



# Spotlight

Find anything on your Mac instantly.

## Features

- **Spotlight menu.** Search through everything on your computer at any time and instantly get the most relevant results organized by category.
- **Fast results.** Spotlight returns search results as soon as you start typing and refines them on the fly as you add to your search criteria.
- **Extensive searching.** Spotlight searches filenames, text content, and metadata to find virtually anything on your computer, including documents, images, movies, music, PDFs, email, contacts, and calendar events.
- **Expanded results.** The expanded search results window displays information for each result; shows previews of images, movies, and PDFs; and provides comprehensive filtering by kind, date, people, and location.
- **Live updates.** Search results instantly update as things change, giving you up-to-the-moment accuracy.
- **Application integration.** Spotlight powers searching in the Finder, Mail, Address Book, Automator, System Preferences, and Terminal.
- **Smart Folders.** Saved Finder searches appear as a new kind of folder containing files that match the search criteria no matter where the files are located. Smart Folders update automatically as files change.
- **Multilingual support.** You can search in any language Mac OS X supports, including Roman, Asian, Middle Eastern, Indic, and Cyrillic languages.
- **Spotlight SDK.** Mac OS X developers can use Spotlight technology to deliver powerful searching in their applications.
- **Spotlight plug-ins.** Plug-ins extend the scope of Spotlight searching by allowing developers to add new file and data types.

Mac OS X version 10.4 “Tiger” introduces Spotlight, a new desktop search technology that finds virtually anything on your computer as quickly as you can type. Built into the core of Mac OS X, Spotlight searches across your applications and files, locating—in an instant—what you need with pinpoint accuracy. Just as web search engines have changed the way you use the Internet, Spotlight will change the way you use your personal computer.

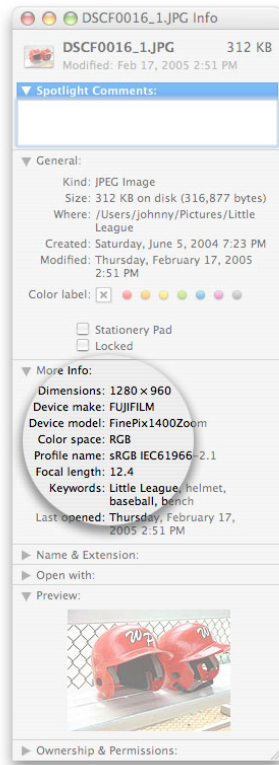
**Spotlight is fast.** Spotlight starts returning results before you finish typing. Because it’s built into the core of Mac OS X, Spotlight knows about files you have changed, added, or deleted on your Mac—ensuring accurate, up-to-the-moment results.

**Spotlight is simple.** Spotlight streamlines your search into a single field. There’s no need to select from complex options or learn a query language. You only need to type a few letters to make Spotlight find what you are looking for. Spotlight is built into the Mac OS X menu bar, so you can start a search at any moment, no matter what application you are using. And the same innovative search technology powers the search field in the Finder, Mail, Address Book, and System Preferences.

**Spotlight is comprehensive.** Spotlight searches across your documents, images, movies, music, PDFs, email, calendar events, and system preferences. It can find something by its text content, filename, or information associated with it, known as metadata. This allows you to find a photo by entering the brand of camera that took it, the name of the person who emailed it to you, or the date you last opened it. With built-in support for the most popular formats, Spotlight can find virtually anything on your system.

**Spotlight keeps you organized.** With Spotlight, you can organize and access information on your computer in ways never before possible. For example, you can use Smart Folders to create groups of files based on a search rule. Each time you open a Smart Folder, Spotlight instantly collects all files that match the search rule, no matter where they’re actually stored. Spotlight technology enables Smart Mailboxes in Mail and Smart Groups in Address Book. Spotlight also gives you the freedom not to organize at all: Simply leave your files anywhere on your system and ask Spotlight to find what you need, when you need it.

With Spotlight, you have immediate access to the information that’s important to you.



**Metadata: Data about data**

Metadata is data about a file, rather than the actual content stored in the file. Every file on your computer includes metadata. For example, a file can include information on its author, the date it was created, its copyright date, the camera a photo was taken with, or the person who emailed you a document. With the ability to recognize many metadata attributes, Spotlight makes your searches more powerful and more precise.

**Using Spotlight**

The Spotlight search field is a permanent fixture of the Mac OS X system menu, so it's ready for you all the time, from any application. A click on the menu or a hot key of your choice lets you begin your search. As soon as you start typing in the search field, Spotlight displays the most relevant search results. With each character you type, it refines the results and updates the list. It's that easy—and that fast—to search everything on your computer.

