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HP's Digital Workbench

Become a digital da Vinci using HP's digital tools.

By Robert Green, *Cadalyst* Contributing Expert

In the days of Leonardo da Vinci, inventors and architects had all the tools of the design trade available at their workbenches. Books, drafting boards with parchment, straight edges, quills, and clay models combined to form the design workbench of the Renaissance. Today's engineers and architects can perform their design tasks with a diverse collection of software, hardware, and Internet tools that form a *digital workbench* of tools.

So what will the digital workbench mean for engineers and architects? If used optimally, the digital workbench will allow them to examine more design iterations without building models, to analyze designs in software rather than via destructive testing, to eliminate interferences in software rather than in the field, and to share their designs with other team members via application sharing. And as they pursue these design-changing practices, the digital workbench will allow them to do so in a single computing environment using a palette of tools specific to the engineer's or architect's needs.

Unlike da Vinci's primitive design tools, today's digital workbench can be configured to enhance our productivity levels. From customizing software to tuning workstation performance to creating step-saving shortcuts using programmable input devices, the digital workbench is an adaptable work environment that adapts to its users, rather than the users adapting to it.

Workbench Components

So what types of tools will you need on your workbench to become a digital da Vinci? The answer to that question will vary based upon the software you use, but a digital workbench should include the following items to achieve maximum design effectiveness.

A powerful workstation. Without the computing firepower to run your design software at a maximum speed, your efficiency will be compromised as you wait for processes to run and lose the ability to run several complex tasks concurrently. With the new Intel Xeon 5500 Series multiple-core processors*, engineers and architects have access to higher processor speeds using Turbo Boost Technology and high-speed memory architectures that accelerate 2D and 3D CAD applications substantially compared with prior generation processors.

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Personalized Services

3D design and analysis software. With the type of workstation hardware available today, there's no reason to restrict your design to 2D CAD anymore. Up your design game by capturing your designs in powerful 3D design packages such as Inventor, SolidWorks, or NX and then analyze your design for thermal and mechanical loads using analysis packages such as ANSYS or Algor. Use these powerful software tools to hone and improve your designs while they are still easy to manipulate CAD files rather than as expensive prototypes.

Powerful, accurate color graphics. Because CAD software ultimately has to display 2D and 3D images, the graphics card and display monitor are keys to achieving accurate depictions of your designs. With DreamColor displays, the colors on screen are the same as the colors you'll see with DreamColor-capable output devices and, more importantly, the colors your clients see when the real project is completed. This is what DreamColor calibration and use of color standards provides — what you see on the screen is what you get.

The HP Z400 (left), Z600 (center), and Z800 (right) combined with DreamColor monitors provide industry-leading processing power and photorealistic color output so engineers and architects can speed through designs and review 3D models with accuracy.

A programmable 3D input device. If you use 3D design software, you've likely experienced some frustration when using a mouse to navigate through the complex zooming, panning, and rotation functions required to visualize models. A multiple-axis controller such as the 3Dconnexion SpacePilot (see figure below) not only allows direct zooming, panning, and rotation of 3D geometry but also provides the ability to program macro strings and shortcuts to speed the use of your design and simulation software.

The 3Dconnexion SpacePilot is a notepad-size input device with three-axis, joystick-style control for viewing and six programmable buttons for software applications to store user productivity macros.

***Cadalyst* Product of the Year: HP xw4600**

All-Star awards honor the best of the best — the most outstanding among all hardware and software products that earned Highly Recommended ratings from *Cadalyst* Labs over the past year. **The editors' pick for 2008 for hardware is the HP xw4600 and LP3065 30" LCD workstation/ display combo** ($3,775).

The HP xw4600 workstation is based on a proprietary Foxconn motherboard that uses the Intel X38 Express chipset; the system *Cadalyst* tested had an Intel Core 2 Duo E6850 processor rated at 3.0 GHz with a front-side bus speed of 1,333 MHz. In June, reviewer Ron LaFon found the LP3065 30" LCD monitor to be "both pleasing and very useful" and judged the pricing, performance, and overall quality of the combo system to be ideal for a broad range of work.

