

# The 2.5GHz Power Mac G5 Quad Creative Workflow Benchmark

## Performance, productivity, and multitasking with the Power Mac G5 and Mac OS X Tiger

### A big step for the Power Mac platform

**The 2.5GHz Power Mac G5 Quad is an important iteration of the Power Mac product line:** While the Macintosh platform has offered dual processor computers for many years, the introduction of professional models offering effectively four central processing units had been eagerly awaited by power users ever since IBM announced a dual-core PowerPC chip.

There is nothing surprising to this: The Macintosh is the platform of choice in many of the most demanding segments of computing, such as digital video, graphic design and publishing, digital photography, as well as professional music production, and Apple's Mac OS X Tiger provides the necessary operating system services to fully exploit every facet of the new architecture.

### Multitasking is moving center stage

A number of key Macintosh applications such as Adobe Photoshop or Final Cut Pro are multiprocessor aware, and will immediately benefit from an increase in available processors. **But beyond multiprocessing, an increasingly important aspect in the modern creative workflow is multitasking.**

The evolution of digital media, the explosion of document sizes, the growing number of files needed to process, as well as the increasing popularity of new file types such as RAW camera files **has resulted not only in the growing need for processing power but in the necessity to accomplish several tasks in parallel.** To take into account this trend, the benchmarks presented here provided particular focus on multitasking in the modern creative workflow (see pages 4 and 5), in addition to an extensive set of performance and productivity measures.

This report provides **key figures and benchmark analysis** from a benchmark project comparing the 2.5GHz Power Mac G5 Quad with two previous generations of Power Mac hardware, the dual processor 1.42GHz Power Mac G4 released in January 2003 and the dual processor 2.7GHz Power Mac G5 released in the spring of 2005. All systems were benchmarked running Mac OS X 10.4 Tiger. All systems were equipped with 4GB of RAM (except for the 1.42GHz Power Mac G4, which accepts a maximum of 2GB of RAM). Please see the "Methodology" sidebar on page 3 for details on the hardware configurations.

Benchmarks conducted include system performance, application performance, and workflow measures. **For a detailed description of the benchmark methodology, benchmark details, and complete results, please download the 2.5GHz Power Mac G5 Quad Benchmark Report at [www.pfeifferreport.com](http://www.pfeifferreport.com).**

### Major Findings

- The 2.5GHz Power Mac G5 Quad shows **significant performance and productivity increases** over older Power Mac models.
- Multitasking and multiprocessing performance of the new 2.5GHz Power Mac G5 Quad is up to **three times faster than previous models.**
- The 2.5GHz Power Mac G5 Quad is **almost up to three times faster than the dual 1.42GHz Power Macintosh G4** performing certain Photoshop functions.
- Spotlight search technology combined with Smart Folders **can help speed up the creative workflow significantly.**

### About Pfeiffer Consulting

- Pfeiffer Consulting is an **independent technology research institute and consulting operation** focused on the needs of publishing, digital content production, and new media professionals.
- Download the complete **2.5GHz Power Mac G5 Quad Benchmark Report** at [www.pfeifferreport.com](http://www.pfeifferreport.com).

**Pfeiffer**  
Consulting  
01001011

# Evolutions of Hardware, Software, and Productivity

## Major Points

- Over the past few years, **hardware requirements for the creative workstation have skyrocketed.**
- The 2.5GHz Power Mac G5 Quad, combined with new features in Mac OS X Tiger, offer **new productivity gains for pro users.**
- The 2.5GHz Power Mac G5 Quad **shows significant productivity and performance increases** over older hardware platforms.
- Multitasking can accelerate overall productivity, **even with applications that do not directly use multiple processors.**

## The continuing race for performance and productivity

The history of computing is an ongoing story of impressive hardware advances on one side, and of software developments that make the fastest-available computer seem slow on the other. Whenever a new generation of personal computers arrives on the market, it seems spectacularly fast, yet almost immediately, more power-hungry software applications challenge the new platform.

**Hardware and software leapfrog each other; in addition, user needs are continually increasing, particularly in the case of creative professionals.** Not only has the size of the files we manipulate skyrocketed, but there seems to be no limitation to the complexity of the typical creative project. Managing the hundreds or thousands of files that we have to deal with creates a significant overhead for the hardware and software we employ. In addition, system software constantly pushes the envelope in terms of functionality—and of course, the hardware requirements to support it.