**The Spotlight Menu**

- 1 Access the Spotlight menu directly from the system menu.
- 2 Your search begins as you type in the search field that appears.
- 3 The Spotlight menu expands to display everything that matches your search rule. Immediate results are organized by category and kept to a maximum of 20 items.
- 4 The most relevant result, called the Top Hit, is placed at the top.

**Rich search vocabulary**

To help you search your system, Spotlight has an extended vocabulary that includes category- and time-related terminology.

- **Categories.** Spotlight groups related file types under category words. For example, if you're looking for a presentation that may have been created in Keynote, AppleWorks, or PowerPoint—but you don't know which—you can type "kind:presentation" to locate all of the files that have a file type in the presentation category. You can do the same with images, music, movies, and other categories of files.
- **Time last viewed.** Type "date:yesterday" or "date:last week" to find data and files based on when you last opened them.

To refine your search further, you can string words together. For example, if you want to find all the images you've opened today, just type "kind:image date:today."

### Organized search results

As Spotlight finds results that match your search criteria, it displays the most relevant items and organizes them immediately. By clicking an item on the list, you can open a document, read an email, view a contact, launch an application, or access a system preference. Mac OS X opens each item directly from the Spotlight menu. You can quickly access the most relevant match, known as the Top Hit, by typing Command-Return.

Search results are categorized by type, so it's easy to see the item you're looking for. Spotlight displays the top 20 items that match your search criteria in the menu. If you want to see more, select Show All to bring up a new display of all items on your computer that match your search, as well as more information about each item.

**The Spotlight Results Menu**

1 Initiate another search right in the window.

2 Results are grouped by categories. A broad range of categories ensures the most comprehensive results possible.

3 Thumbnail views allow you to preview images, movies, and PDFs.

4 Click the information icon to view more information about each file.

5 Organize results by grouping and sorting.

6 Filter results based on time and location in the file system.

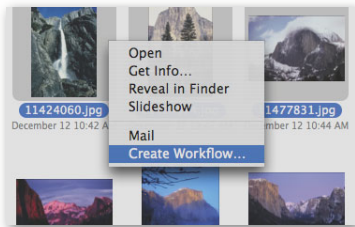
7 Click the Slideshow button to preview images full screen.

### Customized views of search results

By default, Spotlight organizes results by type and sorts them by name. However, it's easy to change the way items are grouped and sorted. Using the options on the right side of the results window, you can choose any of the following organizing principles:

- **Group by.** Choose how items in the results list are grouped. Select Date to group items that you last viewed on the same date. Select People to group results associated with a particular person, either the author of a document or a sender of an email or attachment. Select Flat List to display everything together in a single list.
- **Sort Within Group by.** Change the way items are sorted within a group. Date is the default sort option, but you can also sort by Name or by document Kind. For example, to find a specific mail message from an individual, it may be useful to sort by Kind within a People group.
- **When.** Filter your results based on the date you last opened an item. Select from narrow and broad date ranges, from files you opened today to files you opened in the last year.
- **Where.** Narrow your results based on a location on your computer. You can choose whether you want only those items in your home directory or on a specific hard drive.


By default, Spotlight shows the top five matching items for each category. If there are more items, Spotlight displays a link with the number of additional files in the category. Click the link to see all the results for the group.



### Open options

You can perform a number of actions in the Spotlight results window. By Control-clicking (or right-clicking) an item or group of items, you can reveal the document in the Finder, mail it to someone, or begin an Automator workflow. If you have a set of photo results, you can even create a slideshow on the fly.

### Additional information and document preview

You can view additional information about a particular item in the results window. Click the information icon  to the right of the item to see its associated metadata, such as the author of a mail message, the date of an iCal event, or the color space of an image. Spotlight also displays thumbnails of PDF documents, images, and movies, so you can preview an item's contents before taking the time to open it.

### Opening items directly

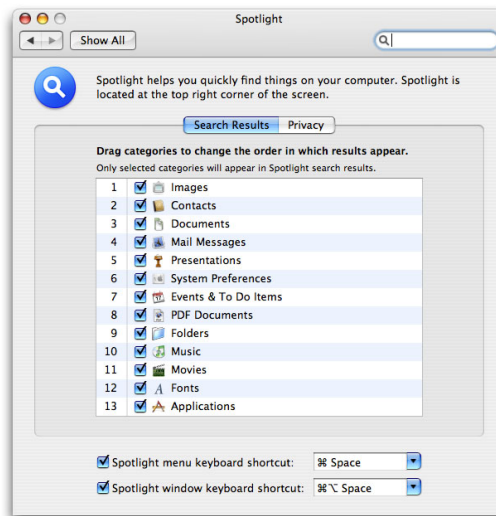
When you select an item from the results list, Spotlight opens it directly. Select an application and Spotlight launches it. Select a system preference and Spotlight opens the related pane in System Preferences. In many cases, opening a file takes you directly to the corresponding entry in its default application. For example, selecting a calendar event takes you to the corresponding day and time in iCal, selecting an email opens the message in Mail, and selecting a person opens that contact in Address Book.

