
Drag and Drop Programming Topics for Cocoa





Apple Computer, Inc.
© 2005 Apple Computer, Inc.
All rights reserved.

No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, mechanical, electronic, photocopying, recording, or otherwise, without prior written permission of Apple Computer, Inc., with the following exceptions: Any person is hereby authorized to store documentation on a single computer for personal use only and to print copies of documentation for personal use provided that the documentation contains Apple's copyright notice.

The Apple logo is a trademark of Apple Computer, Inc.

Use of the "keyboard" Apple logo (Option-Shift-K) for commercial purposes without the prior written consent of Apple may constitute trademark infringement and unfair competition in violation of federal and state laws.

No licenses, express or implied, are granted with respect to any of the technology described in this document. Apple retains all intellectual property rights associated with the technology described in this document. This document is intended to assist application developers to develop applications only for Apple-labeled or Apple-licensed computers.

Every effort has been made to ensure that the information in this document is accurate. Apple is not responsible for typographical errors.

Apple Computer, Inc.
1 Infinite Loop
Cupertino, CA 95014
408-996-1010

Apple, the Apple logo, Cocoa, Mac, Mac OS, and QuickTime are trademarks of Apple Computer, Inc., registered in the United States and other countries.

Finder is a trademark of Apple Computer, Inc.

Java and all Java-based trademarks are trademarks or registered trademarks of Sun Microsystems, Inc. in the U.S. and other countries.

Simultaneously published in the United States and Canada.

Even though Apple has reviewed this document, APPLE MAKES NO WARRANTY OR REPRESENTATION, EITHER EXPRESS OR IMPLIED, WITH RESPECT TO THIS DOCUMENT, ITS QUALITY, ACCURACY, MERCHANTABILITY, OR FITNESS FOR A PARTICULAR PURPOSE. AS A RESULT, THIS DOCUMENT IS PROVIDED "AS IS," AND YOU, THE READER, ARE ASSUMING THE ENTIRE RISK AS TO ITS QUALITY AND ACCURACY.

IN NO EVENT WILL APPLE BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL, OR CONSEQUENTIAL DAMAGES RESULTING FROM ANY DEFECT OR INACCURACY IN THIS DOCUMENT, even if advised of the possibility of such damages.

THE WARRANTY AND REMEDIES SET FORTH ABOVE ARE EXCLUSIVE AND IN LIEU OF ALL OTHERS, ORAL OR WRITTEN, EXPRESS OR IMPLIED. No Apple dealer, agent, or employee is authorized to make any modification, extension, or addition to this warranty.

Some states do not allow the exclusion or limitation of implied warranties or liability for incidental or consequential damages, so the above limitation or exclusion may not apply to you. This warranty gives you specific legal rights, and you may also have other rights which vary from state to state.

Contents

[Introduction to Drag and Drop 7](#)

[Organization of This Document 7](#)

[Dragging Sources 9](#)

[Drag Operations 9](#)

[Drag Messages 10](#)

[The Dragged Image 11](#)

[Dragging Destinations 13](#)

[The Sender of Destination Messages 13](#)

[The Dragging Pasteboard 13](#)

[The Order of Destination Messages 14](#)

[Receiving Drag Operations 15](#)

[Dragging Files 17](#)

[Dragging File Paths 17](#)

[Dragging File URLs 18](#)

[Dragging File Contents 19](#)

[Dragging File Promises 20](#)

[Frequently Asked Questions 23](#)

[HFS Promise Drag 23](#)

[How Do I Set a Custom Drag Image When Doing an HFS Promise Drag in Cocoa? 23](#)

[How Do I Add Other Pasteboard Types to an HFS Promise Drag in Cocoa? 24](#)

[Cross-Application Drag and Drop 24](#)

[When I Rebuild My application on Mac OS X version 10.2, My NSTableView Loses the Ability to Drag-And-Drop to Other Applications. How Do I Fix This? 24](#)

[Document Revision History 25](#)

Tables

Dragging Sources 9

Table 1 Available drag operations 9

Table 2 Drag operations selected with modifier keys 10

Introduction to Drag and Drop

Cocoa gives you the ability to implement sophisticated drag-and-drop capabilities both within your application and between applications. This programming topic describes how you can implement drag-and-drop with just a few methods.