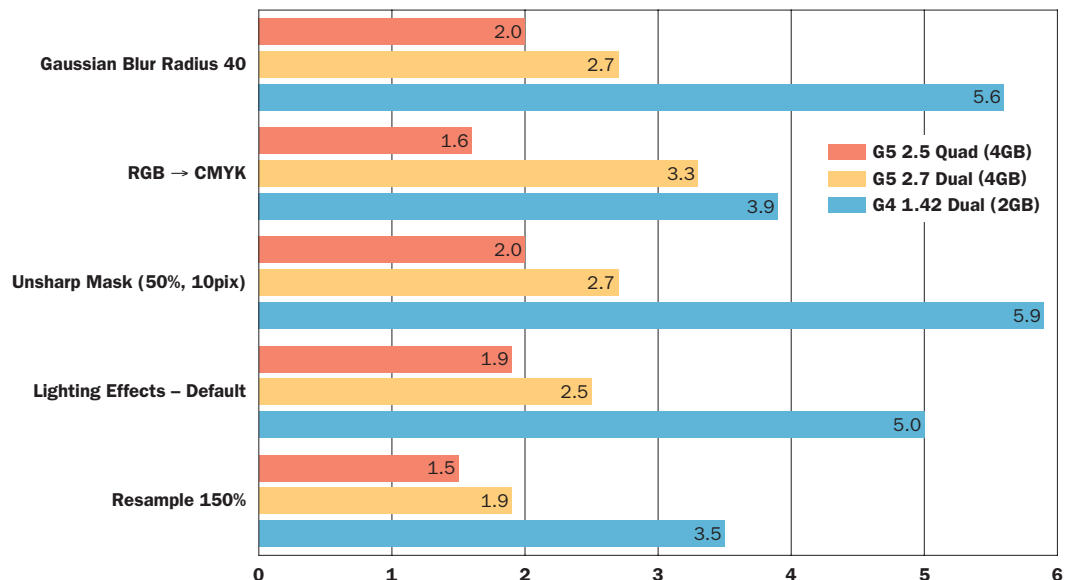
For all these reasons, it is interesting to compare a new hardware platform with previous generations. **Through these comparisons, we can assess how our notions of productivity and performance have evolved**—and how the computing environment lives up to this continually renewed challenge.

## Photoshop Performance: How the 2.5GHz Power Mac G5 Quad Stacks Up

*Adobe Photoshop remains one of the best applications to measure the performance of a workstation, since it draws on all aspects of a hardware platform, using both floating point and integer math, as well as memory and overall hardware throughput.*

*The 2.5GHz Power Mac G5 Quad provides significant performance increases in this respect. The “Unsharp Mask” Filter in Photoshop, for instance, was almost three times faster on the latest Macintosh than on the 1.42GHz Power Mac G4.*

**Photoshop Performance (100MB File)**  
Time scale in seconds. Shorter is better.



## Methodology

- This benchmark project was conducted by Pfeiffer Consulting for Apple Computer. It analyzes the performance and productivity of the **2.5GHz Power Mac G5 Quad** introduced in the fall of 2005, as compared with the **dual 1.42GHz Power Mac G4**, as well as the **dual 2.7GHz Power Mac G5** introduced in the spring of 2005.
- The performance benchmarks included **system performance** as well as **application performance** benchmarks.
- **Productivity benchmarks** were conducted using a set of workflow integration measures, executed with Adobe InDesign CS2, Photoshop CS2, Illustrator CS2, and QuarkXPress 6.5.
- Specific benchmarks were conducted to **compare multitasking performance and productivity**.
- **Benchmarks were conducted on standard hardware configurations.** Both Power Mac G5 computers were equipped with 4GB of RAM. The Power Mac G4 was equipped with 2GB of RAM, the maximum amount of RAM supported by this model.
- All systems were equipped with the **standard hard drives shipped with the computer.** All hard drives were reformatted using a single partition before testing.
- All benchmarks were run on a **standard, unmodified installation of Mac OS X 10.4.2 Tiger.**

For complete results and descriptions of the benchmark methodology, as well as a detailed system configuration, please download the complete benchmark report from <http://www.pfeifferreport.com>.

For more information, please contact [research@pfeifferreport.com](mailto:research@pfeifferreport.com).

This report was created by Pfeiffer Consulting (<http://www.pfeifferconsulting.com>). Charts: Fischer Design. Reproduction prohibited without prior written permission. For further information, please contact [research@pfeifferreport.com](mailto:research@pfeifferreport.com).

