Manage Media with Final Cut Pro X Libraries

White Paper
October 2019

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Introduction

Media management is at the core of today's file-based post-production workflows, and Final Cut Pro X has some powerful and flexible features that make it easy to work with more media than ever before. This document provides an overview of useful methods for organizing media and projects.

For comprehensive information about Final Cut Pro X, see the Final Cut Pro X User Guide.

Media Management Overview

Final Cut Pro X uses a production-focused library format for media organization. Libraries represent a powerful way to organize your work. The library model allows editors to simply collect all of the media for a particular production in a single location and then bring productions online or offline as needed.

There are several concepts in the library model that are important to understand before starting any Final Cut Pro X project.

What Is a Library?

A library contains multiple events and projects in the same location. The first time you open Final Cut Pro X, it creates a library file in the Movies folder. When you create a new project or event, it's automatically included in the active library. The library tracks all your media files, your edited projects, custom Motion effects and titles, and the associated metadata.

You can have multiple libraries open at the same time, and you can easily copy events and projects between libraries. This makes it simple and quick to move media, metadata, and creative work to another system so that you can edit on a portable computer, collaborate with other editors, or archive your projects and media. In Final Cut Pro 10.3 or later, you can also store your libraries on shared storage that uses the SMB protocol. This means that editors with access to the shared storage and media can open the library and start to edit without needing to copy anything to their local system. For more information, see the Apple Support article Use shared storage with Final Cut Pro X.

You can view and set storage locations for each of your libraries using the Library Properties inspector. You have the option to store your files inside or outside the library, at the location you choose. In Final Cut Pro 10.3 or later, you can set storage locations for four categories of files:

- *Media:* Imported files, proxy and optimized files, and consolidated files

- *Motion content:* Effects, transitions, titles, and generators created or customized in Motion

- *Cache:* Render files, analysis files, thumbnail images, and audio waveform files

- *Backups:* Backups of the library database

What Are Managed Media and External Media?

Media that you import into a specific library is stored inside the library and is referred to as *managed* media. Media can also be imported or copied to any location on a connected volume and linked to the library as *external* media. Multiple users can access this external media instantly on shared storage using the SMB protocol or a storage area network (SAN) such as Xsan, Apple's SAN file system.

If you want to share access to managed media, you can place the library on a network that uses the SMB protocol. Or you can convert managed media to external media using the Consolidate command. You can also use the Consolidate command to collect external media as managed media inside the library for easy transport or archiving.

What Is Generated Media?

Render files, optimized files, and proxy files are all considered *generated* media because the system creates them in the background after the original media has been imported. All generated media can be either managed or external. To save storage space before moving or archiving a library, you can remove the render files, optimized files, or proxy files. Copying a project between libraries does not copy render files because they can be quickly regenerated.

About Final Cut Pro Libraries

In Final Cut Pro X, your events are organized within libraries. Events contain both projects and clips.

Libraries

Final Cut Pro X builds on the library concept and tailors it to professional video post-production workflows. You can think of a library as a self-contained unit of work such as a production or a job.
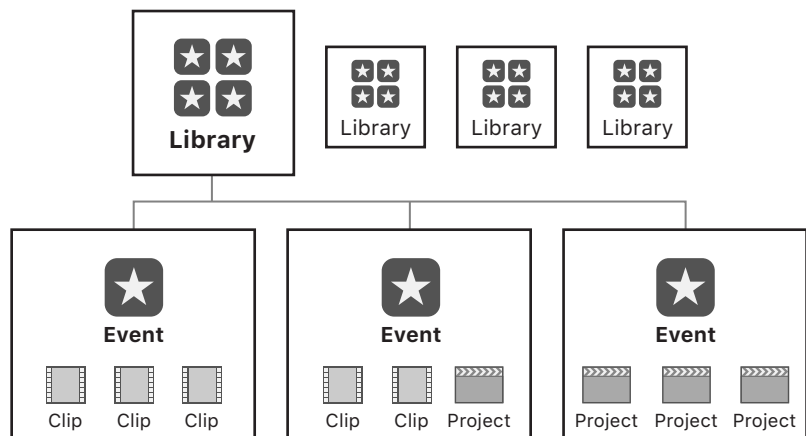
The following are important aspects of the library model:

- *Self-contained:* Libraries are intended to be self-contained and don't depend on the content of other libraries. They may refer to media outside of the library, but they don't refer to clips in other libraries. This simplifies the process of archiving completed work. For more information, see Archive Productions.