Organization of This Document

In the text here and in the dragging protocol descriptions, the term dragging session is the entire process during which an image is selected, dragged, released, and absorbed or rejected by the destination. A dragging operation is the action that the destination takes in absorbing the image when it is released. The dragging source is the object that “owns” the image that is being dragged; it is specified as an argument to the method that instigates the dragging session.

Dragging is a visual phenomenon. To be the source or destination of a dragging operation, an object must represent a portion of screen real estate; thus, only window and view objects can be the sources and destinations of drags. (Note that the source view is not necessarily the same objects as the dragging source defined above.) `NSWindow` and `NSView` provide methods that handle the user interface for dragging an object. You only need to implement a few methods from either the `NSDraggingSource` or `NSDraggingDestination` protocol, depending on whether your window or view subclass is the source or destination.

The dragging protocols are described in these articles:

- [“Dragging Sources”](#) (page 9)
- [“Dragging Destinations”](#) (page 13)

How to receive a drag is described in these articles:

- [“Receiving Drag Operations”](#) (page 15)
- [“Dragging Files”](#) (page 17)

Commonly-asked questions about drag-and-drop are addressed in this article:

- [“Frequently Asked Questions”](#) (page 23)

Dragging Sources

A dragging session is initiated by the user clicking the mouse inside a window or view and moving the mouse. `NSView` and `NSWindow` implement the method `dragImage:at:offset:event:pasteboard:source:slideBack:` to handle the dragging session. You invoke this method in the `mouseDown:` or `mouseDragged:` method of your subclass of `NSView` or `NSWindow`. You provide an image to display during the drag, a pasteboard holding the data, and an object that acts as the “owner”, or dragging source, of the data. During the dragging session, the dragging source is sent messages defined by the `NSDraggingSource` protocol to perform any necessary actions, described below.

Note: `NSView` also implements the convenience method `dragFile:fromRect:slideBack:event:` for when the dragged object represents a file. `NSView` then handles the image, pasteboard, and source messages itself.

Drag Operations

Only one of the `NSDraggingSource` methods needs to be implemented: `draggingSourceOperationMaskForLocal:`. This method declares what types of operations the source allows to be performed. [Table 1](#) (page 9) lists the available drag operations. (In Java, the constants are defined in the `NSDraggingInfo` namespace and lack the `NS` prefix.) The method should return a bitwise-OR combination of the allowed types or `NSDragOperationNone` if no operations are allowed.

Table 1 Available drag operations

Dragging Operation	Meaning
<code>NSDragOperationCopy</code>	The data represented by the image can be copied.
<code>NSDragOperationLink</code>	The data can be shared.
<code>NSDragOperationGeneric</code>	The operation can be defined by the destination.
<code>NSDragOperationPrivate</code>	The operation is negotiated privately between the source and the destination.
<code>NSDragOperationMove</code>	The data can be moved.

Dragging Operation	Meaning
<code>NSDragOperationDelete</code>	The data can be deleted.
<code>NSDragOperationEvery</code>	All of the above
<code>NSDragOperationAll</code>	Deprecated. Use <code>NSDragOperationEvery</code> instead.
<code>NSDragOperationNone</code>	No drag operations are allowed.

The allowed operations may differ if the drag is occurring entirely within your application or between your application and another. The flag passed to `draggingSourceOperationMaskForLocal:` indicates whether it is a local, or internal, drag.

The user can press modifier keys to further select which operation to perform. If the control, option, or command key is pressed, the source's operation mask is filtered to only contain the operations given in [Table 2](#) (page 10). To prevent modifiers from altering the mask, your dragging source should implement `ignoreModifierKeysWhileDragging` and return YES.