Adobe, Illustrator, InDesign, and Photoshop are either registered trademarks or trademarks of Adobe Systems Incorporated in the United States and/or other countries. Apple, the Apple logo, Apple Cinema Display, Finak Cut Pro, iPod, Mac, Macintosh, Mac OS, and Power Mac are trademarks of Apple Computer, Inc., registered in the United States and other countries. Exposé, Finder, Spotlight, and Tiger are trademarks of Apple Computer, Inc. PowerPC is a trademark of International Business Machines Corporation, used under license therefrom. All other trademarks are the property of their respective owners.

## A new platform for creative professionals

In terms of hardware specifications, **the 2.5GHz Power Mac G5 Quad pushes the Macintosh platform to a new level of performance:** With two dual-core processors, equipped with 1MB of L2 cache, the new Power Mac supports up to 16GB of RAM. This hardware platform is clearly highly optimized for high-performance computing, and it significantly outperformed the previous top-of-the-line model in these tests.

**Mac OS X Tiger plays an important part in the performance and productivity provided by the new Power Mac G5.** Without the operating system support for symmetric multiprocessing and preemptive multitasking, it would be impossible to reach the performance levels documented here.

But Tiger also has an important impact in terms of user interface and workflow. In the end, **a technology such as Spotlight can contribute as much to overall productivity increase as faster hardware** (see page 8).

### Analyzing the benchmark results

The 2.5GHz Power Mac G5 Quad shows coherent performance and productivity increases across the board. **Not surprisingly, some of the most impressive figures are linked to Photoshop benchmarks: The latest Power Mac G5 is up to two times faster than the dual processor 2.7GHz Power Mac G5 when performing common Photoshop operations.** Compared with the dual 1.42GHz Power Mac G4, the new Power Mac G5 is more than three times faster in the same benchmarks.

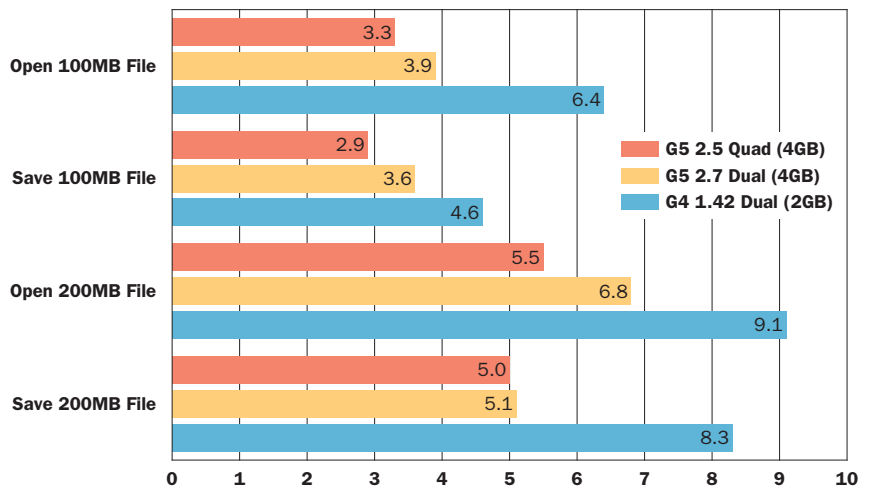
**Even in areas where processor performance has less direct impact, the latest Power Mac G5 shows strong productivity increases.** It is interesting to note that the 2.5GHz Power Mac G5 Quad outperforms the previous model even in system functions that are not automatically enhanced by multiple processors—and despite the fact that the previous Power Mac G5, released just half a year earlier, is slightly faster in terms of individual processor speed, offering 2.7GHz compared with 2.5GHz per processor for the latest model.

Finally, the most important lesson one can take away from the performance and productivity figures of this project is that **multitasking can offer very significant productivity benefits, and is increasingly becoming a major factor of overall productivity in the modern creative workflow.** (See “The Creative Workflow and Real-World Multitasking” on pages 4 and 5.)

## Input/Output: Key Figures

### System Tests 4: File Open/Save (Photoshop)

Time scale in seconds. Shorter is better.



*The 2.5GHz Power Mac G5 Quad provides higher throughput on frequent system operations (such as application-level file open and save operations) than previous Power Mac models.*

# The Creative Workflow and Real-World Multitasking

## Major Points

- New media types, increasing pervasiveness of digital imaging, and an explosion of digital files are **profoundly redefining the requirements of the creative workflow.**
- Processing requirements for creative workstations have skyrocketed, **with an increasing need to process time-consuming tasks in the background** without slowing down foreground applications.
- The new 2.5GHz Power Mac G5 Quad is up to **two to three times faster than previous models** when running multitasking and multiprocessing benchmarks.

