

RAW PROCESSING IN LIGHTROOM

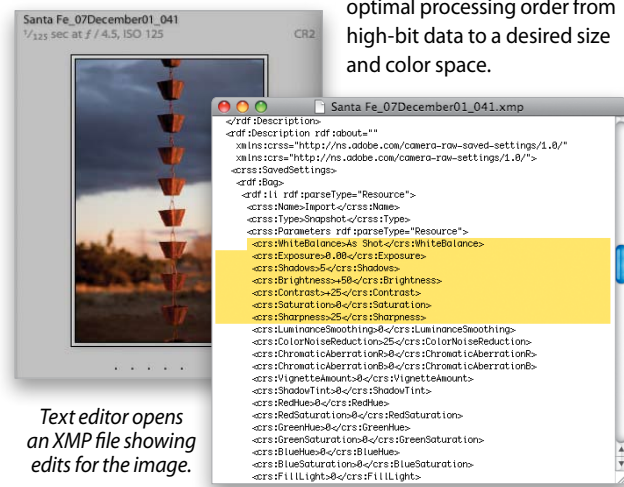
WHY IT'S NOT PHOTOSHOP By Andrew Rodney

Adobe Photoshop was released in February 1990 and Lightroom 1 in February 2006. I mention this because many users new to Lightroom have a lot of experience and history with Photoshop and they may assume that, as an "image editor," Lightroom operates in a similar way. Some come with a Photoshop-centric bias, resulting in a less-than-desirable experience. Let's examine the differences in how the two applications operate as image-editing tools.

Photoshop is a pixel editor. Lightroom is primarily a RAW converter, although you can use it to import and edit rendered (processed, pixel-based) images. (Note: Lightroom and Adobe Camera Raw share the same processing engine and although we'll only be discussing Lightroom, nearly everything here also applies to Camera Raw, in terms of data processing.)

The underlying processing engine in Lightroom creates new pixels from the RAW or rendered data, based on a set of metadata instructions you create. In Lightroom, moving sliders, pulling curves,

painting, or cropping doesn't directly alter pixels, as it does in Photoshop. Instead, you're building a set of XMP instructions that tells Lightroom how to generate an image when it's exported to disk, an external editor, or through the additional modules (Slideshow, Print, and Web). All the editing instructions are automatically applied in the optimal processing order from high-bit data to a desired size and color space.



TOTALLY NONDESTRUCTIVE

With a RAW document, the Lightroom rendering process is totally nondestructive, as the RAW is never altered. It's used to render a newly created, RGB, pixel-based document that can then be opened in Photoshop.

On the other hand, Photoshop can only work with rendered pixels that have a previously defined set of numeric values. As you edit these pixels, you're altering their numbers. This is inherently destructive since no matter the bit depth, these documents don't have unlimited values (bits). Each edit applied in Photoshop further degrades this limited number of bits, because of rounding (quantization) errors. Note that editing original documents in high-bit—that is, those having more than 8 bits per color—provides less data loss throughout the editing process. Additionally, adjustment layers allow us to alter these values as often as we like. Only when the image is flattened or printed does this final set of edits affect the original pixel data. Nonetheless, this isn't nondestructive, at least not on the newly edited document.

Even if you're not working with a RAW file in Lightroom—but whenever possible you should—Lightroom converts the original rendered pixels into a high-bit, wide-gamut, linear-encoded "duplicate," then applies the edits to that data, while leaving the original pixel-based document untouched. This isn't truly nondestructive because the newer, edited set of pixels has undergone alteration resulting in some data loss, but far less than doing individual edits in Photoshop.

METADATA EDITING

A metadata editing scheme has some important advantages over a pixel-editing scheme. Consider working on a 16-bit, 12-megapixel camera capture, which is approximately 72 MB in size. You may only wish to rotate the image, or apply an edit, such as removing sensor dust or altering white balance. Photoshop has to open every pixel into memory just to show you how the image appears, let alone apply these edits and resave them to disk. Lightroom, however, works with only a small preview of the image. When you zoom into a part of an image at 100% or higher, it renders more data to screen so you can see what you're working on. For this reason alone, it's much faster to do many kinds of editing in Lightroom versus doing the equivalent in Photoshop. Because you're only building sets of instructions, you have an unlimited set of history states automatically saved in the Develop module that remains accessible after you quit the application. This is not the case with Photoshop.

Another beneficial attribute of metadata editing is the use of virtual copies (Photo>Create Virtual Copy). If you have an original

and want a black-and-white version, another with increased saturation, a third version with some color effect, and all three with a different crop, Photoshop requires three separate 72-MB documents. Using virtual copies in Lightroom, there's only one original and three separate sets of metadata instructions, which is fast, efficient, and saves tremendous disk space, while making the organization of all images much easier.