Table 2 Drag operations selected with modifier keys

Modifier Key	Dragging Operation
Control	<code>NSDragOperationLink</code>
Option	<code>NSDragOperationCopy</code>
Command	<code>NSDragOperationGeneric</code>

Drag Messages

During the course of the drag, the source object is sent a series of messages to notify it of the status of the drag operation. At the very beginning of the drag, the source is sent the message `draggedImage:beganAt:.` Each time the dragged image moves, the source is sent a `draggedImage:movedTo:.` message. Finally, when the user has released the mouse button and the destination has either performed the drop operation or rejected it, the source is sent a `draggedImage:endedAt:operation:.` message. The *operation* argument is the drag operation the destination performed or `NSDragOperationNone` if the drag failed. (In Java, these method names are `startedDraggingImage`, `movedDraggingImage`, and `finishedDraggingImage`.)

The dragging source generally does not need to implement any of these methods. If you are going to support the `NSDragOperationMove` or `NSDragOperationDelete` operations, however, you do need to implement `draggedImage:endedAt:operation:.` to remove the dragged data from the source. (Note that an `NSDragOperationDelete` operation is requested when dragging any object to the Trash icon in the dock.)

The Dragged Image

The image that is dragged in a dragging session is simply an image that represents the data on the pasteboard. Although a dragging destination can access the image, its primary concern is with the pasteboard data that the image represents—the dragging operation that a destination ultimately performs is on the pasteboard data, not on the image itself.

When the dragging session is started by using the `NSView` method `dragFile:fromRect:slideBack:event:`, `NSView` uses the file's Finder icon for the image. For your own custom drags, you need to construct a suitable image. Possibilities include a semi-transparent snapshot of the displayed data, such as the selected section of text, or a symbolic representation of the data, such as a table icon when dragging spreadsheet data.

Dragging Destinations

To receive drag operations, you must register the pasteboard types that your window or view will accept by sending the object a `registerForDraggedTypes:` message, defined in both `NSWindow` and `NSView`, and implement several methods from the `NSDraggingDestination` protocol. During a dragging session, a candidate destination receives `NSDraggingDestination` messages only if the destination is registered for a pasteboard type that matches the type of the pasteboard data being dragged. The destination receives these messages as an image enters, moves around inside, and then exits or is released within the destination's boundaries.

Although `NSDraggingDestination` is declared as an informal protocol, the `NSWindow` and `NSView` subclasses you create to adopt the protocol need only implement those methods that are pertinent. (The `NSWindow` and `NSView` classes provide private implementations for all of the methods.) Either a window object or its delegate may implement these methods; however, the delegate's implementation takes precedence if there are implementations in both places.

The Sender of Destination Messages

Each of the `NSDraggingDestination` methods sports a single argument: *sender*, the object that invoked the method. Within its implementations of the `NSDraggingDestination` methods, the destination can send `NSDraggingInfo` protocol messages to *sender* to get more information on the current dragging session, such as querying for the dragging pasteboard or the source's operations mask. In Java, *sender* is an `NSDragDestination` object, which implements the `NSDraggingInfo` interface.

The Dragging Pasteboard

Although a standard dragging pasteboard (obtained using `[NSPasteboard pasteboardWithName:NSDragPboard]`) is provided as a convenience in getting the pasteboard for dragging data, there is NO guarantee that this will be the pasteboard used in a cross-process drag. Thus, to guarantee getting the correct pasteboard, your code should use `[sender draggingPasteboard]`.

The Order of Destination Messages

The six `NSDraggingDestination` methods are invoked in a distinct order:

- As the image is dragged into the destination's boundaries, the destination is sent a `draggingEntered: message`. The method should return a value that indicates which dragging operation the destination will perform.
- While the image remains within the destination, a series of `draggingUpdated: messages` are sent. The method should return a value that indicates which dragging operation the destination will perform.
- If the image is dragged out of the destination, `draggingExited:` is sent and the sequence of `NSDraggingDestination` messages stops. If it re-enters, the sequence begins again (with a new `draggingEntered: message`).
- When the image is released, it either slides back to its source (and breaks the sequence) or a `prepareForDragOperation: message` is sent to the destination, depending on the value returned by the most recent invocation of `draggingEntered:` or `draggingUpdated:`.
- If the `prepareForDragOperation: message` returned YES, a `performDragOperation: message` is sent.
- Finally, if `performDragOperation: returned YES`, `concludeDragOperation:` is sent.