## Productivity matrix of a new creative environment

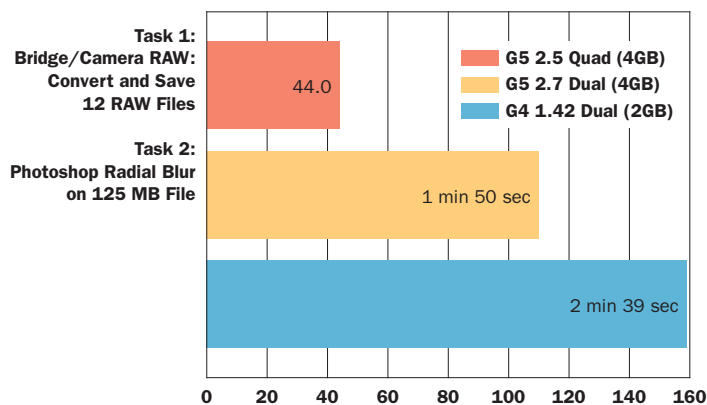
**In the past few years, the creative environment has evolved enormously.** While designers still use key graphics and imaging applications (typically, Adobe Photoshop, Illustrator, or Macromedia FreeHand) to create elements that are then combined in a page layout application for output, **changes in media and technology are increasingly challenging this well-established creative workflow.** Creative projects are becoming increasingly intricate; digital imaging has all but replaced traditional photography in creative workflows. Magazines and agencies now often receive 80 percent or more of their images as digital files; popular new file types such as RAW digital camera files (which encode all the data recorded by the image sensor in “prosumer” and professional digital cameras) **are profoundly changing the processing and workflow needs of creative professionals.**

**Digital photography has multiplied the number of files we are dealing with by at least a factor of five or ten.** Instead of a few dozen pictures for a publication, we now have hundreds or thousands of files that need to be processed, sorted, resampled, and prepared for output. **File sizes have greatly increased, and so has image definition,** with the increasing use of 16-bit files, which preserve more data for future image manipulations.

## Multitasking Benchmarks: Major Results

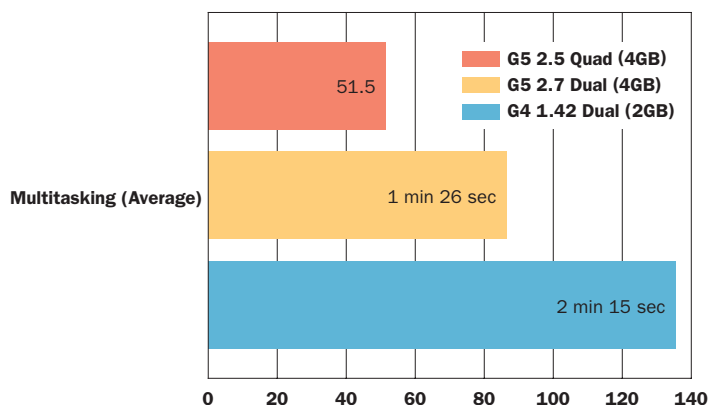
### Multitasking Set 1 (2 Tasks)

Time scale in seconds. Shorter is better.



### Multitasking Performance (Average of All Benchmarks)

Time scale in seconds. Shorter is better.



*The multitasking productivity measures conducted for this benchmark project underline the productivity gains the 2.5GHz Power Mac G5 Quad offers over older multiprocessor Power Macs: in our tests, the new model was 2.5 times faster computing a Photoshop filter while converting RAW files than the*

*2.5GHz Power Mac G5 released in early 2005 (chart on the left).*

*On average, the new Power Mac G5 was more than 60 percent faster than the 2.7GHz Power Mac G5 performing six different multitasking sets of two and three parallel tasks (chart on the right).*

## The necessity of a multitasking workflow

These evolutions have considerably increased the need for a robust multitasking, multiprocessing workflow, capable of handling a variety of processing-intensive tasks in parallel, without slowing down the computing experience for the user. Converting RAW camera files and generating PDF files of a project for client approval, for instance, can take considerable time, and usually can not wait until the computer is not needed for other tasks. **But how well does the computer handle the workload of running several of these tasks in parallel?**

Two components are required for an efficient multitasking workflow: powerful hardware and a mature operating system that can transparently balance the workload to make best use of the available hardware resources. This has been the case in Apple's professional computing environment for several years, but **the 2.5GHz Power Mac G5 Quad announced in October 2005 significantly enhances the level of performance, particularly in terms of multiprocessing and multitasking.**

## Multitasking vs. multiprocessing

Multitasking (the ability to compute several tasks in parallel) and multiprocessing (using several available processors to compute a single, complex task) are both essential to increase the overall productivity in the modern creative workflow, as the benchmarks conducted for this project show.