- *Single library file:* The library file is a single package in the file system containing all of the library databases and other supporting files. This can include generated media such as analysis files, render files, optimized media, proxy media, thumbnails, audio waveforms, and so on. You can copy and move the single library file to easily hand off all of your work on a given job or production.

- *Managed or external media:* Any source media (camera files, audio files, stills, or other movies) may reside either within the library file (as managed media) or outside the library file in a folder located anywhere on a storage device or network. You can also choose to keep your render files, optimized files, proxy files, or custom Motion content either inside the library (as managed files) or in an external folder. A managed library provides a convenient way to copy or move all of the media files associated with a single production. External media, on the other hand, makes sharing media with multiple users easier. For example, you can store external media on shared storage such as a storage area network (SAN).

- *Support for multiple libraries:* In Final Cut Pro X, you can have multiple libraries open in the application at the same time. For example, you can have libraries for stock footage, or for pulling shots from old productions while editing your current production. For more details about moving or copying productions across libraries, see Manage Media and Libraries.

The way you use a particular library depends on the nature of your production and workflow, but the general concept is that all of the media files required for a specific job are contained within a library. Here are some examples of possible library workflows:

- *Feature-length movie:* A movie can contain many days or weeks of dailies organized in events, as well as the many rough cuts of the final movie. Multiple editors can easily exchange events between their own copies of the library.

- *Episode of a dramatic series:* The library can contain all the footage for producing a single episode. If you use content from a previous episode, you can open that library and copy media or events into the current library.

- *Season of a reality show:* Reality shows are shot over a longer period of time, and stories are constructed based on the content that is captured. Media is often used across multiple episodes, and less commonly across multiple seasons as the characters and story lines may change too dramatically.

- *An ad campaign:* When you're working on a series of ads for a particular campaign, you might share media and assets (product stills, storyboards, and so on) across multiple spots.

- *Weddings or other occasions:* Content for an entire wedding can be used for many different types of deliverables (websites, DVDs, and so on), but rarely is content from one wedding used in a project for another wedding. Because multiple libraries can be open at the same time, standardized or reusable content can be sourced from a user-created "stock content library."

Events

An event is similar to a folder that can hold clips and projects. You can easily copy or move clips and projects between events to organize them. An event might represent a day of shooting, an episode of a dramatic series, a location in a reality show, a portion of a wedding such as the reception or ceremony, or a series of edited projects.

Using an event as a "collection" that can be handed off to another editor or an assistant on the team is a good use of the library model. For example, an assistant editor can create an event for a day's dailies and hand this over to the primary editor, and the editor can create an event containing the cuts for a scene or reel of a movie to hand back to the assistant.

Projects

A project corresponds to an edited sequence in the timeline. The project may be a full movie or episode, or it may be a subsection that needs to be handed off.

Projects are contained within events. Placing projects in a single "transfer event" (in a transfer library) makes for cleaner organization and interchange with others working on the same production.

Clips

A clip is the most fundamental element in an edited project. There are two types of clips.

Standard Clips

Standard clips consist of links to the source media files on your Mac or storage device. They also contain metadata such as timecode, keywords, markers, and so on. Standard clips can be synced clips with dual-system sound, sound effects, music, titles, or generators. Whenever you add a standard clip from an event to the timeline, the new timeline clip is a copy of the original event clip.

Reference Clips

Reference clips are composed of a "parent" clip in the browser and "child" clips in the timeline that refer back to the parent clip. Child clips have the advantage of being lightweight while still referring back to the complexity of the parent clip. When you edit the contents of any reference clip, you are in fact editing the parent clip from the browser. Any changes you make to the clip are inherited by all of its child clips. Reference clips include compound clips and multicam clips.

- *Compound clips:* You can use compound clips to group any combination of clips in the timeline or the browser, and nest clips within other clips. In the timeline, compound clips function just like other clips.