Remote graphics software. Rather than loading CAD data into ZIP archives, e-mailing, and waiting for remote team members to unzip your files, simply share desktops via the Internet using HP's fast remote graphics software (RGS). HP's proprietary RGS compression maintains full-screen resolution and real-time speed over modest Internet bandwidth connections while saving you all the drudgery of file sharing.

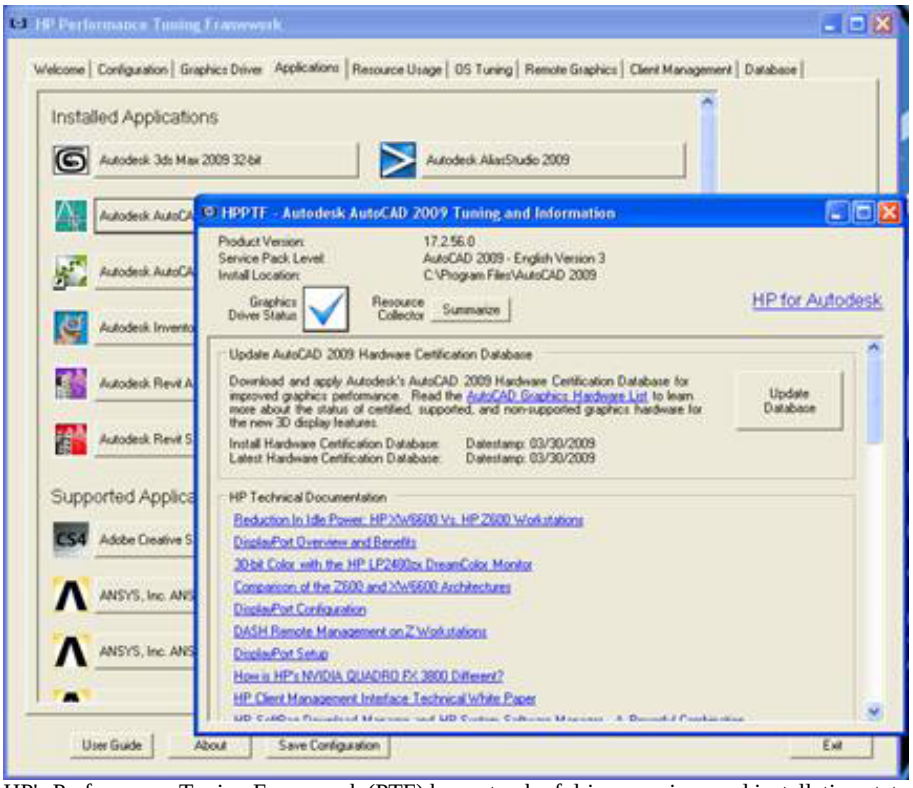
Large-format output device. Large-format DreamColor output devices (see photos below) provide all the functionality of conventional plotters with the added capabilities of printing large, true-color output for realistic depictions of your designs.

The HP Z2100 44 (left) and Z2100 24 (right) offer 44-inch and 24-inch width support, respectively, and DreamColor support for tasks ranging from small-format check prints to large-size, full-color graphics.

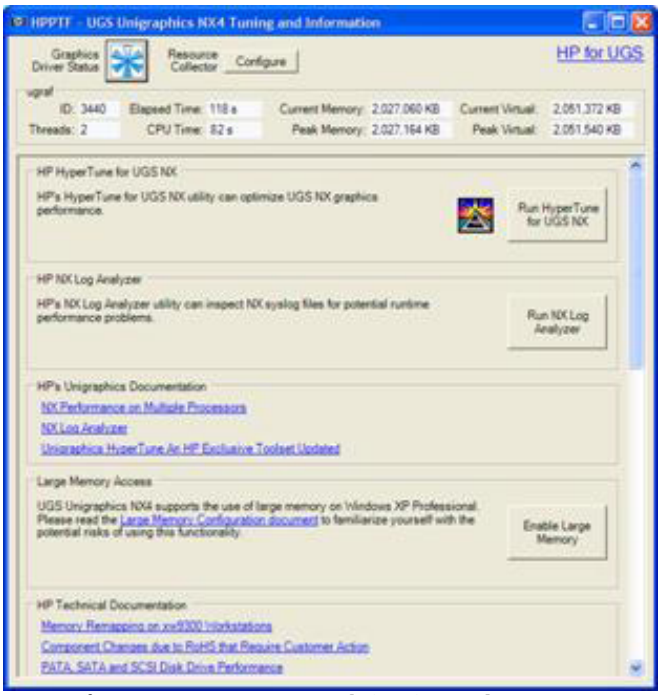
Postpurchase Productivity

When the components of your workbench are in place, it's time to tailor the workstation to your liking. The concept of postpurchase tuning to achieve greater productivity, or postpurchase productivity for short, is that you should be able to adapt and adjust your computing environment to suit how you work rather than to passively accept how the workstation and components behave.