Offering four processor cores instead of two, **the 2.5GHz Power Mac G5 Quad pushes performance both for individual, multiprocessor-aware applications, as well as for running several tasks in parallel.** Despite the fact that the new model is actually running at a slightly lower clock-speed than the previous high-end model, the new Power Mac could process a Photoshop filter almost twice as fast as the dual 2.7GHz Power Mac G5 in our tests—and more than three times faster than the dual 1.42GHz Power Mac G4.

**Productivity gains in the multitasking measures conducted for this project (see sidebar) show even more impressive peak productivity gains over older systems:** Computing the conversion of several RAW digital camera files in parallel with a Photoshop filter could be completed in 44 seconds on the 2.5GHz Power Mac G5 Quad, while the dual 2.7GHz Power Mac G5 required almost two minutes for the same tasks. The older dual 1.42GHz Power Mac G4 required almost three times longer to complete the same tasks.

## The Multitasking Benchmarks

To measure the productivity impact of multitasking on the real-world creative workflow, **Pfeiffer Consulting defined a set of six specifically conceived multitasking benchmarks.**

First, six frequently encountered, time-consuming tasks of the creative workflow (conversion of a page layout to PDF, backup of a project folder on the Finder level, conversion of RAW image files, and so on) were defined and individually timed.

Using these individual tasks, **six multitasking sets were then defined, combining two (and in one case, three) of the six predefined operations.**

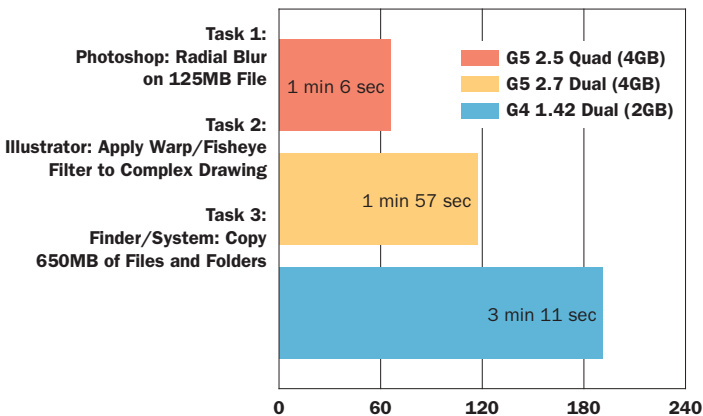
Execution of the benchmarks was performed by triggering the longest operation first, then switching to the second application, and triggering the second task, measuring the total time to complete both operations.

For detailed information on the benchmark methodology, as well as complete results, please download the complete **2.5GHz Power Mac G5 Quad Benchmark Report** at [www.pfeifferreport.com](http://www.pfeifferreport.com).

## Multitasking and Multiprocessing: Key Results

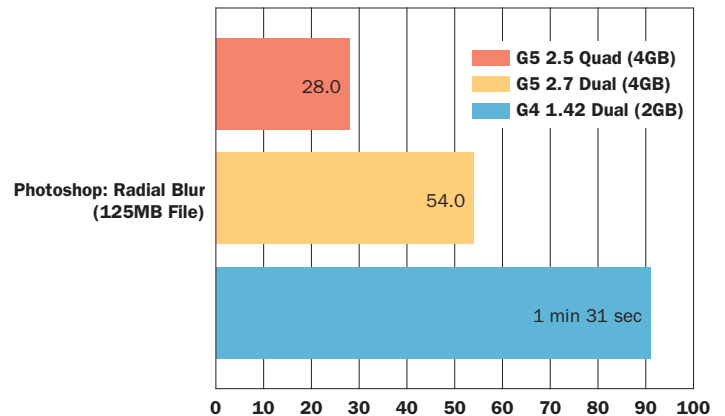
### Multitasking Set 6 (3 Tasks)

Time scale in seconds. Shorter is better.



### Multiprocessing Performance: Photoshop Filter

Time scale in seconds. Shorter is better.



