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## Original Article

# Getting to work – Image ingestion

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### Richard Anderson

is an advertising and corporate photographer based in Baltimore, MD (USA). He made the transition from film to digital photography in 1999 and now uses a completely digital workflow. Anderson has conducted numerous seminars and written magazine articles on digital workflow and quality issues for photographers. He is an ASMP Board officer and chairs the ASMP Digital Standards Committee. He was the principle author of the Universal Photographic Digital Imaging Guidelines (UPDIG). He is the project leader for dpBestflow, a project jointly funded by the US Library of Congress and the ASMP to promote best practices for digital imaging workflow and digital image preservation. In addition to the aforementioned book, the project has published a website, dpBestflow.org., which is a resource for the digital photography community worldwide. Anderson received a 2009 International Photographic Council (IPC) Photographer Leadership Award in recognition for his volunteer work as an ASMP board member, for his contributions to the trade through his role in developing UPDIG, for his efforts in securing a 3-year award from the Library of Congress to further his work on digital standards, and for his educational outreach to the photographic community.

**ABSTRACT** Chapter 7, *Getting To Work – Image Ingestion*, covers the key components of getting digital images from the camera into the computer. The ingestion step is one of the most important steps in a safe and efficient digital image workflow. Performing this step properly can provide the best opportunity to automate the digital workflow and ensure organization and safe-keeping of the photographer's work. We discuss best practices for:

- options for safe transfer of images utilizing dedicated ingestion software,
- creating a file and folder backup;
- file naming conventions and strategies;
- adding metadata and building templates for reuse; and
- visually verifying images in an image browser before the memory cards are reformatted.

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## INTRODUCTION

This book is a guide for photographers, image-makers, or anyone who will be working with image files during the course of their work. It is also a handbook for knowing who should be

doing what, within an Eagle's view of workflow as well as all the iterations that a file will take on during its lifespan. It is for anyone wanting to know the choices for developing a workflow to create consistent, and reliable results in their work.

The goals are to:

- Show how each piece of hardware and software might fit into the bigger digital workflow picture.
- Help our audience understand how to choose hardware, software and a process that is optimal for their photographic goals.
- Show how to make informed decisions about choosing the correct workflow for your needs.
- Provide a framework for keeping up with the evolving digital photographic workflow and ecosystem.
- Provide realistic strategies to preserve digital image files (and the work that you do to them) for the short, and especially the long term, as they are an important part of our history and culture.

During the last few years, the term ‘Workflow’ has migrated from a primarily print and publishing, graphic arts industry persona to an imaging-at-large term. This has resulted in the need for photographers, artists, trainers and educators to integrate this concept and material into their vocabulary and curriculums. Yet, up until now, there has not been a single and complete resource that puts each of the seemingly disparate processes together. There has been a need to create a harmonious map and guide among all the disciplines that ultimately need to work together. In other words, a resource that unites and leads to all the things you need to do within a workflow.

Perhaps the root cause of this lack of understanding and consistency lives in the many definitions or views of workflow, which exist depending on one’s background and discipline. This text provides the necessary components to help build a cohesive workflow that implements best practices and provides solutions for imaging professionals and educators.

*Digital Photography Best Practices and Workflow* is a coherent, concise guide to

- the key aspects of the digital photography workflow;
- a list of resources and links to stay current and up to speed with the rapid changes in technology;
- a glossary to help standardize the language and definitions as one implements best practices

and to synthesize the workflow and communication process;

- what works, why things work, and what choices you need to make for consistency, efficiency and repeatability.