### Spotlight preferences

Spotlight preferences allow you to specify how Spotlight behaves. You can customize the search results display—or choose not to view particular types of results at all. You can even select folders and disks and prevent Spotlight from searching them. The Spotlight preference pane also allows you to specify a hot key for displaying the Spotlight menu.

### Viewing and ordering results

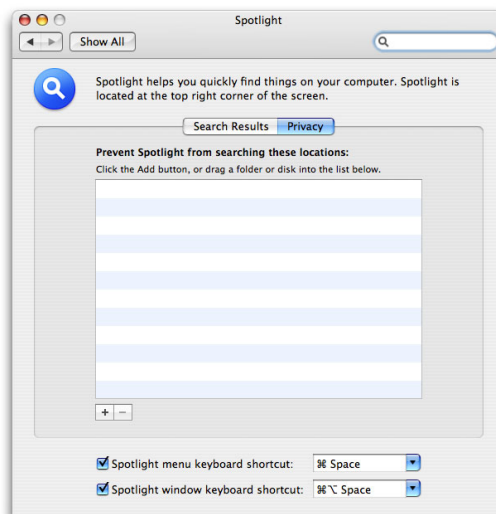
Use the Search Results pane to set the order of categories in the Spotlight menu. Check the box next to a category if you want it to appear in the search results window, and drag the category to specify its position in the list. As soon as you make a change to the list, it's reflected in both the Spotlight menu and the results window.



Customize the way search results appear in the results window.

### “Do not search” locations

The Privacy pane allows you to keep the contents of certain folders or disks from being searched by Spotlight. Drag them into the list and Spotlight removes the associated files and information from its index.



Restrict specified locations from being included in Spotlight searches.



## Powered by Spotlight

The same advanced search technologies that power the Spotlight menu also power searching in the Finder, Mail, Address Book, and System Preferences. Each application focuses Spotlight capabilities on the type of information it's designed to handle—improving searches within the application and introducing new methods of organization that will change the way you use your Mac.

### Finder

With the Spotlight search engine, the Finder becomes an even more powerful tool for searching for data and organizing your files. In addition to its already lightning-fast search by filename, the Finder can now find documents by text content and metadata. You can even save searches as special folders, called Smart Folders, that dynamically “contain” all the files on your computer that match your search criteria—no matter where the files are actually stored.

The Finder Search Window

1 Enter search words in the Spotlight-powered search field.

2 Filter locations from the Finder window.

3 Refine options to narrow results.

4 Save the current search criteria as a Smart Folder.

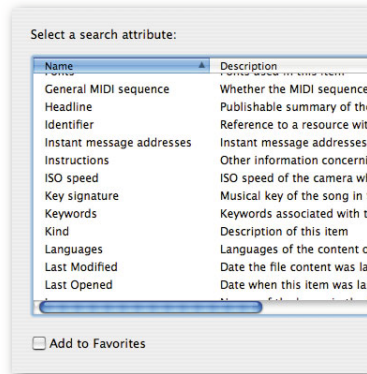
5 Create Smart Folders to keep your files organized.

6 View images, movies, and PDFs in lists or as thumbnail previews.

7 Find your documents by type; expand or collapse categories.

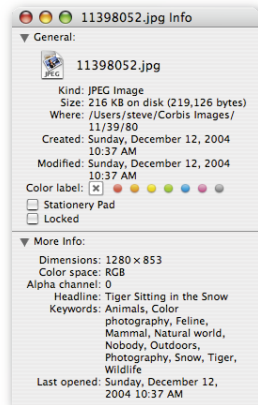
8 View details about your file with the information view.

9 See the exact location of the selected file using the new file path format.



### Searchable metadata

Spotlight extracts metadata attributes from your files, so you can use them in your search. If you can't remember the name of an attribute, just select Other from the search filter to choose from a complete list of supported attributes.



### Get more information

Because Spotlight retrieves more metadata from your files, you can view a lot more information about them in the Finder. The Info window has been redesigned in Tiger to allow you to see all this new information.

