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Feature

Back Up - Road Block Ahead!

By Neil Sadwelkar

At the end of a project, the editor is often asked to back-up the project in case the client wishes to re-visit it later, or wishes to make versions, or even when he/she wishes to complete a half-done project later. And quite often clients don't really understand the nature of a computer-based edit project on systems like *Avid*, *edit**, or even *Final Cut Pro*. So they pull out a floppy and ask you to back it up on that - like a Word document or something.



So really, what's the best way to back-up a project in a way that is useful? And how feasible is it to back-up NLEs? But first, let's understand the parameters of an NLE [*non-linear editor*] project.

At the core is the project itself - the *Avid* project, the *Final Cut Pro* project or the *edit** project. It may consist of bins [*folders in simple English*] and sub-bins. But this has information only on timecodes and tape names of all the sources used in the edit and information on any effects used in the project, and even titles made within the project. And, of course, your timelines or sequences. In short, project files usually have all the meta-data associated with the footage and sequences. But these are just numbers, there is no picture or sound. The real picture and sound that you can see and hear are contained in 'media files' stored on various hard disks in the system.

Project files are quite small. 1 - 5 MB for ad films, up to 10 MB for a short film [10 - 30 min], going up to about 50 MB for an entire feature film. This project file on its own is useless and can't be viewed without the media itself.

Media files on the other hand are very large. They consist of clips that you capture from tape with or without timecode. Audio tracks from DAT, or audio CD or even downloaded audio and video from the 'net'. Even Photoshop files, targa files and sequences, are media. Media could also be 'generated' in the form of render files. But since these are generated on demand, they don't need to be stored, typically.

So these media files and project files are quite useless without each other. They need each other to be viewed and/or worked on, as a film.

To help figure out a good back-up method, as a starting point, I've made a table showing how much space, these media files occupy on your hard disks for various common resolutions. The figures are for PAL.

Type	MB/Sec	MB/Min	GB/Hr	Mins/GB	Mins/CDR	Mins/DVD	Mins/120GB
Avid AVR 3s	0.57	34.5	2.1	29	20.3	130.5	3480
Avid AVR 12	0.88	52.6	3.2	19	13.3	85.5	2280
Avid AVR 6s	1.11	66.7	4	15	10.5	67.5	1800
Avid AVR 8s	2.38	142.9	8.6	7	4.9	31.5	840
Avid AVR 70	2.38	142.9	8.6	7	4.9	31.5	840
Apple P-JPEG 75%	2.7	162	9.7	6.2	4.3	27.8	741

Avid AVR 71	2.78	166.7	10	6	4.2	27	720
Avid AVR 75	2.9	174	10.4	5.7	4	25.9	690
Avid AVR 9s	3.33	200	12	5	3.5	22.5	600
Apple DV	3.6	216	13	4.6	3.2	20.8	556
Avid AVR 75	4.17	250	15	4	2.8	18	480
Avid 2:1	4.5	270	16.2	3.7	2.6	16.7	444
Avid AVR 77	5.56	333.3	20	3	2.1	13.5	360
Apple DVCPRO50	6.8	408	24.5	2.5	1.7	11	294
Apple M-JPEG B	6.8	408	24.5	2.5	1.7	11	294
Apple M-JPEG A	6.9	414	24.8	2.4	1.7	10.9	290
UC 8 bit	20	1200	72	0.83	0.58	3.8	100
UC 10 bit	26.6	1596	95.8	0.63	0.44	2.8	75

Notes on the table:

UC stands for uncompressed. Space required for these is nearly the same for *Apple, Igniter, BMD [DeckLink], Avid* and *Cinewave*.

Mins/120GB is for storage on an external 120 GB hard disk.

As you can see in the table, backing up your entire media may actually be possible for lower resolutions, but not for uncompressed or near-uncompressed resolutions.

Another factor you need to consider when devising a back-up method is the time taken to make the back-up and later, the time taken to restore from the back-up and get back to editing. While considering these calculations, remember that your media already exists on your original rush tapes. Recapturing it takes anything from real time to about twice the real time. Meaning, for a 10 min film, if you haven't already backed up the media, then just recapturing it from the tape would take about 10-20 minutes. So whatever back-up you decide on, make sure that the time taken to back up and restore is not more than the time you might take to recapture the footage. You can get an indication of the time needed to back-up and restore from the above table as well.

What to back up on?

There are many devices that one can make a back up of projects and media. I happened to be reading an article on tape-based back-up devices in the latest issue of *PC Quest*. So I culled some figures from there just to see how they fare as far as NLE back-up is concerned. Not too well as the table shows...

