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DXO OPTICS PRO 3.5 SPEED AND WORKFLOW

A document discussing processing speed in DxO Optics Pro as well as important enhancements in version 3.5

DxO Optics Pro offers a unique approach to photographers to improve the quality of images produced by digital cameras and their lenses. As such, it works in a way that is different from traditional image editing packages. This has a positive impact on workflow and processing speed that are discussed in this document.

How does DxO Optics Pro approach image enhancement?

DxO Optics Pro software has been designed to **automatically** enhance images in a number of ways:

- Elimination of optical defaults:
 - Distortion,
 - Vignetting,
 - Lens softness,
 - Chromatic aberrations
- Reduction of image noise
- Optimization of exposure & dynamic range
- RAW conversion

DxO Optics Pro brings together in a single application and workflow tasks that are otherwise attempted with a combination of tools and plug-ins. This has several advantages:

- Once the images have been added to the queue and basic parameters set (for example output file type or overall sharpness preference) DxO Optics Pro will process all images without requiring further human intervention. Processing a large batch of images *can* take some time but does not require supervision. This is in contrast with other workflows that require constant user interaction for each processed image to adjust numerous parameters, sliders, options, etc.
- DxO Optics Pro's approach is to take into account all significant parameters to enhance the image. For a complete processing chain, there might be several hundred parameters that are significant. That means that each individual image is processed differently. This is why it would be extremely time consuming to attempt to achieve the same results manually and why it is not possible either to write generic scripts (sequences of steps or macro commands) to achieve the same results.
- Because they are performed together, all DxO operations are optimized relative to each other. For example, DxO Noise Engine and DxO Optics Engine are adjusted so

that image noise reduction and elimination of lens softness produce the best possible results when used simultaneously.

- The various DxO components interact with each other as opposed to working in ignorance – if not in contradiction – of each other as can be the case when assembling distinct tools, plug-ins, etc., into a workflow.
- Because all operations reside in one smooth workflow the number of times files are opened, loaded, saved is minimized saving time and avoiding possible quality erosion problems.

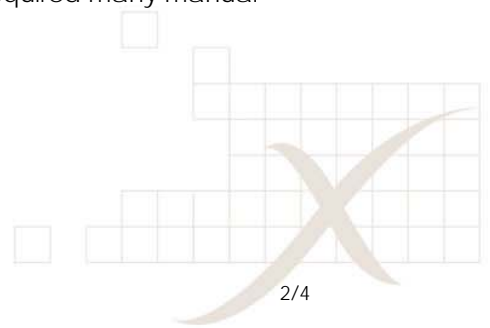
How does processing speed in DxO Optics Pro compare to other applications?

Having said all of the above, it is interesting to compare the processing speed of DxO Optics Pro with other workflows (in as much as a DxO image enhancement can be replicated with other tools). Adobe Photoshop CS2 (with Adobe Camera Raw) and Nikon Capture are two of the more popular workflows with digital photographers and these are the reference points we chose for our test.

We set up the following experiment: processing of a RAW file produced by a 6 Megapixel Nikon D70 Digital DSLR. Processing was performed on a 2.6 Gigahertz Pentium4 PC equipped with 1 Gigabyte of RAM and running Windows XP. The following table shows the results that were measured:

	DxO Optics Pro 3.0		Photoshop CS2 + Adobe Camera Raw 3.1		Nikon Capture 4.3.0	
	Time for settings (seconds)	Processing time (seconds)	Time for settings (seconds)	Processing time (seconds)	Time for settings (seconds)	Processing time (seconds)
Raw Conversion	0	8	0	5	0	8
Lens distortion	0	2	20	4	0	4*
Chromatic aberrations	0	0	20	1	0	6
Vignetting	0	2	5	1	5	3
Exposure Optimization	0	8	20	2	10	8
Lens Softness removal	0	2	15	6	10	2
Noise removal	0	6	25	10	20	40
Total	0	28	105	29	45	71

As can be seen, DxO Optics Pro 3.0 was actually the fastest overall solution. Processing with DxO Optics Pro was carried out in one 28 second cycle, while the other solutions were processed with a lot of smaller “start and stop” operations and required many manual adjustments.



Conclusion: When all factors are considered, DxO Optics Pro is in fact the **quickest** way to achieve optimal results for image enhancement.