### New search field

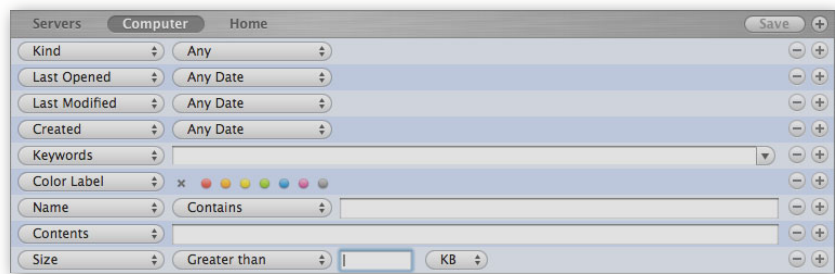
On the surface, the Finder search field looks unchanged, but underneath lies the power of Spotlight. Enter a few characters, a complete word, or a more complex string, and the Finder quickly finds the files that match your search term in the file's name, the file's text content, and the file's metadata.

### Search results

The Finder displays search results on the fly in a new category-based view that organizes your files by type. Each category section is collapsible, allowing you to view the results the way you want. You can also view your results in list and icon views. Scoping buttons at the top of the results window allow you to narrow your search to your home folder or to a specific drive. The path view at the bottom of the window is also improved: As you roll over folders, they dynamically expand to allow you to view their full pathnames. (See "The Finder Search Window" on page 6.)

### Searching refined

Clicking the Add button (+) under the search field reveals a criteria field, where you can specify metadata types and values to refine your search results. The first list reflects the most popular metadata types, and an "Other" selection lists all the metadata types Spotlight tracks. You can add as many of these criteria as you like.

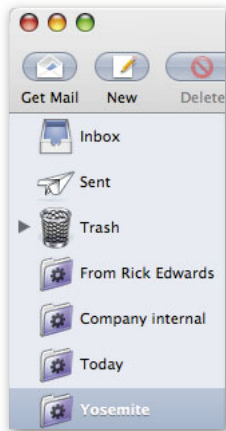


Refine your search right in the Finder window.

### Smart Folders

If you think you'll repeat a search, you can save the search criteria as a Smart Folder. Smart Folders are being updated continuously, finding all the files on your computer that match the search criteria and making them accessible in one convenient folder. For example, you can create a Smart Folder that contains all the presentations on your system or one that finds all the files you've opened in the past two days. You can even create a Smart Folder that keeps track of all CMYK images that are ready for printing.

Smart Folders combine traditional hierarchical organization with dynamic Spotlight organization. While each file still resides in a single location, you can access it through any number of Smart Folders. And because Spotlight integrates with the Mac OS X file system and kernel, your Smart Folders are always current—even if you've added to or deleted files from your system.



### Smart Mailbox examples

Dynamic Smart Mailboxes enable you to organize your email using a wide selection of search criteria. For example, you can search for:

- All mail messages from a particular person
- All mail messages to or from any employee at your company
- All mail messages you've received today
- All mail messages about a particular topic

## Mail

Mail uses the power of Spotlight for faster, more accurate searching. In Tiger, you can refine your searches in the main Mail viewing window or use dynamic Smart Mailboxes to invoke common search queries.

### Smart Mailboxes

You can create a Smart Mailbox by saving your search in Mail or by selecting New Smart Mailbox in the Mail menu and describing the search criteria. When you open the Smart Mailbox, Spotlight searches all of your mailboxes and aggregates email messages that match your criteria. As you receive new mail messages that match the search criteria, your Smart Mailbox—or multiple Smart Mailboxes—can access them dynamically.

Smart Mailboxes are a great companion for rules in Mail. Rules enable you to perform an action on an incoming message, such as assigning it a certain color or moving it to a particular mailbox. Like Smart Folders, Smart Mailboxes can contain messages from multiple mailboxes, without moving the messages from the mailboxes in which you stored them originally.

### Address Book

With Spotlight, the contact information you store in Address Book becomes even more useful. You can use Spotlight to create Smart Groups that update automatically. You can also use Spotlight as a launching pad to find everything on your computer related to a particular person.

### Smart Groups

Just like Smart Folders and Smart Mailboxes, Smart Groups are built by defining search rules. In the case of Smart Groups, your search criteria are based on the contact information in Address Book. For example, a Smart Group could contain a list of all the people who live in a particular city, derived from the contacts' city information in the address field. When new contacts are added to your Address Book, they show up immediately in the appropriate Smart Groups. Address Book even highlights Smart Groups that have changed since you last looked at them.