PRINTING

Let's look at printing and how it differs in both applications.

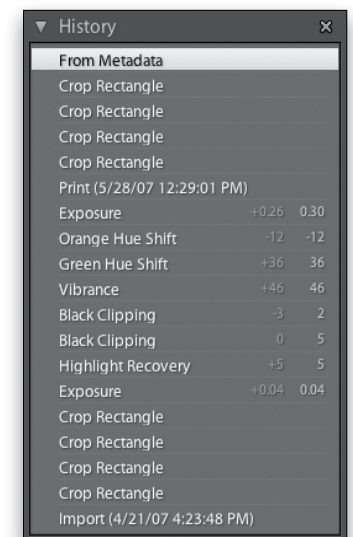
If you want to print the three versions in Photoshop at 11x14" and 8x10", you'll need to render them as separate 72-MB images, open each, size each, and print them one by one. In Lightroom, you simply select the three virtual copies in the Print module then Lightroom gathers the original (RAW) data with the three sets of instructions, and renders the necessary pixels for each version.

If you want to print three 8x10" copies, there's no reason to open each in Photoshop and use the Resize command. Just select the three virtual copies in Lightroom, and in the Layout Engine panel, click Picture Package, then select an 8x10" print template. Lightroom will render the images to that size and send that data to your printer. In version 2, you can even output this as a JPEG by going to the Print Job panel and choosing Print to: JPEG File.

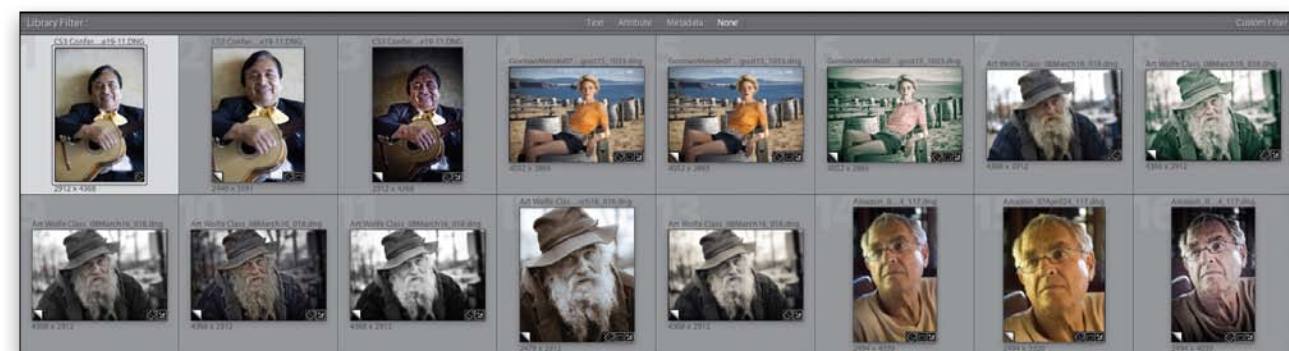
LIGHTROOM IS SO FAST...

Instruction-based editing is fast because it uses what could be called just-in-time (JIT) processing. You can work on one or 100 images in Lightroom, quickly building your metadata instructions, then offset the rendering of the pixels—the time-consuming part of image processing—when you're away from your computer.

You can build as many export presets as you wish to create documents you'll use outside Lightroom. Just go to the Export dialog (File>Export) in version 2, make your selections, and then Lightroom renders the data to the specifications you've applied.



The Develop module's History panel stores every edit ever made to the image.

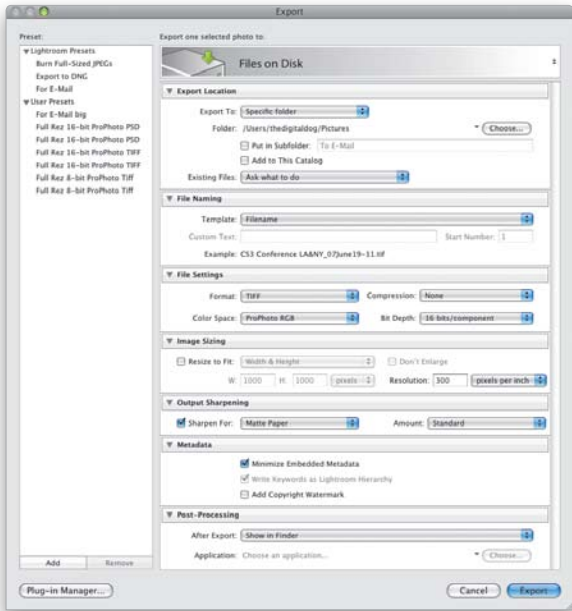


There are only four original images here; the other 12 are virtual copies (indicated by the small page turn).

