

Scared straight

To lay out a prudent workflow for file-based video, it helps to work up some paranoia

“Organizing is what you do before you do something, so that when you do it, it is not all mixed up.”

— A. A. Milne’s Christopher Robin

This is the sixth article from the PBS Quality Group, resuming a series about real-life issues in DTV. PBS convened the Quality Group last year to improve the public TV digital signals reaching viewers’ homes.

The author of this installment is Chris Fournelle, postproduction director for *Frontline* and a seasoned veteran of postproduction tribulations.

Next month the Quality Group will hold another in a series of workshops on improvement of technical quality. It will be held March 2 in Sony’s New York office. Registration fee: still \$50. Details online at pbsconnect.org/qualitygroup.



PBS Quality Group, Part 6

By Chris Fournelle

As *Frontline*’s postproduction director, one of my favorite questions from producers is, “We’re going to shoot file-based. What do I need to know?”

Where . . . to . . . begin?

How to ingest? Codecs? Compression? Imagers? Color-space? Temporal displacement? Static resolution? Archive and retrieval?

If I actually told them what they needed to know, I would lose them soon after I began. As project funding and schedules become more and more compressed, technical considerations appear to have little influence over producers’ expectations that file-based video will be faster and cheaper.

It’s often a foregone conclusion the producer is shooting file-based and probably has picked up a camera without considering some of the questions above.

Ordo ad chaos — Order from chaos

In fall 2008, *Frontline* decided to delay its switch to file-based shooting for as long as possible. We wanted to let the technology and workflows mature until each independent component in the production chain could hand off to the next in a meaningful and efficient way. Time, after all, is money.

Our overly optimistic stance didn’t last long. The flood came.

We were soon swamped by a 90-minute project edited offline in Apple Final Cut Pro, which we planned to complete online with an Avid Symphony Nitris. As we started migrating the project over, we found utter chaos. Files with unpronounceable names in folders labeled Card 1, Card 2, Card 3, etc. — and 20 of each of those folders.

The files were consolidated in Final Cut Pro from original files that had been given different names, so it was hard to go back and find the original shots in hundreds of

hours of material. Originals hadn’t been grouped on a single drive or in a single folder. It was a huge struggle merely to find all the materials, never mind ingesting them all into the Avid system. The process taught us a valuable lesson on the virtues of preparation to allow a smooth transition from offline to online postproduction.

Last year, within months of swearing that we’d put off the transition to file-based production, *Frontline* was taking in about 40 percent of its footage from file-based cameras. This year, we estimate the file-based portion will exceed 90 percent.

With tape-based productions becoming rare, our team soon realized our tape-based workflows were ill-suited to the new file-based world. We began questioning our habitual workflows and timelines.

Some questions we started asking were:

■ How are the files organized? How do we want them to be organized? How does our parent station (WGBH) want them to be organized?

■ Can we work natively, or does the footage need to be transcoded? How long does that take?

■ How do we copy that much footage from place to place? How long will it take to transfer? How long will it take to ingest? How do we know that all of the files copied completely? How are the files safeguarded through the process?

■ Once ingested into my edit system, will they relink back to the original files?

■ How will the files be identified in an EDL (edit decision list)? How does this affect cue sheets? If there are no tapes (and no playback machines), how do the website producers, publicists and other staff members look at the latest versions of our program?

■ How do we archive file-based media? Can our station archive it? How? Can I easily bring a program back from archives if I need to rebroadcast or re-edit it?

You get the idea.

Pre-production phase

It’s always difficult to go back and reorganize partially completed projects, but it’s especially so with complex file-based productions that involve so many people and processes. Better to *begin* with an organizational system and apply it through the production chain.