### Spotlight a contact

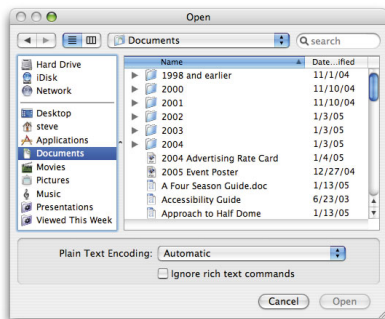
Address Book in Tiger introduces a new way to look at the people you know. Select a contact in your Address Book and choose Spotlight from the Action menu. This brings up the Spotlight results window, showing everything on your system related to the person: chat histories, email correspondence, and documents the person authored or shared with you. And since Spotlight tags downloaded email attachments with the name of the sender, it adds them to your search results as well.





### Spotlight anything

You don't even have to type to find what you need with Spotlight. Just highlight a word or phrase you want to search on, Control-click the highlighted text, and choose Spotlight from the menu. A Spotlight results window displays files and data that match the selected text.



### Spotlight from anywhere

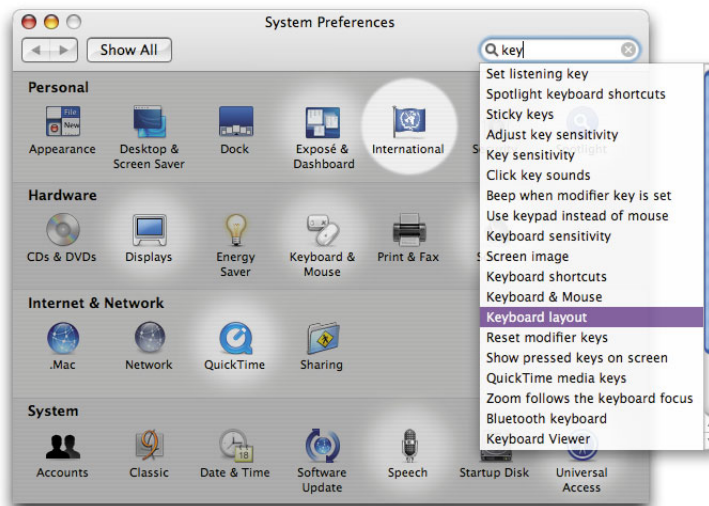
Every Mac OS X application has Spotlight built in. When you choose Open or Save, your Smart Folders appear along with your other folders. You can also initiate a Spotlight search in the Open or Save pane.

## System Preferences

The System Preferences application in Tiger replaces the icon bar with a Spotlight search field—an easy starting point for finding what you're looking for. It's even smart enough to include system terms that a Windows user might use.

### Search navigation

When you start typing in the System Preferences search field, you see a “spotlight” effect on preferences that match your search words. For example, typing “keyboard” spotlights both the Keyboard preference icon and the International preference icon, because there are keyboard settings in both locations. Move the cursor down the results list to go directly to the settings you were searching for.

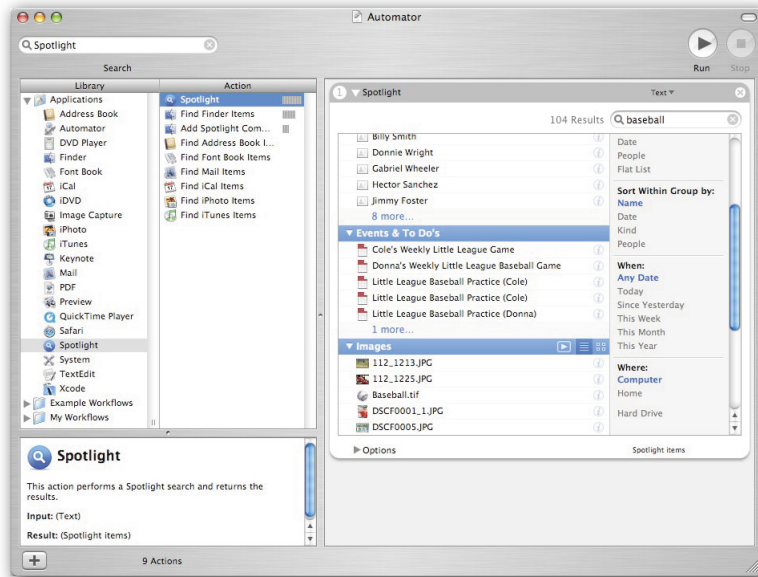


In System Preferences, Spotlight provides visual cues as you search, identifying the preferences where you might find the settings you need.

When you can't remember or don't know what to search for in System Preferences, Spotlight provides the solution. By maintaining aliases for the preference panes, Spotlight can translate the words you know into words used in the pane. For example, in Windows, users refer to pictures placed as the desktop background as “wallpaper.” Spotlight translates “wallpaper” to “desktop pictures” and takes you directly to the correct setting. The same is true for wireless networking terms: Type in AirPort, Wi-Fi, or 802.11, and Spotlight takes you to the right place for configuring your wireless settings.