Type	Capacity GB	Backup Rate GB/Hr	Backup 1 Hr of DV Mins	Backup 1 Hr UC 8bit Mins	Drive Cost Rs	Media Cost Rs	Interface
HDD	165	180	4	24	8000		IDE int
HDD	165	158.4	5	27	35000		FW 800 ext
HDD	165	108	7	40	22000		FW 400 ext
Ultrium-2	196	88	9	49	380000	3100	SCSI ext
Ultrium-2	186	70	11	62	315000	3100	SCSI ext
AIT-3	96	40	19	108	160000	4000	SCSI int
AIT-2	48	21	37	206	67000	3900	IDE int
DVD	4.7	18.8	41	230	20000	300	IDE int
AIT-1	32	14	56	309	48000	3400	IDE int
AIT-1	32	14	56	309	56000	3400	FW/USB
DAT	33	10	78	432	93000	1400	SCSI ext
DLT-IV	38	9	86	480	75000	2800	SCSI ext
DDS-4	18	7	111	617	37000	800	SCSI int
DDS-3	11	4	194	1080	24000	420	SCSI int

HDD is hard disk. **DVD** is, well... DVD. The funny acronyms like **DDS**, **AIT**, **DAT** and **DLT** are tape drive types.

'**int**' stands for internal and '**ext**' stands for external.

It's clear from this table that most tape back-up solutions, while being suitable to servers and that kind of data back-up, are quite useless for NLEs. The fast ones are too costly and the cheap ones are ridiculously slow. I've provided the figures anyway just so that if you just happen to have one of these machines available, you can consider using it if the time factor

suits your application.

So, from the above table after eliminating the unfeasible back-up solutions, the feasible mediums are hard disks, CDs and DVDs.

Type	Capacity GB	Backup Rate GB/Hr	Backup 1 Hr of DV Mins	Backup 1 Hr UC 8bit Mins	Drive Cost Rs	Media Cost Rs	Interface
HDD	165	180	4	24	8000		IDE int
HDD	165	158.4	5	27	35000		FW 800 ext
HDD	165	108	7	40	22000		FW 400 ext
DVD	4.7	18.8	41	230	20000	300	IDE int

Preparing for a back-up

Most NLEs have some kind of a 'consolidate' function. Meaning they can take your sequence, retain only used portions of clips, and copy these used portions elsewhere. This also includes 'handles', or extra frames at the beginning and end of each consolidated clip. In an Avid, this process is called 'consolidate'. In FCP, it doesn't have a name, but there is a Media Manager that does exactly the same thing.

So, using consolidate or whatever your NLE calls it you can pare down your media from its original length, which may be several hours, down to a little more than your sequence length. This consolidate process is especially useful for multi-layered edits where having all layers available separately enables changes later. Providing handles is also useful for making changes like extending or shortening some shots slightly, or improving video-audio sync.

Besides consolidate, most NLEs also give you the option of recapturing only whatever is used in a sequence, so recapturing the entire rush, just to make a few changes is not strictly necessary. So, even if you don't have a back-up of your media, you can still recapture all time-coded material and have it re-linked to your sequence automatically.

And finally, if you have captured your rush at uncompressed resolutions, then just taking a tape dump of the final edit and then recapturing this tape dump to make changes isn't a bad option either. In most NLEs, uncompressed resolutions are virtually lossless even when recaptured off tape. This also applies to material shot on DV or DVCAM and captured to your NLE via FireWire, and then dumped back to tape via FireWire. No loss with DV.

Keep this option firmly in your sight when making a calculation of the time taken to back-up or restore from back-up. Also keep in mind the recapture of 'used-portions only' option. Either of these may be more convenient than a back-up of media.

Finally, how much and how to go about backing up depends on the kind of project you're working on.

Ad films

When editing an ad film, it is best to back-up only after the ad is finally approved. Changes requested by clients often involve using different takes of some shots, so nearly all the media needs to be available.

Depending on what resolution you are editing in, it may be possible to back-up your entire media to a DVD or even a CD. Check the table and you'll see that, backing up 20 mins of DV footage or 30 mins of Avid '10:1' footage is possible in one DVD or 3 mins DV or 5 mins of Avid '10:1' footage in one CD. And a CD burns in 5 mins and a DVD in 15 mins.

But if your media is of a higher resolution and/or of longer durations than this, then it is best to back-up only the project onto a CD and recapture when necessary.

If the ad is finished and approved, then you don't need to back-up the entire media. You can back-up just the consolidated length of the entire ad. Along with the graphics used and the audio tracks - mixed and separate tracks unmixed. At most you may need to make language versions of the ad or shorter version or change some text-supers. Either way, you won't need the whole rush. Even if you do, you can always recapture manually, just the shots you need.

TV shows

After you've finished editing a TV show - serial, game show, talk show etc - and it's accepted for telecast, you almost never need to make any changes. So just making a back-up of the project to CD and a tape dump of the entire edit is the fastest and sufficient method. At most, you may need excerpts of the show in a 'Best of ---' compilation at the year end. Or maybe, make a language or subtitled version for overseas or in-flight markets. Either way your tape dump will do. And the project back-up will enable you to open the project just to see how you set up a particular effect, or what kind of audio EQ you did for a particular scene, or even re-use the titles you may have made.