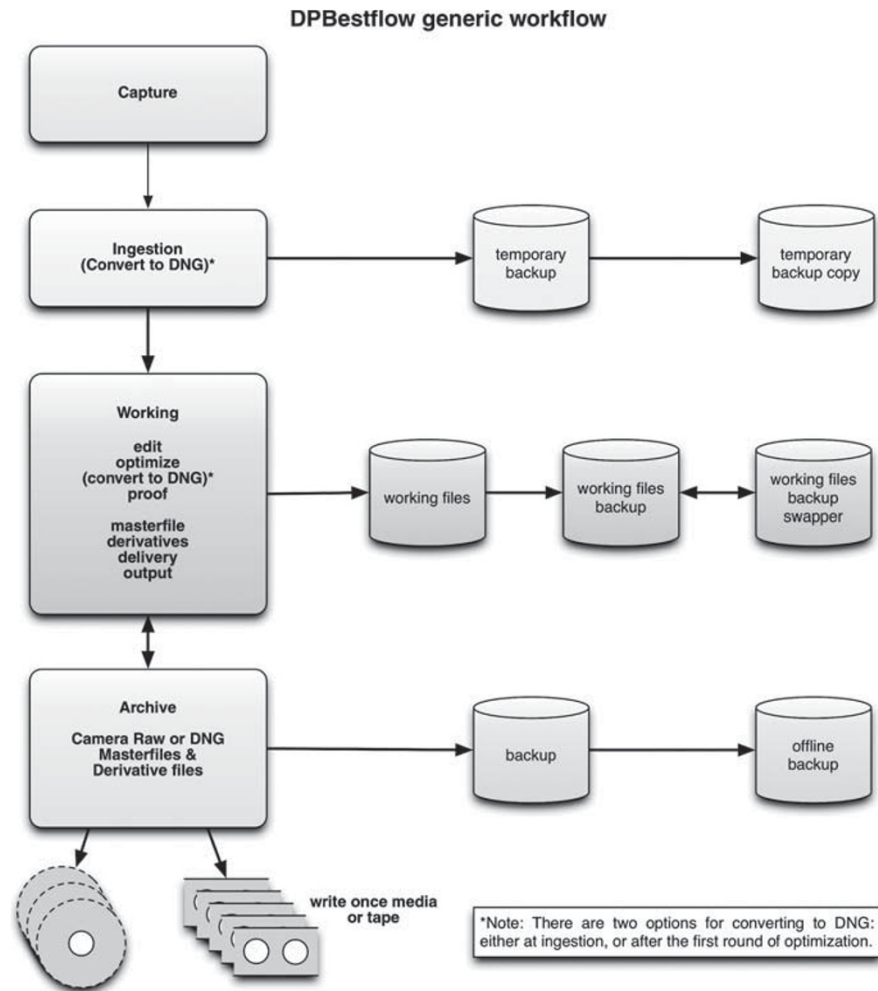
It is sometimes difficult to get direct answers to specific questions; everyone has a position and wants to share that with you. Who really knows the best path and with the most accurate information? Many tools are currently incomplete or are still evolving. Many of today’s requisite skill sets may require a consultation with an expert in that particular step to ensure accuracy. Collaboration is not just a buzzword, it is a necessary part of our workflow.

How do you work smart now? Accepting things verbatim may not always be the best way to go. Use this information to make enlightened decisions while tapping into the growing community of imaging professionals. *Digital Photography Best Practices and Workflow* is a culmination of the knowledge and experience of many of those experts.

Working with technology requires us to consider the following aspects:

- Embrace the concept of integrated information and critical thinking to make good decisions.
- Have an open and informed mind.
- Accept that things evolve and change.
- ‘Know’ the solution before understanding the new process may hinder an otherwise appropriate action.
- Technology often becomes like religion and politics – be a good consumer and employ bi-partisan tactics.
- Learn to examine other’s ideas, maintain an open mind, and allow yourself to adjust your position and known facts.
- All applications have issues – being wedded to one mind-set can hinder a better understanding of the process and a more efficient workflow.
- Flexibility is paramount – yet consistency and discipline are essential.

These are the fundamentals of what workflow is about and what is required to stay on top of, and ahead of the curve. Accumulating knowledge and experience has become what we



**Figure 1:** This is the dpBestflow generic workflow excerpted from Chapter 4 of 'Digital Photography Best Practices and Workflow'.

call the best practices – these are the things that work if a little bit of discipline and consistency are applied. Our digital careers are about living through the technological shifts and synthesizing what works and will continue to work as the technology evolves.