## Automator

Automator is an easy-to-use tool in Tiger for automating repetitive tasks. For example, you can start with one or several documents and perform a series of operations on them, simulating a workflow. Since the start of a workflow often involves finding a specific document, Automator includes a Spotlight action to find the file for you.



Start a workflow in Automator with the Spotlight search action.

## Terminal

UNIX-savvy users can use the command line to view the metadata of a file and to perform Spotlight searches.

- **mdls**. Similar to the UNIX `ls` command, which lists the files in a directory, `mdls` lists all the metadata attributes for a file.
- **mdfind**. This tool allows you to run queries from the command line. For example:

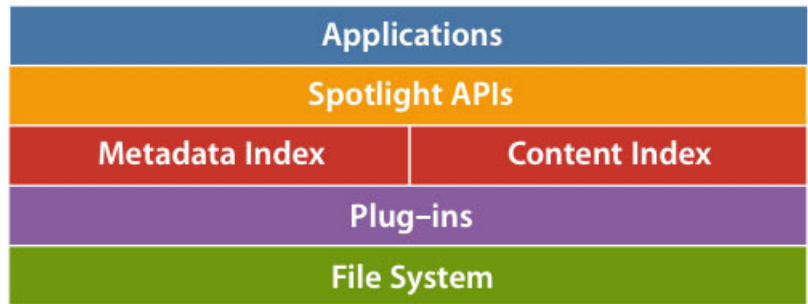
```
$ mdfind "kMDItemAcquisitionModel == 'Canon PowerShot S45'"  
/Users/kyle/Documents/vacation1.jpg  
/Users/kyle/Documents/vacation2.jpg  
/Users/kyle/Documents/vacation3.jpg
```

These command-line tools can also be combined in shell scripts or AppleScript scripts.

## Spotlight Technologies and Architecture

Spotlight is powered by an elegant array of optimized search technologies. Its extensible architecture combines new metadata-indexing technology with a time-proven content-indexing technology that's optimized for Mac OS X Tiger. By focusing the right technology on each type of search task, the Spotlight engine delivers the best possible results and the best possible user experience.

### The Spotlight architecture



Mac OS X Tiger is the only operating system to incorporate desktop search technology that provides fast, comprehensive, and simple access to the information users need.

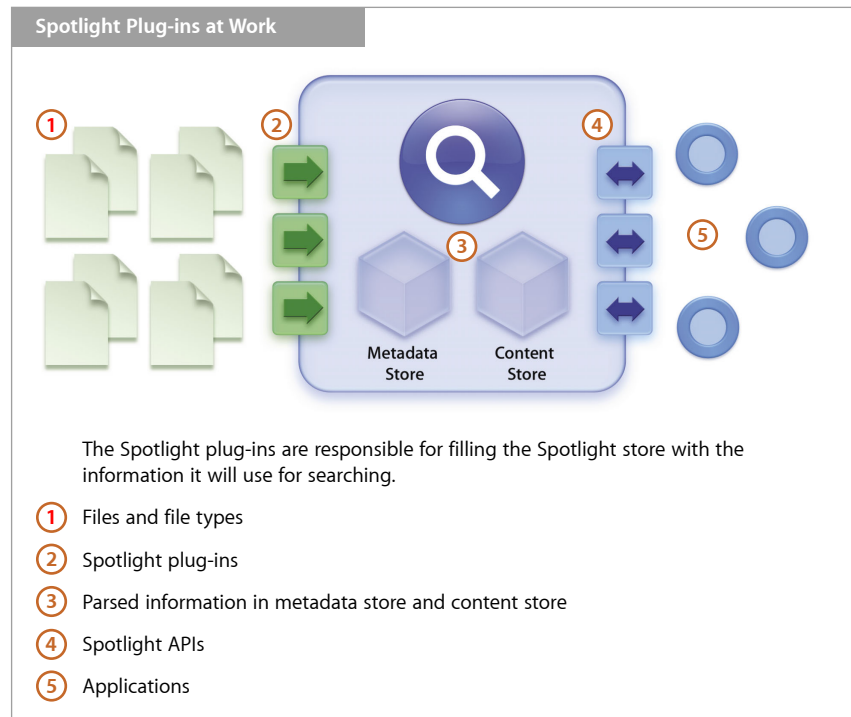
### File system and kernel integration

The Spotlight engine drives the search capabilities of Mac applications such as the Finder, Address Book, Mail, and System Preferences. Tightly integrated into the operating system, it communicates in the background with both the Mac OS X file system and the kernel. Whenever a file is added, moved, deleted, or modified, the file system notifies the Spotlight engine and the engine updates its index, also known as the Spotlight store. The Spotlight engine then updates all of the applications using Spotlight, and changes are reflected dynamically to the user.