Multitasking and multiprocessing have both become key productivity aspects in the modern creative workflow, and productivity measures clearly show the advances of the 2.5GHz Power Mac G5 Quad over older models. On the left, a multitasking benchmark consisting of three parallel tasks: The new Power Mac

G5 Quad is two and three times faster than the other computers tested. Multiprocessing can offer very significant performance gains as well. The chart on the right shows the times for computing a Radial Blur filter on a 125MB Photoshop file.



# System Performance and Productivity

## Major Points

- **Optimization and intelligent use of a variety of hardware resources is essential** to increase overall productivity and performance of a computing platform.
- The operating system and its support for advanced hardware features is a **key factor for real-world productivity gains**.
- The 2.5GHz Power Mac G5 Quad provides **significant performance and productivity increases** for a wide variety of system tasks.

## The need for a coherent hardware platform

It has been said that the iPod has more computing power than the first Macintosh released in 1984. Whether this is true or not is of little importance; it underlines, however, how the notion of what constitutes a computer has changed, and the extent that the perceived computing experience has evolved over time. The first Macintosh computers were the basis for what we call the creative workflow today. The first DTP projects happened on screens with little more resolution than one of today's high-end cell phones.

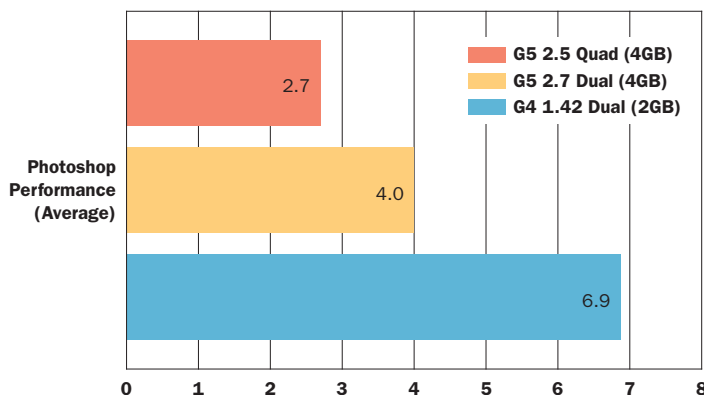
The important point here is that many evolutions take place under the hood. **When a new computer arrives on the market, we tend to focus too much of our attention on the clock frequency of the processor, and we often neglect other aspects**, such as the bandwidth of the system bus, speed of memory, efficiency of multiprocessing support, and so forth.

It is because of optimizations on every level that hardware platforms continue to become increasingly more powerful, even for tasks that are hardly affected by the processing power of the CPU.

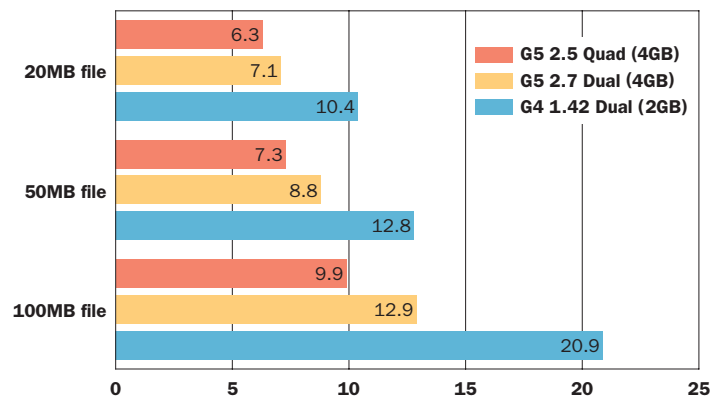
In other words, the real-world computing experience will depend as much on aspects such as network performance, quantity and speed of available RAM, hard drive performance, and even the capacities of the video card.

## Application and Workflow Performance

**Photoshop Performance (Average of All Benchmarks)**  
Time scale in seconds. Shorter is better.



**QuarkXPress-Photoshop Round-trip (Photoshop already launched)**  
Time scale in seconds. Shorter is better.

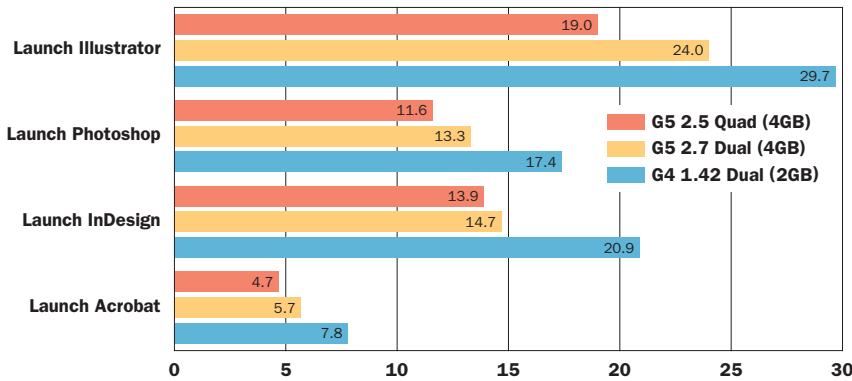


*As a result of an optimized hardware architecture and operating system support, the 2.5GHz Power Mac G5 Quad provides significant performance and productivity increases over older Power Mac models. On average, the latest Power Mac G5 was more than 60 percent faster than the previous model*