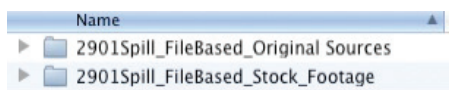
Frontline organizes its digital raw materials in a folder logic-tree system with broad categories in the top folders and subjects narrowing in the deeper levels. We label each folder in a similar manner from show to show, and we maintain lists of each folder’s contents

at the desktop folder level to avoid relying on editing platforms or third-party applications to get basic information. Conveniently, some of this folder information can be used by non-linear editing systems (NLEs) and archiving software to import folder information as metadata later on (as with bin names).

For online editing at *Frontline*, we transfer everything into one folder on our Avid Unity. All the file-based materials, audio, graphics and so on are brought together there. Later on, we'll archive the folder in our facility as well as in WGBH's archives.

For instance, we put the makings of our BP film, *The Spill*, in a folder called "2901 The Great Spill."

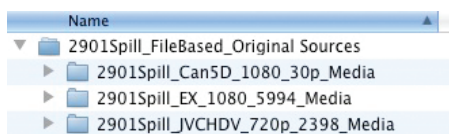
Within that folder we create subsidiary folders based on type of material, using the same naming conventions to structure the folder name.



We start with the most critical information at the front of the name because some software programs using it will cut off the end due to their character limitations. Since we are part of the PBS system, we begin each label with the unique NOLA code for each episode, but this could be any sort of project number. It's followed by an abbreviated program title and then a description of the folder contents.

We seek to minimize characters and spaces and avoid symbols such as \$, #, @, *, !, / and \. While *some* nonlinear editor systems and operating systems may deal with symbols just fine, others may not, especially archiving systems.

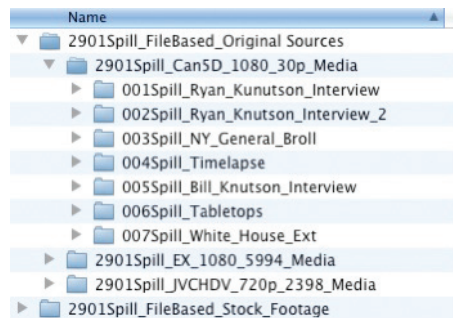
Within the file-based original sources folder, we further subdivide the material by resolution, codec and frame-rate.



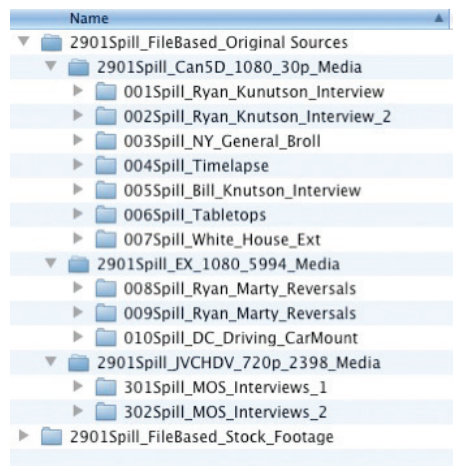
Again, we do this so that we can get a sense of the contents at a glance. It's an improvement over a label such as *5D* or *Card 1*. Without importing anything from the folder, we can see which documentary it's associated with, the camera's manufacturer, the resolution and the frame-rate. We don't want

to assume that everyone who needs to find material will have access to the equipment needed to examine the content itself.

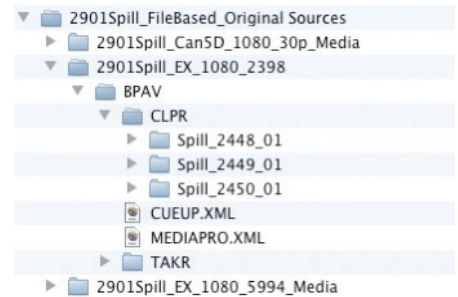
Within these folders are the production's original sources — the contents of our cameras' memory cards. We group materials into subfolders with unique numbers — comparable to a tape number — and including the project's abbreviated working title again and a description of the contents.