- *Multicam clips:* A multicam clip is a set of clips grouped together and synced by a common sync point. You can use multicam clips to edit footage from multicamera shoots or other synced footage in real time. View all angles playing simultaneously in the angle viewer and easily cut and switch between them.

Manage Media, Libraries, and Archives

For maximum efficiency and creativity, you can organize your libraries and media to suit your specific workflow. You can rename libraries and drag events between libraries. You can also create new libraries from a collection of events, projects, or clips.

In Final Cut Pro X, you have full control over storage locations for imported files and generated media (including proxy, optimized, render, and cache files). Additionally, you can easily delete optimized, proxy, and render files from within Final Cut Pro.

For more information, see the Final Cut Pro X User Guide.

View and Set Storage Locations

You can view and set storage locations for media files, cache files, library backup files, and custom Motion content using the Library Properties inspector. You can store these files within the library or in external folders. You can also collect ("consolidate") files as managed media inside the library for easy transport or archiving.

View and set library storage locations

1. Select a library in the Libraries sidebar.

2. To open the Library Properties inspector, do one of the following:

   - Choose File > Library Properties (or press Control-Command-J).

   - Click the Inspector button in the toolbar.

The inspector shows the storage location settings for the selected library, as well as the total amount of original, optimized, and proxy media on each storage device. (This is media that was previously imported or generated for the selected library.)

3. To change storage location settings, click Modify Settings.

   A window appears with four pop-up menus that you can use to set storage locations. By default, media and cache files are stored within the library, backups of the library database are stored in your Movies folder, and custom Motion content is stored in the Motion Templates folder located in your Movies folder.

4. To change storage locations, use any of the following pop-up menus:

   - *Media:* To set the location for imported files, proxy and optimized files, and consolidated files, choose "Choose," navigate to the new storage location, and click Choose.

   - *Motion Content:* To set the location for titles, effects, transitions, and generators created or customized in Motion, choose either In Library or "In Motion Templates folder."

   - *Cache:* To set the location for render files, analysis files, thumbnail images, and audio waveform files, choose "Choose," navigate to the new storage location, and click Choose.

   - *Backups:* To set the location for backups of the library database, choose "Choose," navigate to the new storage location, and click Choose. If you don't want Final Cut Pro to back up your library, choose Do Not Save.

5. When you're finished setting storage locations, click OK.

Final Cut Pro uses your new storage locations for future source media file imports, custom Motion content, cache files, and backups.

Important: Existing source media and backup files remain in their original locations. To change the location of existing source media and backup files, see "Consolidate media files for the library," below. If you changed the cache storage location, Final Cut Pro offers to move your existing active render files to the new location.

Consolidate media files for the library

1. In the Media section of the Library Properties inspector, click Consolidate.

2. If you want to include optimized and proxy media, select the checkboxes in the window that appears, and click OK.

Final Cut Pro copies the media into the selected library file, or to the external storage location.

Consolidate custom Motion content for the library

1. In the Motion Content section of the Library Properties inspector, click Consolidate.

2. In the window that appears, confirm the storage location (either the library file or the Motion Templates folder) to consolidate the files into.

   If a message appears stating that there's nothing to consolidate, it means that all of your media files are already consolidated at one location, on one storage device.

3. Click OK.

The Motion content files that are in use in the library are copied into the current Motion content storage location (either the library file or the Motion Templates folder).

For more information about consolidating libraries, events, and projects, see Consolidate.

Work with Managed and External Media

Camera originals are the assets that are created by cameras and other recording devices during the production process. These assets are the most precious components of the production because they cannot be re-created after the fact. For this reason, it's very important that the original assets be carefully organized and tracked for use by all productions that require them. Final Cut Pro X provides two ways of tracking original camera media.

Managed Media

All original assets live within the library file and travel with it wherever that file goes. This has a number of advantages, including ease of archiving, distribution, and organization. However, storing the assets inside the library file makes it less efficient to share them with other editors and with applications such as Motion and Adobe Photoshop.