Receiving Drag Operations

This document shows sample code which allows a view (or window) to accept dragging sessions for several data types, performing different drag operations based on the dragged type. The sample implementation can accept either a color or a file. A dragged color will be copied while the file will be either linked or copied.

Before a view can receive a drag operation, you need to register the data types that it can accept by invoking its `registerForDraggedTypes:`, like this:

```
[self registerForDraggedTypes:[NSArray arrayWithObjects:
    NSColorPboardType, NSFileNamesPboardType, nil]];
```

Now, any time a dragging session that consists of either of these data types enters the views bounds, the view is sent a series of `NSDraggingDestination` messages. The code below is a simple example of the initial method that gets sent: `draggingEntered:`. The method obtains the dragging pasteboard and available drag operations from the *sender* object. If the pasteboard contains color data and the source object permits dragging, the method returns `NSDragOperationGeneric`, indicating that the destination permits dragging of the color data on the pasteboard. If the pasteboard contains a file name and the source object permits linking, the method returns `NSDragOperationLink`, indicating that the destination permits the link. If the source does not allow linking, the destination also checks if a copy operation is allowed instead, returning `NSDragOperationCopy` if so. Failing all these tests, the method returns `NSDragOperationNone`.

```
- (NSDragOperation)draggingEntered:(id <NSDraggingInfo>)sender {
    NSPasteboard *pboard;
    NSDragOperation sourceDragMask;

    sourceDragMask = [sender draggingSourceOperationMask];
    pboard = [sender draggingPasteboard];

    if ( [[pboard types] containsObject:NSColorPboardType] ) {
        if (sourceDragMask & NSDragOperationGeneric) {
            return NSDragOperationGeneric;
        }
    }
    if ( [[pboard types] containsObject:NSFileNamesPboardType] ) {
        if (sourceDragMask & NSDragOperationLink) {
            return NSDragOperationLink;
        } else if (sourceDragMask & NSDragOperationCopy) {
            return NSDragOperationCopy;
        }
    }
    return NSDragOperationNone;
}
```

```
}
```

As the dragging session continues, the destination is sent `draggingUpdated:` messages. You only need to implement this if the destination needs to know the current position of the dragged image, either to change the dragging operation or to update any visual feedback, such as an insertion point, you are providing. If not implemented, `NSView` assumes the dragging operation is unchanged from the `draggingEntered:` invocation. If the dragging session leaves the views bounds, the `draggingExited:` method is invoked. Implement this if you need to clean up after one of the preceding messages, such as removing the visual feedback.

When the image is dropped with a drag operation other than `NSDragOperationNone`, the destination is sent a `prepareForDragOperation:` message followed by `performDragOperation:` and `concludeDragOperation:`. You can cancel the drag by returning `NO` from either of the first two methods.

You do the bulk of the data handling in the `performDragOperation:` method; the other two methods are implemented only if necessary. The following code sample shows a possible implementation of this method. The method again checks the pasteboard for the available data and, if necessary, it also checks the dragging source's operation mask for the available operations.

```
- (BOOL)performDragOperation:(id <NSDraggingInfo>)sender {
    NSPasteboard *pboard;
    NSDragOperation sourceDragMask;

    sourceDragMask = [sender draggingSourceOperationMask];
    pboard = [sender draggingPasteboard];

    if ( [[pboard types] containsObject:NSColorPboardType] ) {
        // Only a copy operation allowed so just copy the data
        NSColor *newColor = [NSColor colorFromPasteboard:pboard];
        [self setColor:newColor];
    } else if ( [[pboard types] containsObject:NSFileNamesPboardType] ) {
        NSArray *files = [pboard propertyListForType:NSFileNamesPboardType];

        // Depending on the dragging source and modifier keys,
        // the file data may be copied or linked
        if (sourceDragMask & NSDragOperationLink) {
            [self addLinkToFiles:files];
        } else {
            [self addDataFromFiles:files];
        }
    }
    return YES;
}
```

Dragging Files

When dragging files, the dragging pasteboard can transfer the files in four different ways. The pasteboard can hold a list of file paths, a single URL, a file's complete contents, or a promise to create files at a location to be determined by the destination. Each style corresponds to a separate `NSPasteboard` data type and has a different method for reading and writing the dragged data. The following sections describe each style and how to handle them, whether you are the dragging source or destination.