Making a back-up of the unmixed audio track with dialogue and music/SFX on separate tracks is also useful to be able to re-use the music or SFX. This audio back-up can be done to a CD. 2

tracks for 2 episodes of the average 25 min episode, or 4 tracks for one 25 min episode will fit comfortably on a CD. And you can burn a CD in, under 5 mins.

Short films

Corporate films, 'AVs', music videos, documentaries etc. Backing up these kinds of projects is a bit tricky since these are the kind of projects that are most likely to have changes even after editing is nearly complete. There is also the consideration that you may have to remove some effect or layer afterwards if it isn't approved. Or update some sections that may have changes over a period of time. So to back-up this type of projects, it is nearly always a good idea to consolidate and make a back-up of the consolidated media.

Another consideration is that you may like to use some footage, shot for one film, in another. If you shoot in DV and capture via FireWire, or in Digital Betacam and capture uncompressed via SDI, then making a tape dump of all good shots and recapturing them is lossless. So you can, in fact even do a 'sort' of all OK shots and dump them back to tape and use this shortened selected rush as your source next time.

For short films, the best back-up method is to make a tape dump of the finished film. Then you can duplicate the final sequence, strip any masks, supers and dissolves and make a dump of that as well as a safety measure. Then consolidate all media along with render files, and save this consolidated media to a DVD along with the project. The next time you need to re-work the film, you can copy all media and render files back to hard disk and open the project. It should relink to the media and render files automatically and your sequence is ready for re-editing.

Feature films

Feature films have extremely long rush lengths which can occupy hundreds of gigabytes even at offline resolutions. So backing up the entire media is not practical. On the other hand, feature films have 'deep pocket' budgets, so it may just be viable to just fill up external FireWire hard disks with the entire rush and keep them away as a back-up. A 500 GB FireWire hard disk costs about \$ 700 [should be under Rs 50,000 in India] and can store about 550 rolls of 35 mm film captured at DV or Avid 'AVR 9's resolution.

But even if you can't and don't want to back-up media, you can store the final project to a CD. Along with that, you must store telecine logs and batch lists from FCP and the keycode databases. For a full 3 hr feature film, all these will be under 100 MB. So not backing these up to a CD is criminal. In fact, I normally advise people to back-up these on a daily or weekly basis throughout the course of the edit. So if something should go wrong with the project, you can go back to the last good back-up and end up losing at most a day's work.

While back-up after a project is completed is important, it is a good idea to make back-up at intermediate stages as well. This is because it is not uncommon to have one's project corrupted due to disk errors, system crashes, or just 'pilot error' - meaning human goof up. Projects take up just a few MB, so it is entirely feasible to back-up your project at the end of every working day. Along with PhotoShop files, graphics, scripts, audio tracks etc. This is particularly important if you are working in a studio where many different editors handle the machine and someone may accidentally delete you entire project or other files.

Conclusion

In making a back-up of projects done on any NLE, first and foremost, make a tape dump. Dump a full and final film, then an unmixed audio version, then a version without supers and if needed, without masks and other visual effects. Remember to work on a duplicate of your final sequence, while removing all the effects and supers for back up. Then back-up the project. This will take just a few minutes and any project will fit on a CD. Then back-up all audio files, graphics and any media captured from a non-TC source. These too will fit on a CD.

After that, consolidate all 'used media'. Measure this consolidated media and assess how long it will take to burn to CD or DVD. So if your entire rushes are on one DV tape and the used media is just 3 minutes, then recapturing might be faster than backing up. On the other hand if your entire rushes are spread over 10 DV tapes and your used media is 15 mins long, then backing up to one DVD is faster than recapturing from 10 tapes.

And CDs cost Rs 25 and DVDs about Rs 200. And one CD stores 700 MB and burns in about 5 mins [with a 48x writer], and a DVD stores 4.5 GB and burns in about 15 mins. So factor this time and money into the equation as well. It might be a good idea to verify the CDs or DVDs after you finish burning them, especially if you have written them at high speeds.

Partial back-ups during the course of a NLE project are like insurance. You make them with the hope that you may never need them. But a back-up after a project is completed is a part of finishing the film. It's as important as making a copy of your final film to store with you and to show the world.

About Neil Sadwelkar



Neil Sadwelkar has little formal training, so he just about makes a living in the film & TV industry in India. His profession is a higher form of meditation through which one can deny hunger and sleep - it's called editing. In his spare time thinks hard and writes stuff like this piece above. And in whatever time is



left over, he does his own accounts and chases clients for money. As you must have noticed by now, he is also shamelessly besotted with Macintosh machines and considers them as God-sent gifts to man kind!

He builds and tinkers with computers, so some people get conned into believing that he knows a lot about computers and editing software, so they even pay him as a consultant. Really! If you love what he's written you can drop him a line at neil@misenscene.net and tell him he's the greatest. He even has a web site dedicated to Final Cut Pro where you can take in more of his writings.

If you're a budding editor you can make him feel good by asking for advice. But if you're looking for work, don't bother because he doesn't have contacts. And if you really hate his writings, write to him and give him some work, so he has no time to write stuff like this. But don't make him chase you for money; else he'll go back to writing.

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