

Benchmark Testing & the Need for Speed

HP Z600 Workstation Speeds up Toolpath Calculations

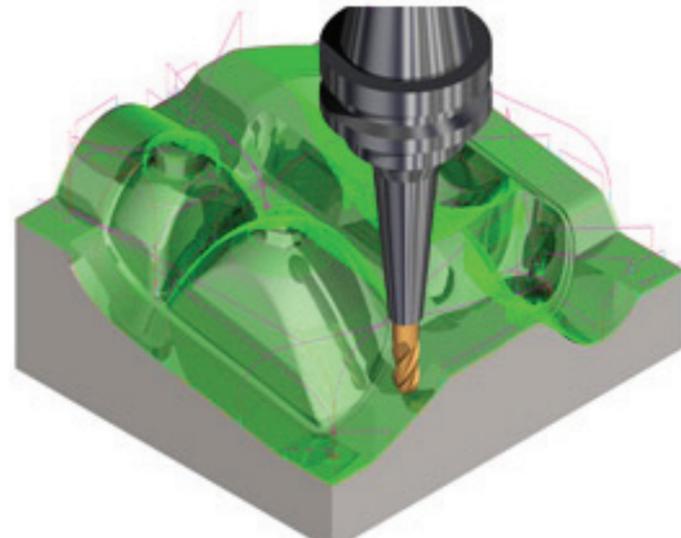
By David Heller

The need for speed is especially relevant when it comes to manufacturing where time to market is critical and the need to save time during the

process can make or break a company. That's why Mark Forth, CAM Project Manager for Delcam has focused his efforts refining Delcam's latest PowerMILL 10 software to take advantage of multi-threaded processing. More processes running in parallel reduces processing time during number crunching toolpath calculations. Mark heads up Delcam's effort to include a number of sequential background-computing operations to speed things up. But, without the best and fastest workstation he wasn't able to realize the full potential of his efforts

Delcam's software is used to translate a mechanical drawing into commands that control a milling machine. It calculates the optimal configuration that the machine's tool head uses to zip across and cut into the surface of bare metal to fashion a finished product. In short, it calculates and delivers toolpath commands that guide the milling machine's operation.

Before the advent of multi-threaded computing, these complex calculations could take days, or even weeks to complete on a single workstation.



Headlamp Toolpath

But now, with chip-set advances made by Intel and AMD in collaboration with major workstation manufacturers, the time to completion has been cut to hours, and in many cases these calculations are completed in minutes.

Mark recently wrote that parallel processing using PowerMILL 10 would perform best on a Quad Core workstation. However, he concluded that there was little benefit above 4 cores. The white paper also mentions that PM10 would perform better if all the processors were on the same chip and shared a common cache. I was anxious to benchmark the HP Z600 because it's an 8 core machine (dual quad core) powered by the latest Intel® Xeon® 5500 chipset, where all its processors are on the same chip and share a common cache. I wanted to see if Mark's hypotheses of 'little benefit above 4 cores' would hold water when I ran standardized tests on the Z-600.

(Read Mark's Parallel Processing white paper, written prior to HP Z600 testing.)

Before I performed the tests I made an educated guess that the results would show that the 8 core HP Z600 mid range workstation would perform better than Mark had anticipated. HP and Intel had worked closely together to tune Intel's Xeon® 5500 series processors into HP's Z architecture workstations, and the new processors boast integrated memory controllers with three DDR3 native channels for enhanced performance. And, when you add Intel's scalable shared memory QuickPath® architecture that includes high speed point-to-point interconnect, you get an additional performance jump of more than 2X compared to the front side bus architecture of Intel's previous 5400 series of processors.

The Intel® Xeon® 5550 processor used in HP's Z600 workstation also includes new Turbo Boost technology that ratchets up