*in Photoshop performance benchmarks. Compared with the dual processor 1.42GHz Power Mac G4, the new model was almost three times faster (chart on the left). Workflow productivity of the design environment is also significantly increased (chart on the right).*

### Application Launch

Time scale in seconds. Shorter is better.



Launch times (first launch after system startup) for key applications in the creative workflow.

In the case of the Power Mac G5, the overall system architecture has been fine-tuned over the years, which has led to significant **performance and productivity differences between the latest 2.5GHz Power Mac G5 Quad and older systems.**

### The importance of the operating system

Last but not least, **the operating system is of crucial importance in the overall productivity we can expect from a computing platform.** Much more than we realize, we rely on the operating system to make good use of available hardware resources. Popular Mac OS X features such as Exposé or Widgets (introduced with Tiger) make sense only if they are instantaneous—and that is possible not just because of a speedy processor, but also because of a clever use of the processing power on modern video cards.

Multiprocessing is another good example: With Mac OS 9, dual processors were useful only for a handful of applications specifically adapted to use multiple processors. Mac OS X, on the other hand, offers symmetric multiprocessing: **The operating system automatically spreads the processing load over the available hardware.** This feature can mean significant productivity benefits, even for mundane tasks such as converting RAW digital camera files, which is almost two times faster on the 2.5GHz Power Mac G5 Quad (see chart below).

## Workstation Graphics

While the Macintosh has always been a very powerful graphics platform, it has so far been lacking support for workstation-level graphics cards essential in professional 3D production. This situation is about to change, however.

The 2.5GHz Power Mac G5 Quad offers as a build-to-order option the NVIDIA Quadro FX 4500 graphics card, providing 512MB of GDDR3 SDRAM and supporting two 30-inch Apple Cinema Displays as well as stereo visualization.

**The most important aspect, though, will be support of professional 3D modelling and rendering applications.** So far, Alias has announced that it will provide support for the NVIDIA Quadro FX 4500 in Maya, increasing the credibility of the Power Mac G5 as a professional 3D production platform. Other applications are likely to follow.

## The Impact of the Hardware Platform

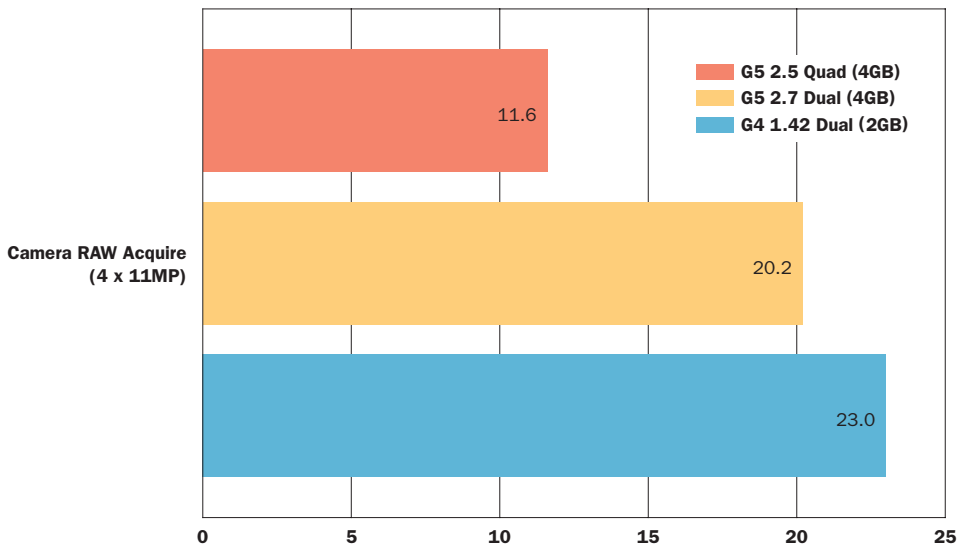
Processing RAW files from digital cameras requires significant computing resources, since images need to be converted to standard file formats before they can be edited in Photoshop or placed in a page layout.