THE RIGHT TOOL FOR THE RIGHT JOB IN THE RIGHT ORDER

Lightroom is ideally used to render pixels from a RAW capture, so it's important to use its toolset to create an image with the best possible and preferable appearance before opening that image in Photoshop. Why attempt to fix an image in Photoshop when you can accomplish these tasks faster, and nondestructively, using Lightroom?

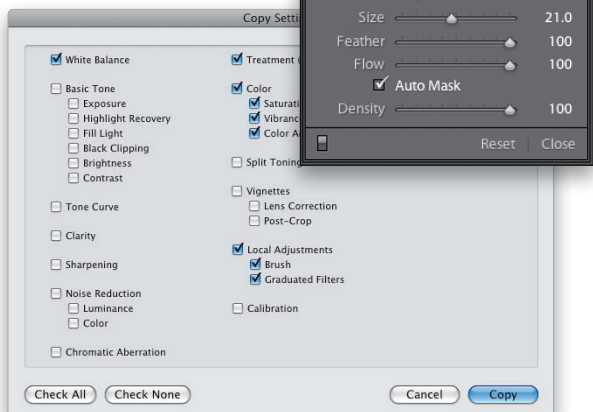
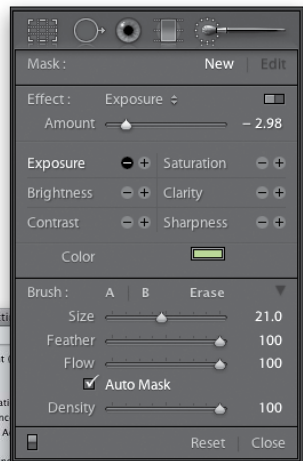
RAW processing is pixel creation, not color correction! Create pixels of the highest quality whenever possible. With the new selective tone and color controls in Lightroom 2, you should be able to reduce virtually all the major correction work you were conducting on rendered pixels in Photoshop. This is what makes shooting RAW and using tools, such as Lightroom, so advantageous over trying to "fix them" later in Photoshop. Use Photoshop for very precise pixel-editing tasks, such as retouching, compositing, accessing layers and blend modes, and for its unique capabilities not available in Lightroom.



New Export dialog in Lightroom 2

You can apply sets of rendering instructions to multiple images via copy-and-paste. Suppose you've been shooting on location and find a dust spot on the sensor—and the 900 images you captured. Imagine opening each image in Photoshop and using the Clone Stamp tool (S) to remove each spot! In the Lightroom Develop module, you can apply the Spot Removal brush (N) to one image, then copy-and-paste that instruction onto the remaining 899 images. In seconds, Lightroom will alter the clone source appropriately for each image to remove the dust. If one or more of the clone edits isn't perfect, it's easy to alter this metadata, as you haven't actually burned the edited cloning on existing pixels, as you would in Photoshop. You can alter this edit at any time without any permanent change or data loss to the original.

In Lightroom 2, we also now have far more selective editing functionality—such as Exposure, Brightness, Contrast, Saturation, Color, Clarity, Sharpness/Blurring, and Gradients—and these newer edits are also available to copy-and-paste across multiple images.



New Local Adjustments can be copied-and-pasted onto other images.



The rendered image (left) has blown-out highlights and nothing in Photoshop will bring back this loss of data. Image captured in the RAW (right) used Lightroom tools to render the data.

With this in mind, it's useful to look differently at pixel rendering in a tool such as Lightroom than you would if you only had Photoshop. For example, I find that many users who approach Lightroom after years of working with Photoshop immediately gravitate to using curves when rendering their images. In Lightroom and Camera Raw, the tools are presented in an idealized editing order: top down, left to right. Curves in both products are seen below other tools that should typically be used first. This explains in part why the main Histogram is plotted differently than the histogram seen inside the Tone Curve panel. Curves are applied to the rendering edits *after* the sliders above it.

While you can work in any order you wish, you'd spend far less time rendering your images if you work with the tools in the "correct" order. You'll find the curves in Lightroom provide very precise fine-tuning control over tonal rendering. If you work with the White Balance and Tone sliders first, you may find you'll rarely need to use the curves.

The point is, Lightroom wasn't designed or built to be Photoshop, so don't expect it to operate like a different tool you may be familiar with. There's a reason Lightroom isn't Photoshop. ■

Andrew Rodney is owner of The Digital Dog (www.digitaldog.net), a digital imaging training and consulting business located in Sante Fe, New Mexico, and a founding member of PixelGenius. He's been a beta site for Photoshop since version 2.5 and is currently an alpha tester for Adobe. Andrew has written for many publications and he's the author of Color Management for Photographers: Hands on Techniques for Photoshop Users (Focal Press). In 2007, Andrew was inducted into the Photoshop Hall of Fame.