Don't worry if your shooting is not as segmented as the example below. The important thing is to try to add some description. The other folders can continue the unique numbering system or begin a new group such as 300 or 400.



All of the contents from your recording are copied into these folders. It's very important that all the contents are included. Some file-based acquisition systems generate just one file for each clip, such as the Canon 5D, but others, such as the Sony XDCAM EX, generate other necessary folders as part of their BPAV folder structure. Failure to include these other folders or files could prevent you from accessing the media.



Acquisition phase

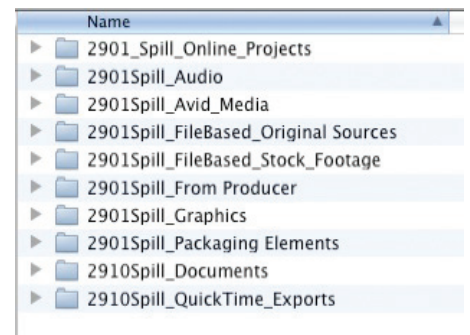
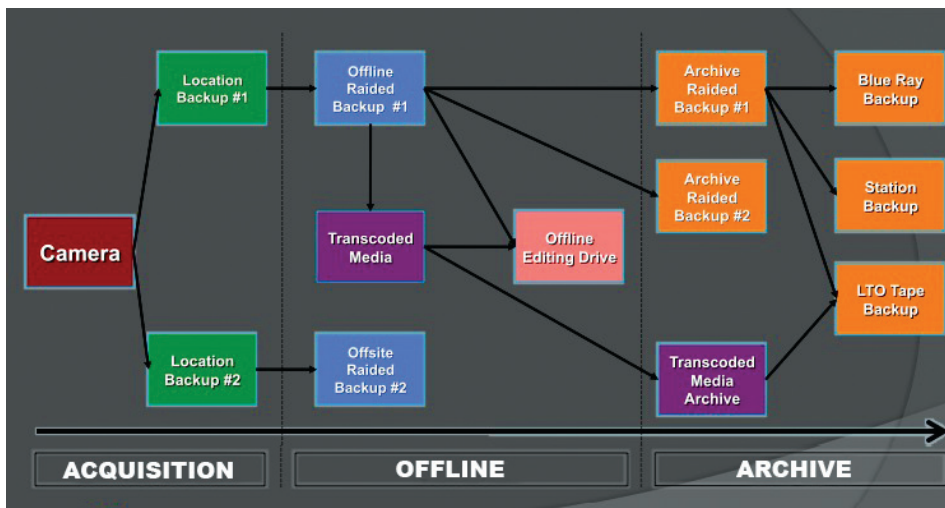
You begin putting your naming conventions into practice even before hitting "Record" on the camera. The camera establishes important metadata here, tagging each file with date and time, time code, codec, camera type, aperture, frame-rate and other details. Most of the metadata is created automatically, but you can add valuable tags clip by clip, with limited shot-logging or, with an XDCAM, adding your own name to the beginning of every file name, which helps connect clips to a particular project. The more information you add during acquisition phase, the more useful it is through the production chain.

While *Frontline* receives footage from virtually every make and model of camera, most originates on Sony XDCAM EX, XDCAM 50mb, Panasonic P2 and Canon 5/7D. With the exception of the XDCAM disc-based material, all those files have to be stored safely outside the camera at the end of the shooting day.

How you move and organize that media is possibly the most important thing you can do to positively influence your project's workflow. The better organized you are at this stage, the more it will help you later when you are running out of time and money.

While in the field, it's recommended that you store copies of your materials on at least two devices at all times — on memory cards, if you have enough of them, and backed up on another storage device every day. If you plan to clear cards for further shooting, that means having two storage devices to hold copies of the data.

When copying your data, it's possible to simply copy the media from the card to a folder on your hard drive at the finder level, as most people do, but a better practice is to use copy software that includes a check-sum



All of these files are housed in the master folder that is archived to SDLT and in our station's digital archive on LTO tape.