Managed media works best for the following types of projects:

- Single user
- Small projects
- Minimal sharing of individual media files

External Media

You can also choose to store the original media outside the library file as external media. You can store media on your computer, connected storage devices, and network volumes, including shared storage and storage area networks such as Xsan. External media is visible to any applications or libraries that need to work with it. However, along with this advantage comes the responsibility to move any media required for a library when you move the library, and to delete the source media files if they're no longer used. Final Cut Pro X never deletes media stored outside a library file because other libraries or applications may refer to it.

Libraries with external media lend themselves best to these kind of productions:

- Multiple users

- Medium to large projects

- Interchange with other applications

In Final Cut Pro X, you can control media storage using the Library Properties inspector. After you set the library storage locations, any newly imported or generated media is automatically stored there. This means that an assistant or the first person to import original camera files can put them anywhere on shared storage. No matter where the original media is located, you can consolidate it in the library file (as managed media) or move it to another external location at any time.

Work with Generated Media

There are several types of media files that are generated within Final Cut Pro. Most of these files are stored within the library file and can be regenerated as needed.

Render Files

Render files are shared across multiple projects and events within a library. Conveniently, duplicated projects share the same render files. You can delete render files for projects, events, or an entire library to free up space on media storage devices. When deleting generated files from a library or an event, you have the option to delete all render files or just the unused render files.

Tip: To make it easier to transfer a large library to another system, delete the library's render files first. You can regenerate the render files after the transfer.

Optimized Media, Proxy Media, and Thumbnails

If you work with long-GOP formats such as H.264 that cannot be easily edited with good performance, you can create optimized or proxy versions of your media. You can store your optimized files, proxy files, and render files in external folders outside the library. With a single command, you can delete these generated files before moving or archiving a library.

Optimized media uses the Apple ProRes 422 codec format, which provides better performance during editing, faster render times, and better color quality for compositing.

Proxy media is a smaller-frame-size Apple ProRes version of the original media. You can create proxy files to dramatically improve real-time editing performance on slower computers. Proxy media also takes up much less space on media storage devices. After all the proxy media has been generated, you can switch between playing proxy media and higher-quality media using the View pop-up menu in the upper-right corner of the viewer.

Finally, there are application files, including video frame thumbnail files and audio waveform thumbnail files. These thumbnails provide a visual representation of the media content.

Media management commands in Final Cut Pro X allow you to copy and move optimized and proxy media. Render files and thumbnails are not copied during these operations and are regenerated as needed.

Analysis Files

Final Cut Pro X analyzes media in the background and creates files that enable optical flow retiming and automatic color balance adjustments, as well as other operations such as people detection.

All analysis files are regenerated on demand and are moved along with source assets during media management operations.

Manage Media and Libraries

There are some standard workflows involving media management that are critical to professional post-production. A few of the most important media management operations and commands are listed below.

Copy and Move

The Copy and Move commands transfer media to a different location. This results in the data being only in the final destination (Move) or in both locations (Copy). In addition to using the Copy and Move commands, you can copy and move clips and projects by dragging.

The Copy and Move commands work the same way as moving files within and across volumes in the macOS Finder. Dragging items within a library moves the items, and dragging items to a different library copies the items. If you hold down the Option key while dragging an item within a library, the item is copied.

Move clips or projects within a library

- Drag items to the new location.

Managed and external media files are not moved. Just the clip or project is moved.

Copy clips or projects within a library

- Option-drag items to the new location.

Managed and external media files are not copied. Just the clip or project is copied.

Copy clips or projects to another library

- Drag items to an event in the other library.

Managed media files are copied to the new library. External media files are left in place.

Note: You can also move items to another library by Command-dragging them.

Add clips to projects in another library

- Open a project in the other library, and then select an event in the first library and drag clips from the browser to the timeline.

Managed media files are copied to the new library. External media files are not copied.

Consolidate

The Consolidate command collects all of the media associated with a particular library, event, or project into a single storage location (which you set using the Library Properties inspector). This location can be either internal (managed) or external to the library file. Consolidating is an easy way to collect all media and customized Motion content for housekeeping or archiving.

- Consolidating to a managed library gives you a convenient package to archive or transfer.

- Consolidating to a managed library copies the media into the library file, leaving the original media undisturbed (in case other libraries or applications refer to it). After consolidating, the library is linked to the managed media.