Dragging File Paths

The most common and simplest method for dragging files is to transmit a list of the files' paths. The dragging source creates an `NSArray` containing `NSString` objects of all the paths of the files to be dragged and places the array onto the pasteboard with the data type `NSFileNamesPboardType`. The dragging destination then reads the array from the pasteboard and performs the requested operation using the paths that it holds.

To initiate a drag operation for a single file, you can use the `NSView` method `dragFile:fromRect:slideBack:event:` when the user clicks in the view representing the file. The first argument is the path of the file to drag. This method places the file's path onto the dragging pasteboard with the `NSFileNamesPboardType` pasteboard type and starts the drag operation.

To initiate a drag operation on multiple files, you need to use the `NSView` or `NSWindow` method `dragImage:at:offset:event:pasteboard:source:slideBack:.` You must place the array of file paths onto the pasteboard yourself, using the `NSPasteboard` method `setPropertyList:forType:.` The following sample code shows a possible implementation.

```
NSString *filePath1, *filePath2; // Assume these exist

- (void)mouseDown:(NSEvent *)theEvent
{
    NSImage *dragImage;
    NSPoint dragPosition;

    // Write data to the pasteboard
    NSArray *fileList = [NSArray arrayWithObjects:filePath1, filePath2, nil];
    NSPasteboard *pboard = [NSPasteboard pasteboardWithName:NSDragPboard];
    [pboard declareTypes:[NSArray arrayWithObject:NSFileNamesPboardType]
        owner:nil];
    [pboard setPropertyList:fileList forType:NSFileNamesPboardType];
}
```

```
// Start the drag operation
dragImage = [[NSWorkspace sharedWorkspace] iconForFile:filePath1];
dragPosition = [self convertPoint:[theEvent locationInWindow]
                    fromView:nil];
dragPosition.x -= 16;
dragPosition.y -= 16;
[self dragImage:dragImage
    at:dragPosition
    offset:NSZeroSize
    event:theEvent
    pasteboard:pboard
    source:self
    slideBack:YES];
}
```

After a drag operation is dropped, the dragging destination receives a `performDragOperation:` message. To extract the `NSFileNamesPboardType` data from the pasteboard, use the `propertyListForType:` method. Even if only one file is being dragged, the file's path is stored in an `NSArray`.

```
-(BOOL)performDragOperation:(id <NSDraggingInfo>)sender
{
    NSPasteboard *pboard = [sender draggingPasteboard];

    if ( [[pboard types] containsObject:NSFileNamesPboardType] ) {
        NSArray *files = [pboard propertyListForType:NSFileNamesPboardType];
        int numberOfFiles = [files count];
        // Perform operation using the list of files
    }
    return YES;
}
```

Dragging File URLs

Files can also be specified by their URLs. A file's URL is stored in a pasteboard with the type `NSURLPboardType`. Unlike the `NSFileNamesPboardType`, which holds an array of file paths, the `NSURLPboardType` type holds a single `NSURL` object. It is not possible to store more than one URL on the pasteboard using this pasteboard type, so you cannot drag more than one file with a URL.