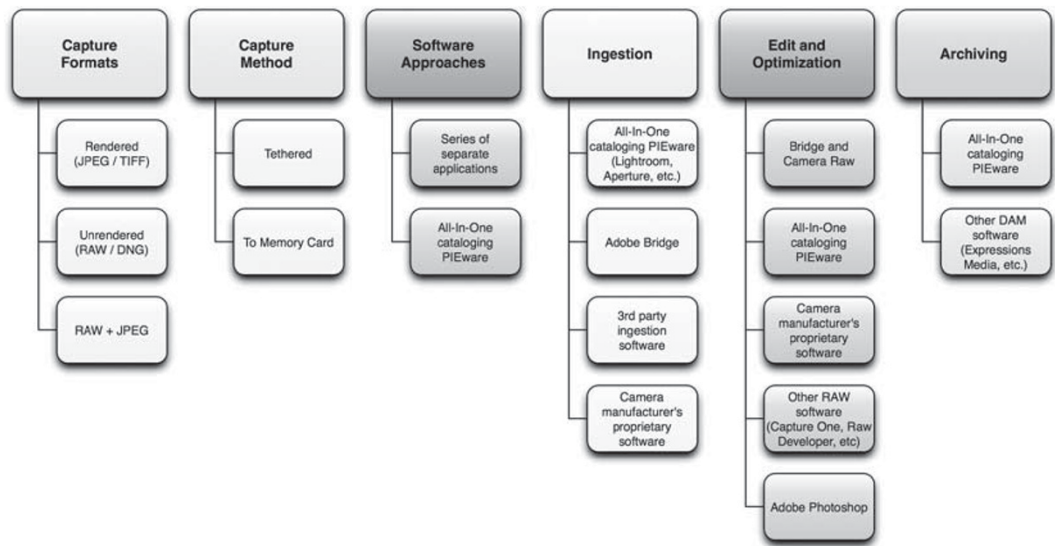
Figures 1 and 2 provide a workflow overview from Chapter 4 of 'Digital Photography Best Practices and Workflow.'

## DATA PRESERVATION AND DATA BACKUP

The primary goal of image ingestion is to preserve image data and create backups. Image ingestion from memory card(s), tethered cable or wireless requires similar steps. In the capture

section, we referred to the ideal setup of using a backup card when shooting if your camera model supports that function. If you do not use two cards for capture, you should

- regularly download your single cards to a disk or storage device;
- not format cards until the downloaded images can be reviewed and backed up to a second drive;
- not connect the camera directly to the computer to ingest images (unless shooting tethered);
- always use download software as opposed to using the Finder application to copy the image files.



**Figure 2:** Workflow parameter decision points.

Using the Finder to copy files is potentially unreliable, sometimes resulting in skipped or missing files. Never use the finder to *move* files from the memory card. If you move (not copy) files or folders between the memory card and computer disk and some glitch happens to the destination volume, or your connection with it, all your files vanish – both on the memory card and on the destination hard drive. There are many other good reasons to use dedicated ingestion software, but image preservation is the most important one.

### DPBESTFLOW FILE NAMING CONVENTIONS

Naming (or re-naming) digital image files is a key organizational task in digital image workflow as it is the most basic element of your file system structure. Digital cameras do not currently have very sophisticated naming options, and the default names are confusing and lack one of the most important criteria for digital image file naming – each file name must be unique.

The first criterion for file naming is that it must follow these basic computer system rules:

- Letters in the name should only be the letters of the Latin alphabet (A–Z, a–z).
- Numbers should only be the numerals 0–9.
- Only use hyphens and underscores. Avoid any other punctuation marks, accented letters,

non-Latin letters and other non-standard characters such as forward and back slashes, colon, semi-solon, asterisks, angle brackets or brackets.