The takeaway

We've tried to create a workflow that is mostly agnostic about the brands of cameras and nonlinear edit systems.

Why worry about these details? Isn't this why you send the job out to a postproduction facility and let them deal with it? Absolutely. But you pay eventually for disorganization. Every minute that postproduction personnel struggle with your material is another minute they put on your bill — a cost you may not have budgeted for. At *Frontline*, where we do our own online editing of every program, time wasted on organizational glitches is time we can't use to make the program look and sound its very best.

So, practice paranoia. Organize as if your production life (and afterlife) depends on it. Losing your file-based sources — whether it's your disk drive that fails or because of poor organizational efforts — can be catastrophic.

The important takeaway is to organize your workflow so that it's as universally comprehensible as possible. How would you want a project delivered to you? What information would you want if you'd never seen a frame of the production?

Perhaps you don't expect to ever send your project to another production house or resurrect it after decades in the archives, but when somebody shows up with that unexpected \$300,000 check, if you've prepared your files well you'll be in far better shape to accept it. ■

The PBS Quality Group is funded by CPB. Group members, including the author and PBS Chief Engineer Jim Kutzner, group manager, are listed on the project site, pbsconnect.org/qualitygroup.

Graphics by WGBH for the Quality Group. Questions or suggestions? E-mail: qg@pbs.org.

analysis program. Doing so will ensure that every last byte is copied and that nothing will be corrupted on the way.

There are many Mac and PC programs that can automate the process, which saves time and mistakes in the field. One product *Frontline* uses is Synk Pro, a \$45 Mac-only program that checks for complete copies and can copy to multiple drives at the same time. There are many other products that perform similar functions.

Edit phase

The organizing process continues after you return to your office. From your location drives, use your backup/synchronization program to back up your media to two or three raided drives at your offline facility. One will hold the original data, a second will serve as the edit drives for your nonlinear editing, and a third is for off-site storage in case of emergency. In the example below, one of those three drives is the offline editing drive.

Care needs to be taken to maintain your naming conventions in nonlinear editing. Editors historically have been able to change clip names to reflect the clip contents. But changing a file name in the NLE from "34hgort9e305ld95" to "Bill's interview" breaks a valuable link between the edit-system copy and the original clip. Finding the original can be a nightmare. This is not so crucial if you're ingesting at full resolution and will finish the entire project on one edit system, but it becomes an imperative if the material will be shared with others in the edit process or will be handed off to another facility for finishing.

Another problem is that it is almost impossible to identify source footage when doing cue sheets or EDLs at the end of a project, since the clips in the timeline will not refer to the source-folder location or its

original name. Neither Avid nor Final Cut Pro, in present versions, puts the original file name (unless you've left the clip name unchanged) and their residing folder in the edit decision list. This is a good example of how everything in the production chain can't efficiently handle file-based media.

Please, please, please do not rename the clips. Adding a text field or comments field and adding your new name there can allow your editor to make sense of it all and still retain some links.

(One exception is standalone QuickTime files such as those produced by the Canon 5D, but they can be renamed only *before* ingesting. Renaming still isn't recommended unless you are very familiar and comfortable with file-based workflows.)

Archival phase

Once the project is complete, the material generally must be stored for possible later use. Storing video files is not as simple as putting tapes on a shelf. There are many options for safely archiving files. Factors such as budget, longevity, format type, physical space, size of your company, number of sources, and ease of restoring archived material should inform your choices. The archival rule of thumb is to maintain three backups on two different format types, including one located off-site. While this practice is the safest for your valuable sources, the cost can be high. Of note, if your materials are stored on a hard drive, spin up the drives once every six months or so to insure that they do not seize up.

Consider how much you plan to archive. Just the original sources? The offline media? The transcoded media? All assets that make up a project? *Frontline* archives the entire online project as demonstrated below so that nearly every piece will be in one place if we want to work on it again.