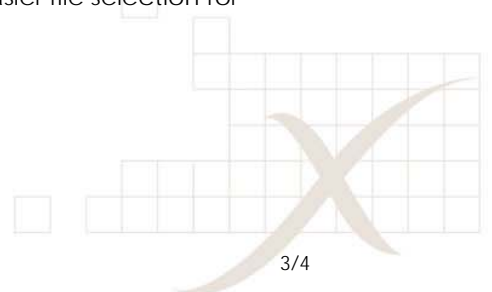
Notes on the test:

- **DxO Optics Pro:** Raw conversion (DxO Raw Engine), distortion, vignetting, chromatic aberration and lens softness correction (DxO Optics Engine) as well as exposure optimization (DxO Lighting) and removal (DxO Noise Engine) processed in full automatic mode. Processing time was just under 30 seconds but required no human intervention (slider adjustments).
- **Adobe Photoshop CS2 + Adobe Camera Raw 3.1:** ACR used for RAW conversion. ACR also used to correct chromatic aberrations and Vignetting which both require manual slider adjustments. To correct distortion at a basic level, the Lens Correction filter was used (manual adjustment required). Lens softness elimination was approximated using the "Smart Sharpen" filter (again manual adjustment required). To remove image noise, the "Reduce Noise" filter was used (again manual adjustment required). Image contrast was enhanced using "Shadow/Highlight" adjustment which again required manual intervention.
- **Nikon Capture 4.3.0:** Nikon Capture was used for RAW conversion, chromatic aberration removal, Vignetting and distortion correction (*only available for Nikkor 10.5mm fisheye lens). Vignetting removal required manual intervention. USM (with manual adjustment) was applied to improve image sharpness. Noise correction and contrast improvement (Nikon DLighting) were applied, both with manual adjustment.
Note : Nikon Capture 4.3.1 was not available at the time of the test

What are the speed enhancements in DxO Optics Pro 3.5 ?

Although we have seen above that DxO Optics Pro is in fact a very efficient solution for image enhancement; when it comes to speed there is no such thing as "too much". DxO Optics Pro 3.5 introduces a number of enhancements to further increase response and processing speed:

- **New multiprocessor workflow capabilities provides up to double processing speed.**
Multiprocessor CPUs have been fairly widely available on the Macintosh platform for some time. With the arrival of dual-core processor based PCs, the Windows world is set to benefit soon from widespread availability of similar functionality.
DxO Optics Pro 3.5 will therefore take advantage of multiprocessor/dual core CPUs to provide faster processing times on both platforms.
Image batch processing, which is the most CPU intensive step of the DxO Optics Pro workflow, can be made up to twice as fast, when executed on dual-core or bi-processors machines.
The CPU load is balanced between available CPU resources, according to user preferences. The batch images and correction settings are analyzed and load balancing is optimized to achieve the fastest performance within the hardware configuration.
- **Image caching to improve "Before/After" comparisons.**
DxO Optics Pro 3.5 also implements an image cache to speed up comparison of unprocessed versus processed images. Prior to version 3.5, the "unprocessed" image is regenerated every time a "Before/After" comparison is requested. In the case of RAW images, this results in a delay before displaying each pair of images. Version 3.5 will pre-calculate these "unprocessed" images and store them in a cache, therefore providing a much improved user experience.
- **User Interface improvements for faster workflow.**
DxO Optics Pro 3.5 also introduces a number of user-interface enhancements to improve workflow and overall ease of use:
 - **Totally redesigned "Add Images" dialog box** improves the way the user can select and open images in DxO Optics Pro. Browsing is much easier and the RAW image thumbnails are displayed. A lot of other useful information is displayed along with usual file properties thus enabling much easier file selection for processing.



- **Smart Filters** to select and sort images in DxO Optics Pro accelerates batch preparation.
- **New Delete image functionality** makes deletion of unwanted files faster.
- **New crop function** removes the need to open another application to crop an image.
- **New workspace.** Thumbnail and preview windows are now available at the same time, providing better and quicker access to the desired image. The images list management has also been greatly improved by adding new sort and display filter options.

With these improvements, DxO Optics Pro 3.5 provides a new level of productivity for photographers using Digital SLRs and who want to get the best from their cameras and lenses.

About DxO Labs and its DxO Technology

DxO Labs is a software company developing image generation and enhancement technologies. We provide reliable off-the-shelf solutions for serious amateurs and professional photographers, photography journalists and experts as well as companies in the imaging business such as digital camera or cameraphone vendors, mobile operators, and printing or photofinishing professionals. The company's patented DxO technologies, the DxO Technology Foundations, are the result of state-of-the-art academic mathematical research. The DxO Technology Foundations comprise a set of software components to generate images or correct major imaging defects, such as color, contrast, blur, various optics faults, JPEG artifacts, etc.

For more information, visit DxO Labs online at www.dxo.com

Press Contact Information

Deborah Gallin
Press and External Relations
DxO Labs (France)
+ 33 6 24 47 45 61 (cell)
pressrelations@dxo.com

Steve Rosenbaum / Leigh Grimm
SI.R. Marketing Communications, Inc. (U.S.A.)
+ 631-757-5665
sir@sironline.com

DxO Labs, S.A. 3, rue Nationale 92100 Boulogne France

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