- File names should end in a three letter file extension preceded by a period, such as .CR2, .JPG, > TIFF and so on.

The next important criterion is that each digital image file should have a unique file name. Having multiple files with the same name is confusing to the photographer and clients alike. There is the danger that a file might automatically overwrite another file with the same name. How you arrive at unique file names will require some thought. Once you have developed a system, it is important to standardize and adhere to it. Some parameters that can be used to develop unique names can incorporate the following aspects:

- *Your name or initials as the beginning of the string.* Keep in mind that you are limited to 31 characters, so short names or initials work best.
- *The date of the photography session.* This works best if you use year, month and day to keep files lined up in a chronological order.
- *A job sequence number.* The first project of the year might have a date/job string such as 09001, and so on. This will cause files to line up in job number order.

- *A sequence number.* This number can begin at 0001 and go until the end of the job (make sure to have enough digits to contain the total number of files, or your files will not line up correctly). Many photographers like this model because they tell at a glance if the total number of files matches the final file number. Another reason to use this system is that the order that files line up (and are likely viewed and proofed) can be controlled easily by organizing the files in a desired order and then renaming them. Another approach is to use the automatically generated numbers from the camera. One problem with this approach is that this cannot guarantee unique job names if you use more than one camera when you shoot.
- *Avoid incorporating a job name or description in the file name.* Although you can do this, it is hard to avoid running into an overly long file name using this approach. Another consideration is that if you do a lot of shoots for a particular client, or at a particular location, you will have to use some other naming string to differentiate the shoots from one another, so the descriptive component of the name is not particularly helpful.

One final criterion is to have a file naming system that allows you to easily tell whether a file is an original file, masterfile or derivative file. There are any number of possible variants such as a black and white version, a CMYK version or a standard file format version from a raw original, such as JPEG or TIFF. Plan for this, and incorporate enough headroom into your file naming schema to add a descriptor for these variations. For instance, a masterfile could have the letter M or, MF or Master added at the end of the file name, but just in front of the three-letter extension. A CMYK version could have CMYK added, or a black and white version could have BW added and so on.

We recommend appending short descriptors for different versions of an image file as part of your file naming schema. For instance:

- Original: RNA\_08002\_001.cr2
- DNG version: RNA\_08002\_001.DNG

- Masterfile: RNA\_08002\_001\_M.PSD
- Layered Masterfile: RNA\_08002\_001\_LM.PSD
- Flattened masterfile: RNA\_08002\_001\_FM.PSD
- Web version: RNA\_08002\_001\_web.jpg
- Offset printing version: RNA\_08002\_001\_CMYK.TIFF
- Desktop or Lab print version: RNA\_08002\_001\_print.TIFF

Once you have created a file naming system, use it consistently for all files. Just as with the optional workflow step of converting proprietary raw files to DNG, there can be early binding file naming, or late binding file naming. Although many prefer to implement a file naming schema on ingestion, those who use multiple cameras when they shoot, or those who want to organize image files in a particular order and have the file names preserve that bit of organizational effort, prefer to rename image files after the editing workflow step.

#### *Tripwire*

One of the very worst things you can do with file naming is to create a situation in which the same image file has two different names. This can occur if you make an immediate duplicate copy of the ingested files, put away a copy and go on to edit and rename the other copy. A workflow like that will be doubly confusing because not only will the file names not match up, but the total number of files may be different as well. Although there are workarounds, such as matching up image files by capture time, or putting the original file name into a metadata field and matching files up that way, it creates more work and wastes time. However, putting the file name into a metadata field, such as the 'Title Field', is useful for delivery files. This allows you to easily recover from situations in which the files' recipient renames them and then needs another version of the same image. You can direct the person to where the original file name is stored and

your search time becomes much shorter. In addition, keeping the original file name in the metadata can be useful when you need to rename a file for use on your web page. This will make it more discoverable by search engines.

