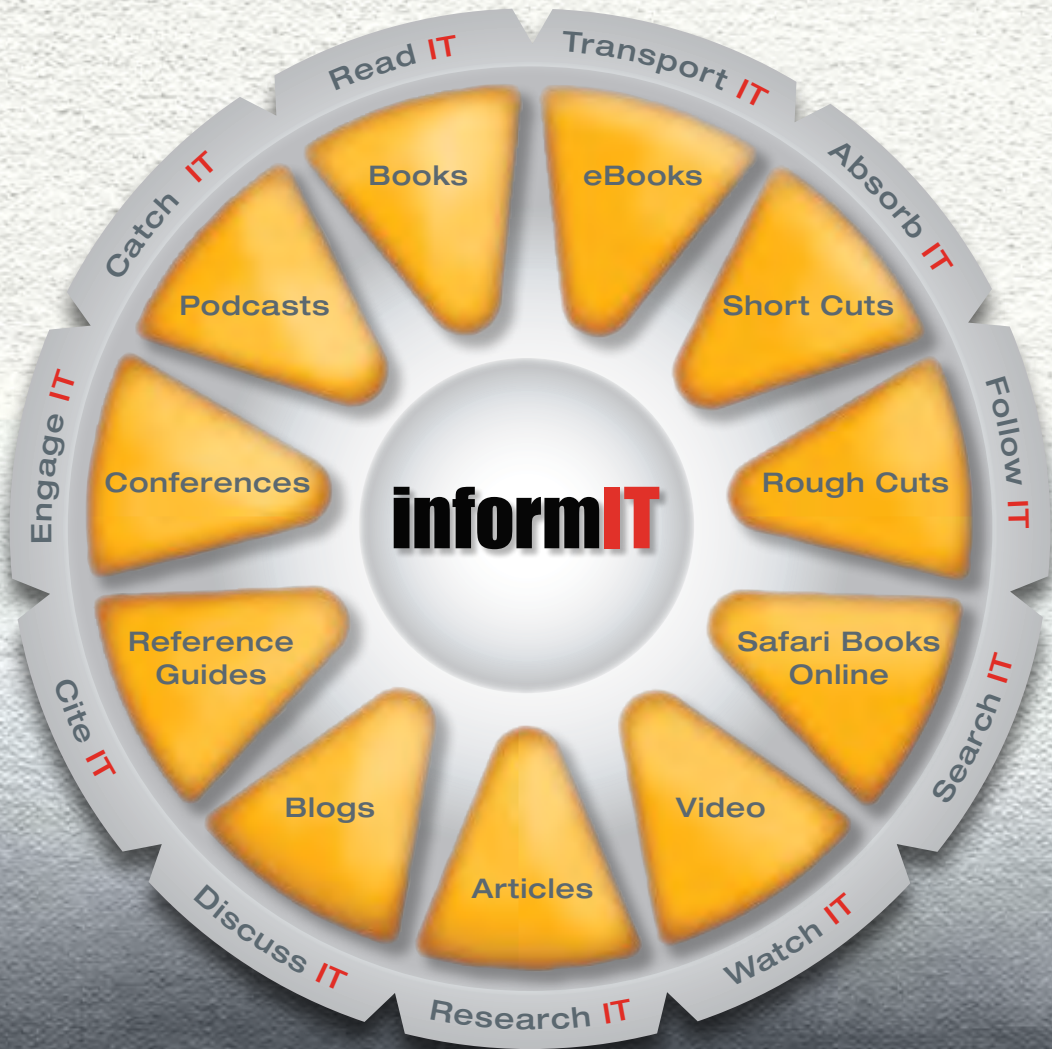
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