To initiate a drag operation on a file using its URL, you need to use the `NSView` or `NSWindow` method `dragImage:at:offset:event:pasteboard:source:slideBack:..` You must place the file's URL onto the pasteboard yourself, using the `NSURL` method `writeToPasteboard:..` You must declare the `NSURLPboardType` before calling this method, though. This allows you to place both a file path and a file URL onto the pasteboard. The drag operation can then be dropped on destinations that registered for either drag type, or both. The following sample code shows a possible implementation for writing the data to the pasteboard.

```
// Write data to the pasteboard
NSURL *fileURL; // Assume this exists
NSPasteboard *pboard = [NSPasteboard pasteboardWithName:NSDragPboard];
[pboard declareTypes:[NSArray arrayWithObject:NSURLPboardType] owner:nil];
[fileURL writeToPasteboard:pboard];
```

See [“Dragging File Paths”](#) (page 17) for more complete sample code on starting the drag operation.

After a drag operation is dropped, the dragging destination receives a `performDragOperation:` message. To extract the `NSURLPboardType` data from the pasteboard, use the `NSURL` class method `URLFromPasteboard:`.

```
- (BOOL)performDragOperation:(id <NSDraggingInfo>)sender
{
    NSPasteboard *pboard = [sender draggingPasteboard];

    if ( [[pboard types] containsObject:NSURLPboardType] ) {
        NSURL *fileURL = [NSURL URLFromPasteboard:pboard];
        // Perform operation using the file's URL
    }
    return YES;
}
```

Dragging File Contents

Files do not need to be dragged using references to the file only; a file's contents can be placed directly onto the pasteboard and dragged using the `NSFileContentsPboardType`. Use this pasteboard type when you want to supply the contents of a file instead of its location in the file system. The destination can choose to extract the data directly to a location in the file system that it specifies or into a file wrapper in memory.

To initiate a drag operation on a file's contents, you need to use the `NSView` or `NSWindow` method `dragImage:at:offset:event:pasteboard:source:slideBack:`. You must place the file's contents onto the pasteboard yourself. You can write the data to the pasteboard using either the `writeFileContents:` method, which reads the data directly from the file system, or the `writeFileWrapper:` method, which reads the data from an `NSFileWrapper` object that you have already created. The following sample code shows a possible implementation for writing the data to the pasteboard.

```
// Write data to the pasteboard
NSString *filename; // Assume this exists
NSPasteboard *pboard = [NSPasteboard pasteboardWithName:NSDragPboard];
[pboard writeFileContents:filename];
```

See [“Dragging File Paths”](#) (page 17) for more complete sample code on starting the drag operation.

In addition to writing the file's contents to the pasteboard with the general type `NSFileContentsPboardType`, the `writeFileContents:` and `writeFileWrapper:` methods write the data with a more specific type based on the file's filename extension, if it exists. The drag destination can register for this more specific type instead of the generic type to restrict drags to files of a particular type, such as `mp3` or `mov` files. You can obtain the name of this specific pasteboard type by passing the filename extension to the `NSCreateFileContentsPboardType` function, which returns an `NSString`. The following code sample shows how a view could register to receive only QuickTime movie files.

```
NSString *pboardType = NSCreateFileContentsPboardType(@"mov");
NSArray *dragTypes = [NSArray arrayWithObject:pboardType];
[self registerForDraggedTypes:dragTypes];
```

After a drag operation is dropped, the dragging destination receives a `performDragOperation:` message. To extract the file contents from the pasteboard, use either the `readFileContentsType:toFile:` method, which copies the data from the pasteboard and writes it to the file path you specify, or the `readFileWrapper` method, which creates an `NSFileWrapper` object from the pasteboard data.

```
- (BOOL)performDragOperation:(id <NSDraggingInfo>)sender
{
    NSPasteboard *pboard = [sender draggingPasteboard];

    if ( [[pboard types] containsObject:NSFileContentsPboardType] ) {
        NSFileWrapper *fileContents = [pboard readFileWrapper];
        // Perform operation using the file's contents
    }
    return YES;
}
```

Dragging File Promises

In some cases, you may want to drag a file before it actually exists within the file system. You may have a new document that hasn't been saved, yet, or perhaps the file exists on a remote system, such as a web server, to which the dragging destination may not have access. (Typically, the destination is the Finder.) In these cases, the drag operation serves as a technique for specifying a location at which to save the new file. When the drag operation is dropped, the dragging destination tells the source where it wants the files saved and the dragging source creates the files. This type of file drag is called an HFS promise, because, in essence, the drag operation contains a promise from the source to the destination that the source will create the specified files if the drag operation is accepted. The data on the pasteboard has the type `NSFilesPromisePboardType`.