## ADD METADATA

The second goal of the ingest step is to advance the workflow by adding

- metadata;
- image adjustment presets;
- applications such as Image Ingestor Pro software that can even add cataloging information as the files come into the computer.

At the cost of a little bit of setup time, batch metadata can be added to the image files via metadata templates. This will save lots of time later in the workflow and does not add significantly to the download time. Adding basic metadata at this stage helps to insure that all derivative files will have the same base metadata as the originals. We recommend that your basic metadata template should consist of the following:

- File Name (in the document title field)
- Name of the Creator/Author
- Address
- Phone
- E-mail
- Copyright status
- Copyright notice
- Generic rights usage

This basic set of metadata can be built to provide more specific custom metadata as the image files go through the editing process. This additional metadata might include the following:

- Description and/or headline
- Specific rights usage (possibly PLUS code or usage description)
- Client name
- Location
- Keywords
- Star ratings
- Special instructions

## INGESTION TOOLS

### Card readers

Card readers come in many configurations to accommodate different computer connections (USB, USB2, Firewire 400/800) and several types of memory cards (Compact Flash (CF), Secure Digital, Memory Sticks and so on).

If you have a collection of cameras, from point-and-shoot to high-end digital, you may need an all-in-one card reader to accept a wide variety of card sizes. This type of card reader is usually a USB device. You may also need a higher speed Firewire 400 or 800 CF card reader. If you photograph events or sports and have a need for speed, you may want to have a set of Firewire 800 card readers. These stackable units can download from multiple cards at the same time. The gold standard for information on flash memory cards and card readers is available on the Rob Galbraith site ([www.robgalbraith.com/bins/reader\\_report\\_multi\\_page.asp?cid=6007-9392](http://www.robgalbraith.com/bins/reader_report_multi_page.asp?cid=6007-9392)). As with most other things digital, plan to periodically replace older memory cards with newer ones that have greater storage capacity as well as increased read and write speed. Luckily, they have gone down in price.

### Download/ingest software

Many software applications used for image ingestion are multifunctional – meaning they can be used as a browser, parametric image editor, cataloging application or all of the above, as is the case for such all-in-one programs such as Adobe Lightroom and Apple Aperture. One software stands out as purely dedicated to image ingestion, the aptly named *ImageIngestor*. Another widely used application, *PhotoMechanic*, adds a browsing function as well. Camera manufacturers make downloading utilities and browsers, although their metadata support varies. *Adobe Lightroom*, *Apple Aperture*, *Adobe Bridge* and *PhotoMechanic 4.6* include image ingestion along with tethered shooting (*Aperture* directly, and *Lightroom*, *Bridge* and *PhotoMechanic* indirectly by means of auto import from a watched folder fed by the manufacturer's capture utility). Some Cataloging Software, such as *Expressions Media* have import functions, although few use it for that purpose as it jumps ahead too many steps in the workflow. *Phase One's Capture One* software is widely used for



tethered ingestion, although its metadata support is extremely minimal. Bibble Labs's Bibble software also offers tethered shooting. However, its metadata support is only slightly better than Capture One; although like Capture One, it offers advanced parametric image editing capabilities.

*Tripwire:*

Earlier, we said that managing image metadata can be confusing. We face that confusion firsthand in the ingestion step. Some of these examples are as follows:

- ImageIngester writes only the XMP variety of metadata.
- Others (for example: Aperture) write only the legacy Information Interchange Model (IIM) International Press Telecommunications Council (IPTC) variety.
- Adobe Software writes both varieties.
- PhotoMechanic lets the user decide whether to use XMP or legacy IPTC and where to put it.

*PhotoMechanic issues*

- PhotoMechanic can embed XMP metadata in proprietary raw files (although not any longer as a default setting). Not only is this a potentially dangerous practice, it can also cause a metadata collision with Adobe Camera Raw, where a proprietary raw file can have embedded XMP metadata from PhotoMechanic coexisting with attached XMP (sidecar file) from Adobe Camera Raw. This will not appear to be a problem, unless the same files are put back into PhotoMechanic and any change is made to the metadata. A change will cause Adobe Camera Raw to read only the newer XMP, which is embedded, and ignore the older XMP (camera settings in the sidecar file).