This chart shows the time necessary to convert four 11-megapixel RAW files using Adobe Camera Raw. Interestingly the process takes almost as long on the dual processor 2.7GHz Power Mac G5 as on the dual processor 1.42GHz Power Mac G4.

The new 2.5GHz Power Mac G5 Quad, on the other hand, is almost two times faster than the previous Power Mac G5, underlining the real-world productivity gains that the new multiprocessor architecture can provide.

### Photoshop Performance (Acquisition of RAW Digital Camera Files)

Time scale in seconds. Shorter is better.



# How Spotlight Can Change Your Way of Working

## Major Points

- Mac OS X Tiger includes Spotlight technology, which can help **speed up the creative workflow** by providing fast access to files, independently of their location in the folder structure of the file system.
- Smart Folders can provide **a simple way to access files when working in a team** and for limiting file display to relevant documents in a project.
- Programs that support drag and drop from the Finder can use Smart Folders and Spotlight **to quickly integrate documents stored in different places** into a project file.

## Finding things is only the beginning...

When Apple launched Tiger, analysts immediately pointed out that Spotlight search technology was a significant improvement over previously available search functionality in Mac OS and other operating systems. **What was only rarely noted, however, was the fact that Spotlight could significantly change our way of working, whether on our own or within a team.**

Most creative projects consist of dozens (if not hundreds) of different files, usually organized by folders. Navigating the file system to locate a required document can slow down productivity, especially when working in a team.

It takes very little effort to create a Smart Folder that will use Spotlight to always present an updated list of very specific files—independently of their location within the file system's folder structure.

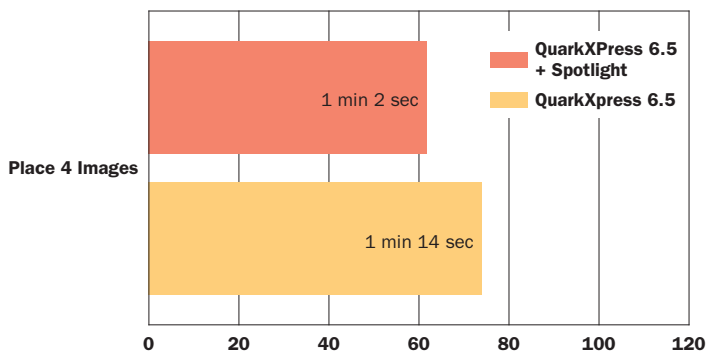
Such a Smart Folder could automatically search for all Photoshop, Illustrator, or PDF files created in the preceding week, or could look only for files that contain a certain project or client code used by all members of a team.

**Setting up such a search takes only a few moments, and Smart Folders can be programmed to show up in the sidebar of any "Open..." dialog box.** When using applications that support drag and drop from the Finder, such as the Adobe Creative Suite, a designer can drag files directly from the Smart Folder to his or her page layout document—a considerable time gain (see sidebar).

## The Impact of Spotlight on Workflow Productivity

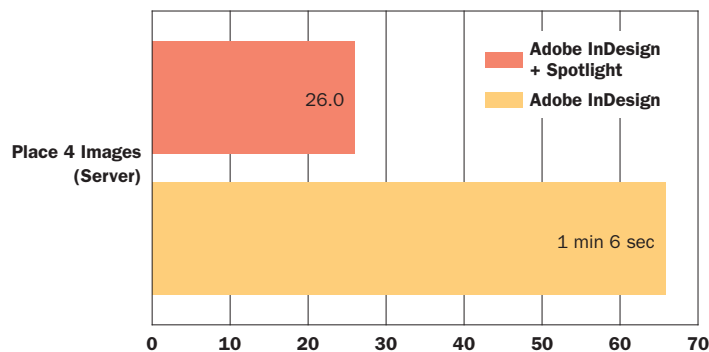
### QuarkXPress

Time scale in seconds. Shorter is better.



### Adobe InDesign

Time scale in seconds. Shorter is better.



*Real-world productivity measures underline the productivity gains that can be obtained by using Spotlight and Smart Folders in a workflow setup. For this test, a Smart Folder was set up to find any file that contained a project-identification code and had been created in the previous week. The chart on*

*the left shows the time necessary to access files in a variety of folders in four individual operations.*

*The chart on the right shows the time necessary to access the files from different server locations through drag and drop from the Smart Folder.*