- Consolidating a library to an external location moves or copies all media referenced by the library to a single location. Media within the library file is moved to the external location, resulting in a smaller library file. All media that was already external to the library file is copied to the new external location.

- The Consolidate command can also be used to copy media from one external location to another. (Use the Library Properties inspector to set the storage location to the new external location, and then click Consolidate in the Media section of the Library Properties inspector, or choose File > Consolidate [*item*].)

- You can consolidate custom Motion content (effects, transitions, titles, and generators created or customized in Motion) either in the default Motion Templates folder in your Movies folder or inside a library.

The Consolidate buttons in the Library Properties inspector act on the current library only, but the File > Consolidate [*item*] command can be used on a library or on one or more events or projects. For more information, see the Final Cut Pro X User Guide.

Delete Generated Files

You can delete generated files (render files, optimized files, and proxy files) from a library or from one or more events or projects. When deleting generated files from a library or an event, you have the option to delete all render files or just the unused render files.

Merge Events

The Merge Events command combines multiple events into a single event. If two clips are truly duplicates, the resulting event contains only one version of the clip. If the clips differ in any way, both clips remain so that you can resolve the differences.

Back Up Libraries and Projects

In addition to using systemwide backup functions such as Time Machine, you can use tools in Final Cut Pro X to automatically back up all of your creative work.

Duplicate Projects as Snapshots

In addition to duplicating projects using the Duplicate command, you can use the Duplicate Project as Snapshot command to quickly create a self-contained version of a project that may be used at a later time. The important difference between this snapshot and a regular project duplicate is that all the compound and multicam clips are independent and are thereby protected from accidental changes as you continue to edit your original project.

Back Up or Restore the Library

Final Cut Pro X periodically backs up all library databases so that they can be restored in the event of a problem.

At any time, you can open a "known good" copy of your library from the Final Cut Pro Backups folder. This folder can be located on another storage device or in a specific location on a network so that if the main storage device fails, there is still a usable copy to restore. These backups include all library, event, and project databases, but not your media. As it generates new library backups, Final Cut Pro automatically deletes backups that are more than a few days old.

When the backup library is restored, a new library is created so that you can move any changes from the working library into the new library if needed.

Note: Backup files are not copied during media management operations.

Archive Productions

Important projects need to be archived. You can archive a project as a short-term solution to free up storage space, or you can archive a project for long-term storage and retrieve it when it needs updating or repurposing.

Archive a production

1. Select the items in the library you want to archive, such as one or more events or a final project.

   The media included in the archive depends on your selection:

   - Select an event to archive all media in the event, whether or not it's used in a project.

   - Select a project to archive the project and the media needed for that project. This results in a smaller archive.

2. Choose File > Copy [*item*] to Library > New Library, type a name for the new library, navigate to a location for the new library, and click Save.

3. In the window that appears, do one of the following:

   - *If you want the smallest possible archive:* Make sure the Optimized Media and Proxy Media checkboxes aren't selected.

   - *If you want to include optimized or proxy media (and copying time and storage space aren't issues):* Select the Optimized Media checkbox, the Proxy Media checkbox, or both.

4. Click OK.

   The new library (with storage settings inherited from the original library) appears in the Libraries sidebar.

5. If you want to adjust the storage locations for the new archive library, select it, choose File > Library Properties (or press Control-Command-J) to open the Library Properties inspector, and make your changes.

6. Click Consolidate in the Media section of the Library Properties inspector (or choose Files > Consolidate Library Media), and then click OK.

   - Consolidating managed media within the library provides you with one library file that has everything you need later.

   - Consolidating to an external location results in two items to move—the library and the media folder. However, you can more easily share this media later with multiple editors (on a storage area network, for example).

   - In the Motion Content section of the Library Properties inspector, you can also choose to consolidate any custom Motion content to the new library.

Note: Render files are not copied across libraries. You can regenerate them when you reopen your library.

You may also want to archive a rendered media file of the final project together with a Final Cut Pro X XML export of the final project. This XML file is a human-readable text representation that describes the edited sequence in the timeline with all of the edit timing, asset references, effects, metadata, and other information available. This is a much richer archiving choice than an EDL and makes for a more accurate and complete re-creation of the project at a later date. For more information about exporting an XML file, see the Final Cut Pro X User Guide.