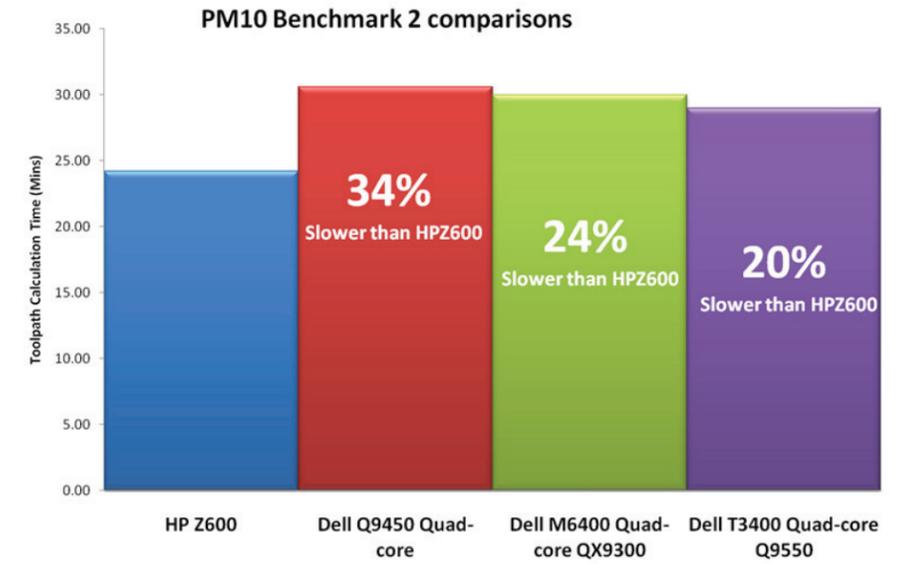
performance by as much as 400MHz for applications that aren't designed to take advantage of all the available computing power. This innovation is measurably effective for lightly threaded applications and since part of PowerMILL 10's speed enhancement comes from sequential background processing I felt that we'd see improvements in this area and in overall performance.

While Turbo Boost assists in the background, the new Intel chipset's hyper threading technology enables highly threaded applications, like PowerMILL 10, to run much faster because every core enables 2 processing threads. So, for an 8 core solution 16 processor threads are instantiated to deliver a quantum leap in the final performance numbers. In general, the HP Z600 workstation exhibits a whopping overall performance improvement of 180%; 2.8 time faster than previous HP workstation models.

Comparative benchmark results

The bottom-line results of our PM10 benchmark comparative tests, which do not take into consideration the additional productivity of using background processing while calculating, editing, or preparing tool paths, show that the HP Z600 is approximately 20% faster than Dell's fastest workstation - the Dell T3400 Quad Core Q9550.

In addition to testing Delcam's PM 10 software, Mark also wanted to see how their previous PowerMILL 9 (PM 9) software would perform. He sent me both the PM9 and PM10 software, and two multi-axis toolpath standardized tests so we could fairly compare how much time each process would take after running both tests on both versions of PowerMILL across multiple processor configurations on the HP Z600.



HP's Z600 Gets the Job Done 20% Faster

You can download detailed result data for all tests on both PM 10 and PM 9 on all computers as an Excel Spreadsheet from <http://www.MCADCafe.com/benchmarks/powermill-Z600.xls>.

About the Z600 Workstation

This midrange workstation's brushed aluminum housing and sleek exterior design scream power and innovation. And, because it's been designed with integral carrying handles and has a small footprint I easily carried it with one hand to our lab where I did the Delcam toolpath testing. I was taken aback when I pulled the side latch and opened the anodized aluminum case to peek inside my evaluation Z600. No screws, no cables, and a modular design reminiscent of an aircraft's serviceable electronics bay.

Visual clues and green touch points on each module intuitively allowed me to remove, replace, and upgrade the workstation's major serviceable components. For example, I could easily upgrade the power supply by replacing the power supply module, add RAM or swap out a traditional hard drive with a solid state one without getting tangled up in a mess of wires and connectors.

The Z600' custom tuned chip set, and the finely tuned I.O's measurably speed-up performance to get the job done in record time.



Below is a screen shot of the Z600 workstation's configuration I used to perform the benchmark testing with:



Need for Speed Satisfied

If you have a need for speed, and want to lop hours off your next multi-threaded computational tasks whether they include rendering, toolpath calculation, or heavy duty number crunching the HP Z600 will certainly fill the bill. And if you need to reduce your time and cost even more I'd recommend that you check out HP's top of the line Z800 workstations. Whatever your decision, you'll be able to configure your new workstation to make quick work of your compute intensive tasks, and you'll get your project finished or your product to market faster and more efficiently.

About Delcam (<http://www.delcam.com>)

Delcam is one of the world's leading suppliers of advanced CAD/CAM solutions for manufacturing industry. Delcam's range of design, manufacturing and inspection software provides complete, automated CAD/CAM solutions that take complex-shaped products from concept to reality. Delcam is now the largest developer of product design and manufacturing software in the UK, with subsidiaries in North America, Europe and Asia. Delcam's software is used by more than 30,000 organizations in over 80 countries.



By David Heller

David Heller has written more than twelve technical and fiction books published by Addison-Wesely, Simon & Schuster, Prentice-Hall, McGraw Hill, and more.

He is a technical writer and professional columnist, and has devoted the past twenty-two years to Internet business focusing on MCAD/CAM, EDA, Architecture and Geo-spatial Information Systems.



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