HP's Performance Tuning Framework (PTF, see figures below) greatly simplifies the task of managing your workstation productivity. It has many features, but let's just look at one — optimizing your application settings. The diagram below shows AutoCAD and how you can load the optimum settings into your system in just the right locations with a single click. No extra work. As improvements are made over time, you simply go back and click again. PTF also has suggested settings for the operating system, and a memory management tool that is simple to use and a critical must-have for anyone still using 32-bit systems.



HP's Performance Tuning Framework (PTF) keeps track of driver versions and installation status so you don't have to.



HP's Performance Tuning Framework (PTF) provides a Hyper Tune analyzer for each supported CAD application. By running the analyzer (at right, middle of screen), memory use and processor affinity can be set to allocate workstation resources to an application as desired.

Combine performance tuning with software shortcuts on your 3Dconnexion SpacePilot controller and you'll reduce the amount of time you spend inputting commands and the time you spend waiting for the computer to process — a double dose of productivity.

How It Pays for Itself

Engineers and architects will have the chance to work with the digital workbench only if the companies they work for see a positive value in equipping them with these tools. And because these tools cost money, companies rightly will want a justification before purchasing them.

The simplest way to justify the digital workbench analogy is to use these tried-and-true equations:

Time = Money

Productivity = Competitiveness

The table below demonstrates how even a small daily time savings can add up to big dollars throughout the course of a year. Depending on how many years you keep your digital tools in service, it's clear that the digital workbench can more than pay for itself in simple time savings. And because it doesn't even consider the savings due to fewer design errors in this computation, it actually is a conservative way to justify digital workbench tools.

		Labor Rate ($/hr)					
		25	35	45	55	65	75
Time Saved (min/day)	5	500	700	900	1100	1300	1500
	10	1000	1400	1800	2200	2600	3000
	15	1500	2100	2700	3300	3900	4500
	20	2000	2800	3600	4400	5200	6000
	25	2500	3500	4500	5500	6500	7500
	30	3000	4200	5400	6600	7800	9000
	45	4500	6300	8100	9900	11700	13500
	60	6000	8400	10800	13200	15600	18000

By using an optimally configured digital desktop, you can achieve time savings every day. To find out how many dollars per year you can save, simply intersect your time saved per day and your approximate labor rate.

Wrapping Up

As software and workstation tools become more powerful and change the way engineers and architects design, it's up to us to make sure we use these tools to their fullest potentials. By viewing all the tools available to you as part of your digital workbench and optimizing your workbench to serve your specific needs, you'll produce better designs in shorter timeframes and lower design costs. In today's challenging economic climate, it will be the companies that design better, work faster, and lower their costs that will survive while others fail.

I have to believe that if Leonardo da Vinci were alive today, he'd have the most sophisticated tools he could get in a highly customized digital workbench configuration to help him design and innovate. Given the tools available, shouldn't we all become digital da Vincis?

About the Author

Robert Green
Robert provides CAD implementation, consulting and programming services for a variety of companies throughout the United States and Canada. He holds a degree in mechanical engineering from the Georgia Institute of Technology and is the author of *Expert CAD Management: The Complete Guide.* Reach him via his web site at www.cad-manager.com.

* Intel's numbering is not a measurement of higher performance. Dual Core/Triple Core/Quad Core is a new technology designed to improve performance of certain software products. Not all customers or software applications will necessarily benefit from use of this technology.

** Prices available at HP Direct and participating resellers and are subject to change without notice.

*** For hard drives, TB = 1 trillion bytes. Actual formatted capacity is less. Up to 8GB (for XP and XP Pro) and 12GB (for Vista) of system disk is reserved for system recovery software.

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