*Result:*

When this happens, all your parametric edits will be lost, and you will have to start over with your color and tone edits.

*Best Practice:*

Our advice is to make sure that the PhotoMechanic preference is set to always create a sidecar file for the XMP data.

## INGESTION SETUP

### Card handling

- Have a plan for keeping shot cards separate from un-shot cards.
- Make sure that the un-shot cards are formatted and ready to go.
- Establish a numbering or coding system for your cards. If you find corrupted files, this will make it easier to track down which card may be creating the problem. It also just helps you keep track of your cards.

### Backing up downloaded cards

The ideal plan is to use a software that writes files to two separate drive destinations. Use of a Raid1 external drive is highly recommended. But if your software only supports writing to one destination, the second choice is to regularly download to a second drive, although this doubles your download time. The third choice is to regularly copy files from the first download to a second drive. In all cases, memory cards should not be formatted until downloads have been verified. The easiest method of verification is to put the downloaded files into a raw processor, and let it build new thumbnails from the raw data.

*Tripwire:*

Browsers set to use the embedded camera previews cannot be used to verify raw files. The preview JPEG can appear fine, but the underlying raw data can be corrupt. When using parametric image editors (or browsers set to build previews from the raw data), be aware that you need to let them build their cache and create thumbnails from the raw data before you can judge whether the underlying raw data is good.

## HANDLING YOUR CAPTURE FORMAT CHOICE

Capturing and downloading JPEGs is simplest, and has the least issues. Shooting and downloading Raw+JPEG is trickier. Be sure to test your workflow as weird things can happen. We found that some software gives the raw files and the JPEG files sequential numbers instead of the

**Table A1:** Comparison chart of ingestion software features

	<i>Photo mechanic</i>	<i>Lightroom</i>	<i>Bridge</i>	<i>Downloader Pro</i>	<i>ImageIngestorPro</i>
Ingest to multiple locations	Yes, up to 2	Yes, up to 2	Yes, up to 2	Yes, up to 3	Yes, up to 3
Choose images to be ingested	No	Yes	Yes	Yes	No
Allow automatic ingestion when card is detected	No, but ingest window can pop up	No, but ingest window can pop up	No	Yes	Yes
Rename files during ingestion	Yes	Yes	Yes	Yes	Yes
Arrange images into folders by date and time or by name	Yes	Yes	Yes	Yes	Yes
Convert to DNG during ingestion	No	Yes	Yes	Yes, with plug-in	Yes
Verify image during ingestion	No	Only if DNG conversion is being used	Only if DNG conversion is being used	Only if DNG conversion is being used	Yes
Embed metadata during ingestion	Yes	Not in raw files	Not in raw files	Yes	Yes
Sidecar metadata during ingestion	Yes	Yes	Yes	Yes	Yes
Metadata variables	Yes	No	No	Yes	Yes
Metadata memory	Yes	Yes	Yes	Yes	Yes
Rename differently for different cameras	Yes	Yes	No	Yes	Yes
Filter files being ingested	Yes	No	No	Yes	Yes
Tag GPS during ingestion	No, but tags can be synced after ingestion	No	No	Yes	Yes
Eject card after ingestion	Yes	Yes	No	Yes	Yes
Launch external viewer after ingestion	No	No	No	Yes	Yes
Download multiple cards at once	No	No	No	No	Yes

same number with different extensions. This behavior can vary according to the model of the camera and whether ingest is done from cards or done auto-imported when the camera is tethered. Downloading proprietary raw, whether

tethered or from cards, takes longer than JPEG, but is otherwise straightforward. Some software supports converting files to DNG format on ingestion. There are pros and cons, which we discuss in Chapter 9, Optimization.