There are a few other items you should archive in addition to the library. These are elements of your project that you would need if you set up a new system to edit an archived library.

- *Fonts:* Any custom fonts that aren't included with the system
- *Plug-ins:* Any third-party plug-ins used within the project, such as FxPlug effects, Audio Units plug-ins, or camera manufacturer plug-ins that enable playback of specific camera formats such as RED

Collaborate with Other Editors

You can use the power and flexibility built into Final Cut Pro to work easily and efficiently with all members of your team. Carefully managing the handoff or "turnover" process allows multiple individuals to work collaboratively.

Tip: To prevent any confusion over current versions of a project, keep media and projects in separate events. This way, the primary editor can control versions of edited sequences in an event dedicated to that purpose. Meanwhile, assistants can transfer media (such as dailies) using media-only events that are separate from the editor's working projects.

When handing off new events to an editor who already has a working library, you can copy the events directly to the working library or create a transfer library containing the events.

Prepare dailies

When preparing media for multiple users to share, you should always store the media at an external location (on a media storage device or shared network).

1. Within a new library, create an event for each day's dailies, and import each day's media into the event for that day.

2. Use keywords to organize media based on important criteria such as scene and take.

You can also create new clips as needed:

- Synced clips with dual-system sound

- Multicam clips

Hand off a new library

When first handing off events to another editor, you need to create a new library containing the events. For example, an assistant editor can create a new library containing events to be handed off to the primary editor, and then make the new library available on shared storage.

1. In the working library, select the event or events you want to hand off.

2. Choose File > Copy Events to Library > New Library.

   Note: When you hand off a library, you have the option to include optimized or proxy media. If you don't include these files, copying goes faster and the library takes up less space on the destination media storage device. However, if copying time and storage space aren't issues and including the files will save time when the editor begins working, you should make sure all the generated media is copied as well.

3. Type a name for the new library, navigate to a location to store the new library, and click Save.

4. If you want to include the media files along with the library, do the following:

   a. In the Libraries sidebar, select the new library and choose File > Consolidate Library.

   b. In the window that appears, confirm the library file and click OK.

5. To consolidate any custom Motion content, choose File > Consolidate Motion Content.

6. When copying is complete, select the new library in the Libraries sidebar and choose File > Close Library.

7. If the new library is not already on shared storage, move the library to a location where the other editor can access it.

Hand off new events to a working library by copying

You can copy new events from your working library to another editor's working library located on shared storage. For example, an assistant editor can use this method to update the primary editor's working library.

1. On the destination system, close the working library on shared storage or the storage area network.

2. Open this library (the destination library) in Final Cut Pro on the system you want to hand off from.

3. Drag the events you want to hand off from your library (the source library) to the destination library you opened.

    - When you copy an event to the library, all of the clips in the event are copied, whether or not they're used in a project.

    - If you copy a project to the library, only the clips needed for that project are copied.

    - If you're working with external media on shared storage, no media files are copied.

4. To consolidate any custom Motion content, choose File > Consolidate Motion Content.

5. When copying is complete, select the updated destination library in the Libraries sidebar and choose File > Close Library.

The second editor can then open the updated destination library on their system and continue working.

Hand off new events to a working library using a transfer library

Another way to hand off new events to a working library on shared storage is to create an intermediate library, or "transfer" library. For example, an assistant editor can create a transfer library containing new events to be handed off to the primary editor, and then copy the new events from the transfer library to the primary editor's working library.

1. On the system you want to transfer from, select the events you want to hand off.

2. Choose File > Copy Events to Library > New Library.

3. In the window that appears, type a name for the new library, navigate to a location to store the new library, and click Save.

4. If you want to include optimized or proxy media in the new transfer library, select the appropriate checkboxes in the window that appears, and click OK.

5. To consolidate any custom Motion content to the new library, choose File > Consolidate Motion Content.

6. In the Libraries sidebar, select the newly created library and choose File > Close Library.

7. On the destination system, open the new transfer library by choosing File > Open Library > [*library name*], and drag the updated events to the working library.