### Spotlight plug-ins

When Spotlight is notified of a change, the engine queries Launch Services to determine the kind of file that has been updated—the same way the Finder uses it to determine which application to launch when a file is double-clicked. Once the Spotlight engine has identified the file type, it calls the appropriate Spotlight plug-in to parse the file.

Spotlight plug-ins do most of the work for the Spotlight engine. Each plug-in is specialized for a particular file type or set of file types. For example, there is one Spotlight plug-in for Keynote and another for all image types that Mac OS X supports natively.



### Xcode project templates for plug-ins

Apple's Xcode developer tools include project templates that make it easy to write Spotlight plug-ins. This means developers can make their proprietary file formats searchable by Spotlight.

When called by the Spotlight engine, each plug-in runs as a separate process, gleaming the appropriate metadata from the file and placing it in the Spotlight store. If the file type contains text or metadata—such as data regarding the composition of an image, information on the author of a presentation, or camera details embedded in a photo—the plug-in indexes it.

### Spotlight store

The Spotlight store retains information that the plug-ins extract in two separate indexes: one for metadata and the other for content. This provides important performance benefits, because Spotlight doesn't waste time looking through its massive content index unless specifically requested.

Each index is created on a per-volume basis, which means each disk or partition carries its own set of indexes for the information on that volume. Spotlight works with most locally mounted volumes that can be read and written to, including FireWire and USB/flash drives. Some volumes, such as Windows-formatted drives, are not indexed automatically. You can change this easily by opening the Info window for the volume in the Finder.

Spotlight indexes are designed to deliver linear performance as you search across more and more items. And because the index is optimized to support partial-word searches at the same speed as full-word searches, you get live results as you type.

### Metadata store

This fine-tuned index is designed to handle the unique needs of metadata, representing each file as an MDItem object. Each MDItem contains a dictionary of the various metadata attributes of the file, organized by unique keys. Following are examples of these unique keys.

Attribute key	Data type
kMDItemContentType	Uniform Type Identifier (UTI) of a file
kMDItemKeywords	Set of keywords associated with an item
kMDItemContentCreationDate	Date an item's content was created
kMDItemFSCreationDate	Date an item's file was created
kMDItemPixelHeight	Height of an image or video frame
kMDItemAudioSampleRate	Sample rate, in hertz, of audio data

### Developer ready

Just as Spotlight powers Apple applications, third-party developers can use the Spotlight engine to power their own applications. In addition to creating plug-ins that recognize specialized file types, developers can build Spotlight capabilities into the search fields in their applications—or use its rich metadata- and content-indexing features to enhance other functionalities.

Because different file formats may express the same metadata in different terms, Spotlight uses abstract keys, rather than the name of a key in a particular format. This enables Spotlight to map metadata to existing attributes. Developers can extend these attributes to recognize their own specific file types. By normalizing terms into a single namespace, it's easier to create searches that are both efficient and constrained.

Tiger ships with a large number of keys defined to handle a variety of metadata types; see the “Spotlight Data Types” section on page 15.

### Content store

This portion of the Spotlight store is created using Search Kit, a time-tested content search engine that has been optimized for Spotlight in Tiger. The content indexes are tuned specifically to achieve extremely fast index and search performance along with accurate, relevant results.

### Powerful, intelligent queries

The Spotlight engine provides a simple yet intelligent query service to the applications that use it. Unlike most search engines—which present the user with a query language that maps to its database or index—Spotlight leverages sophisticated techniques for turning natural-language queries into meaningful results.

Spotlight assumes that you are going to type in a series of words, with each new word narrowing the scope of results. As you type, Spotlight maintains several methods to translate your string of single words into precise queries, so that you don't need to learn the language.

One method is word substitution. For example, Spotlight keeps track of the dates that files are opened or viewed, and it stores them as specific dates in the index. When you search for everything that you opened “today,” Spotlight expands the term “date:today” into a query that's more like: “Find everything that was opened on <today's date>.”

Spotlight searches are also case insensitive and diacritic insensitive, so it ignores or translates certain characters into equivalent versions by default. For example, in the German language, the symbol “ß” is used to express a double-s (ss). Just as “A” and “a” are the same character when using case insensitivity, Spotlight returns similar character combinations with the same results. This makes searching more flexible, because it doesn't require exact matches in all cases.