To initiate an HFS promise drag operation on one or more files, you need to use the `NSView` method `dragPromisedFilesOfTypes:fromRect:source:slideBack:event:.` The first argument is an array listing the file types of all the files the source promises to create. The types can be specified as filename extensions or as HFS file types encoded using the `NSFileTypeForHFSTypeCode` function. If a directory hierarchy is being dragged, only the top-level files and directories need to be listed in the type array. The `dragPromisedFiles:..` method places the file type array onto the dragging pasteboard with the `NSFilesPromisePboardType` pasteboard type and starts the drag operation.

```
- (void)mouseDown:(NSEvent *)theEvent
{
    NSPoint dragPosition;
    NSRect imageLocation;

    dragPosition = [self convertPoint:[theEvent locationInWindow]
                               fromView:nil];
    dragPosition.x -= 16;
    dragPosition.y -= 16;
    imageLocation.origin = dragPosition;
    imageLocation.size = NSMakeSize(32,32);
    [self dragPromisedFilesOfTypes:[NSArray arrayWithObject:@"pdf"]
      fromRect:imageLocation
      source:self
      slideBack:YES
      event:theEvent];
}
```

```
}
```

When dragging HFS promises, the dragging source must also implement the `namesOfPromisedFilesDroppedAtDestination:` method. This method is invoked when the destination accepts the drag operation. The single argument is an `NSURL` object that identifies the location within the file system that the source should create the files. The method returns a list of the filenames (not full paths) of all the files the source promised to create. If a directory hierarchy is being dragged, only the top-level objects need to be listed in the returned array.

For short operations, you can create the promised files within the `namesOfPromisedFilesDroppedAtDestination:` method. For long operations, however, you should defer the creation of the files until later to avoid blocking the destination application. One technique is to cache the destination URL and create the files in your source's `draggedImage:endedAt:operation:` method. Alternatively, you could spawn a background thread to create the files or delay the action on the current thread using an `NSTimer`, an `NSNotificationQueue`, or the `NSObject` method `performSelector:withObject:afterDelay:`.

Before the drag is actually dropped, a potential dragging destination does not have access to the filenames of the files being promised. Only the file types are available from the pasteboard. The destination can obtain the file types by requesting the pasteboard's `NSFilesPromisePboardType` data using the `propertyListForType:` method. The returned array contains the file types that the source passed to the `dragPromisedFiles...` method. The destination can then accept or reject a drag operation based on the contents of the types array.

After a drag operation is dropped, the dragging destination receives a `performDragOperation:` message. To specify the drop location and to obtain the filenames of the promised files, use the dragging information object's `namesOfPromisedFilesDroppedAtDestination:` method, passing the `NSURL` for the drop location as the one argument. The return value is an array of the filenames (not full paths) of the files that the source will create. The dragging destination must invoke this method only within `performDragOperation:` or else the source may create the files in the incorrect location.

```
NSURL *dropLocation; // Assume this exists

- (BOOL)performDragOperation:(id <NSDraggingInfo>)sender
{
    NSPasteboard *pboard = [sender draggingPasteboard];

    if ( [[pboard types] containsObject:NSFilesPromisePboardType] ) {
        NSArray *filenames = [sender
                               namesOfPromisedFilesDroppedAtDestination:dropLocation];
        // Perform operation using the files' names, but without the
        // files actually existing yet
    }
    return YES;
}
```


Frequently Asked Questions

This document answers commonly asked questions about the drag and drop capabilities of the Application Kit. This includes information on HFS promise drags and special information regarding cross-application dragging from NSTableView objects.

Note: This document obsoletes Developer Technical Q&A's 1200, 1220, and 1300. Future updates to these questions will be posted to this programming topic.