### Support for multiple languages

Spotlight respects the primary language settings that are set up in the International preference pane—so all of your searches work with your language of choice. Spotlight searches the appropriate language version for anything that is localized, including file-names, applications, and system preferences. What's more, Spotlight understands whether diacritical marks should be ignored or substituted by other characters.

While Spotlight handles partial-word searches, it also knows when you don't want to search on a partial word. For example, in a literal partial-word search engine, if you type in "Paris," you get results that include filenames containing the word "comparison." Spotlight is smart enough to realize that you are probably looking for something related to "Paris" and not "comparison." The same is true for words that include punctuation, such as "up-to-date." Most search engines treat "up," "to," and "date" as separate search words, but Spotlight conducts a query based on the compound word.

### **Live updates**

When you invoke a query, Spotlight searches the index for things that match and provides you with up-to-the-moment results. Sometimes you may have Spotlight results on the screen for a while, such as a Smart Folder or the Spotlight results window. In other search technologies, results from searches become stale and don't represent the current state of things. Spotlight uses a feature called "live queries" to make sure that the results are kept current, even to the extent of updating the results right in front of your eyes.

Whenever a Spotlight client specifies that it's invoking a "live query," Spotlight maintains the query in the engine. Think of it as a watch list. Whenever something is updated, Spotlight checks to see if a live query is in effect and immediately notifies and updates all of the clients synchronously with new content. That way, you are assured of seeing the latest results immediately.

### **Authenticated results**

On systems with separate user accounts, Spotlight respects the boundaries of users' personal files—even though there is only one index per volume. When the Spotlight engine finds a set of results, it uses Mach messaging to communicate with the kernel and determine whether the current user has access to all of the data. Any files that the user isn't permitted to see drop off the results list. Because Spotlight is tightly integrated with the file system and the kernel, this check takes no additional time. In fact, the whole process is transparent to the user. This mechanism works even if you're applying access control lists (ACLs) to your user accounts.

## Spotlight Data Types

Spotlight provides comprehensive, organized search results by tracking all sorts of details about everything on your computer. Spotlight supports a large number of industry-standard file formats and metadata types right out of the box. In addition, developers can create plug-ins that enable Spotlight to discover specific formats and data types.

### Supported file types

#### Documents

- Plain text, RTF/RTFD
- PDF
- AppleWorks
- Keynote
- Pages
- Images: GIF, JPEG, PNG, TIFF, EXIF, DNG
- Adobe Photoshop
- QuickTime movies
- Music: MP3, AAC
- Microsoft Word
- Microsoft Excel
- Microsoft PowerPoint

#### Application-specific data

- Email from Mail
- Contacts in Address Book
- iCal events and to-do items
- iChat logs (if logged)

#### System-related data

- Folders
- Applications
- Fonts
- System preferences

### Supported metadata

#### General

- Filename
- Author
- Date modified
- Date created
- Label
- Extension
- Type
- Creator
- Date opened/used
- Keyword
- Where from
- Kind: image, presentation, movie, and so on
- Copyright

### Text, Word, and PDF documents

- Page size
- Page count
- Line count
- Word count
- Text content

#### Mail

- Sender
- Recipient
- Subject
- Text content

#### Contacts

- Name
- Address
- City
- Notes

#### iCal events

- Summary title
- Attendee
- Location
- Notes

#### iChat logs

- Buddy name
- Text chat content

#### Presentations

- Slide titles
- Slide count
- Text content

#### Photos and images

- All EXIF and IPTC metadata, including:
  - Bits per sample
  - Color space
  - Profile name
  - Image width/height
  - Resolution width/height
  - Aperture
  - Camera brand

- Camera model
- Date/Time of original
- Exposure mode
- Exposure time
- Flash
- GPS
- ISO speed
- Orientation
- White balance
- EXIF version
- Layers (Photoshop files)
- Caption (IPTC)

### Movies and other time-based media

- Acquisition source
- Codec
- Delivery type
- Duration
- Format
- Total bit rate
- Audio bit rate
- Aspect ratio
- Color space
- Frame height
- Frame width
- Profile name
- Video bit rate

### Music

- Album
- Artist
- Genre
- Duration

## Mac OS X Version 10.4 "Tiger"

With Spotlight, Mac OS X features a new way to navigate and organize everything on your computer. In addition, Tiger offers more than 200 innovative new features, including Automator, for easily automating complex or repetitive tasks; Dashboard, which provides desktop accessories that instantly appear on your screen with the touch of a key; and iChat AV, a multiperson video conferencing system that makes it easy to keep in touch with friends, family, and colleagues around the world.

### For More Information

For more information about Mac OS X, Spotlight, and other Mac OS X technologies, visit [www.apple.com/macosx](http://www.apple.com/macosx).

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