This document covers the following subjects:

- [“HFS Promise Drag”](#) (page 23)
- [“Cross-Application Drag and Drop”](#) (page 24)

HFS Promise Drag

The questions addressed in this section include:

- [“How Do I Set a Custom Drag Image When Doing an HFS Promise Drag in Cocoa?”](#) (page 23)
- [“How Do I Add Other Pasteboard Types to an HFS Promise Drag in Cocoa?”](#) (page 24)

How Do I Set a Custom Drag Image When Doing an HFS Promise Drag in Cocoa?

NSView's `dragPromisedFilesOfTypes:fromRect:source:slideBack:event:` method doesn't provide a way to set the drag image to be used when dragging an HFS promise file. However, this method calls another NSView method, `dragImage:at:offset:event:pasteboard:source:slideback:` in its implementation, which does provide a parameter for an NSImage to be used as the drag image. So, to set a custom drag image, simply override `dragImage:at:offset:event:pasteboard:source:slideback:`, setup your custom image, invoke `super's dragImage:at:offset:event:pasteboard:source:slideback:` and pass in your custom drag image.

For more information, see documentation on NSView.

How Do I Add Other Pasteboard Types to an HFS Promise Drag in Cocoa?

`NSView's dragPromisedFilesOfTypes:fromRect:source:slideBack:event:` method doesn't provide a means to add other pasteboard types to the HFS Promise data, because it doesn't expose the pasteboard that it uses. However, there is a workaround to add other pasteboard type data. `dragPromisedFilesOfTypes:fromRect:source:slideBack:event:` calls `NSView's dragImage:at:offset:event:pasteboard:source:slideBack:` method in its implementation. So, you can override `dragImage:at:offset:event:pasteboard:source:slideBack:`, add any additional pasteboard types you need, and then invoke `super's dragImage:at:offset:event:pasteboard:source:slideBack:` to allow everything to continue as before.

For more information, see documentation on `NSView`.

Cross-Application Drag and Drop

The questions addressed in this section include:

[“When I Rebuild My application on Mac OS X version 10.2, My NSTableView Loses the Ability to Drag-And-Drop to Other Applications. How Do I Fix This?”](#) (page 24)

When I Rebuild My application on Mac OS X version 10.2, My NSTableView Loses the Ability to Drag-And-Drop to Other Applications. How Do I Fix This?

A bug in `NSTableView` in Mac OS X version 10.2 and later causes cross-application drags to not work without additional code from the application developer. Drag-and-Drop within an application still works correctly.

You can work around the bug by subclassing `NSTableView` and overriding `draggingSourceOperationMaskForLocal:` to return the appropriate `NSDragOperation` (typically `NSDragOperationCopy`, depending upon what drag operation you want the drag-and-drop to perform). Only applications built on Mac OS X version 10.2 and later are affected; applications built on Mac OS X version 10.1.x are not affected.

In Mac OS X v10.4 you can work around this bug without subclassing. By default the `NSTableView` implementation of `draggingSourceOperationMaskForLocal:` disallows dragging to destinations outside of the application while allowing any type of drag within the same application. You can change this behavior by sending the table view a `setDraggingSourceOperationMask:forLocal:` message. Passing a value of `YES` as the second parameter indicates that specified mask applies when the destination object is in the same application. Passing a value of `NO` indicates that the specified mask applies when the destination object in an application outside the receiver's application. The masks are archived with the table view.

Document Revision History

This table describes the changes to *Drag and Drop Programming Topics for Cocoa*.

Date	Notes
2005-08-11	Added information about <code>setDraggingSourceOperationMask:forLocal:</code> to the Frequently Asked Questions article.
2003-10-13	Added a “Frequently Asked Questions” (page 23) article to obsolete Technical Q&As 1200, 1220, and 1300.
2003-04-03	Dragging of color uses <code>NSDragOperationGeneric</code> , not <code>NSDragOperationCopy</code> . Updated sample code and descriptive text in “Receiving Drag Operations” (page 15) to use the correct drag operation.
2002-11-12	Revision history was added to existing topic. It will be used to record changes to the content of the topic.

