

VODAFONE McLAREN MERCEDES HITS THE TRACK FASTER WITH LENOVO.

ThinkStation



From notebooks to workstations and design office to pit wall, it is Lenovo technology as far as the eye can see as one of the world's leading performance racing teams replaces its IT infrastructure with the leading PC supplier's hardware.

I heard an interesting quote once, it went something like this: "A Formula One™ car takes 12 months to design; it just so happens that half way through the design cycle the new season starts. This isn't bad scheduling, this is just how the industry works."

One look at how the cars evolve throughout the season and you can see why this is true. Cars never race in the same configuration twice. Damper settings, gear ratios, weight distribution and more are all changed for each circuit, even if there are no technical upgrades to the car, all in the pursuit of trimming a few hundredths of a second off lap times. Tiny design changes can have a massive impact on performance; and for this reason, the design department in any Formula One™ team is vitally important. It is here that little miracles occur, the ones that result in podiums, champagne and silverware.

In December 2008, Vodafone McLaren Mercedes and Lenovo announced a partnership that would see Lenovo providing the Formula One™ team with the hardware (notebooks, desktops, workstations, etc.) necessary to address the team's mission-critical computing requirements, from the drawing office at the beginning of the design process to the pit walls on race day.

For one person, Alan Duerden, a Lead Systems Engineer at the McLaren Groups immensely impressive McLaren Technology Centre just south of London, life would become very interesting over the next 12 months. His job is to support 120 CAD/design engineers within McLaren Racing – one of the many McLaren Group companies located at the state-of-the-art facility in the Surrey countryside.

"The big thing from the CAD perspective is that we had gone as far as we could performance wise, with our UNIX workstations." Duerden tells us. "It's not that they are bad, after all we did win the Drivers' World Championship title using this hardware, it was just the realisation that modern computing architectures could offer us so much more. Modern 64-bit architectures allow us to use much more RAM in a computer and we quickly realised that we could make a significant step change if we were to adopt contemporary technology."

As well as the predicted performance gains, Vodafone McLaren Mercedes had another reason to justify the migration of its CAD hardware over to Lenovo. Dassault Systèmes, creator of CATIA, the design software used by Vodafone McLaren Mercedes, will be withdrawing its support of the Unix version of its PDM system, VPM. "This was a big issue for us," Duerden explains. "We could have moved onto IBM AIX machines, which are more likely to be supported, but we thought 'what's the point', especially when you consider that CATIA is now being written natively for the workstation and new and eminently capable workstation technology was available." It is fair to say that the

concept of a partnership with Lenovo landed at just the right time. Indeed the decision was made to eventually convert the company's entire computing infrastructure over to Lenovo, with the mission-critical elements coming first.

In the design office Vodafone McLaren Mercedes opted for a standard configuration across 123 brand new Lenovo ThinkStation™ S20 workstations. The configuration comprises an Intel® W3570 processor, 8 GB of RAM, 250 GB hard disk drives running 64-bit Windows® XP. "One of the advantages of the standardised build," Duerden explains, "is that we only needed one image and from a maintenance perspective a single build is a lot easier to manage."



It rapidly became apparent to the engineers at Vodafone McLaren Mercedes just how powerful their new workstations were. Simulations performed in MIDAS, the simulation software used by the team, now take on average, just 70% of the time they used to take on the previous PC's. And this figure is expected to get even better as the power on tap from quad-core processors is further harnessed. From the CAD angle, the most demanding operations were the processor-intensive drawing and model updates and it was here that the Lenovo ThinkStation workstations would really show their capabilities.

"As you can imagine, a lot of our work revolves around carbon fibre – from cutting the initial shapes all the way through the final layup and autoclave work," Duerden continues. "For the chassis bonding and machining, we use seven A0 drawings, all of which contain an incredible amount of detail. To change a single chamfer is easy on screen, but to then transfer this change so that it is reflected in all of the primary assembly drawings used to take a long time; however, using the Lenovo ThinkStation, this is now down to 25% of what it used to be. The old joke about going to get a coffee while a drawing updates is now no longer valid. It's that quick.

"We are also automating as many of our design processes as possible. Carbon fibre components are made up of many different individual pieces of composite material of varying shapes and sizes. To aid the manufacture of the components, a 'laminating manual' (also known as a plybook) is generated showing step by step instructions of how the pieces of composite material should be positioned. These laminating manuals typically contain 80 A3 sheets and we generate 500 to 600 of them a year. The Ultra 45 workstations used to take over 11 minutes to generate these and they were the only machines capable of doing it; our other workstations just did not have the power. Our new Lenovo ThinkStation S20 workstations do it in less than three minutes. That's a saving of 80 hours in total.

"Another processor-intensive task is parametric updating," Duerden continues. "This is where changes in base model drawings and components are then reflected in all subsequent and connected assembly drawings. We are now able to perform a CATIA update in less than 40% of the time it would take us on the Ultra workstations. And considering we release over 25,000 drawings every year, the accumulated time savings are immense."

Many of the engineers need to work remotely, either at home in the evening or out at the tracks when testing and racing, so part of the total Lenovo package was the provision of 80 ThinkPad W500 mobile workstations. According to Duerden, the ThinkPad notebooks were extremely good when compared to the UNIX workstations: "We were very surprised about how



good they were." To back this up, performance data suggests that the ThinkPad mobile workstations were either at par or better than the UNIX workstations – halving the time to perform CATIA updates in some instances.

Another advantage of the migration away from the UNIX system is the single user interface for the engineers. As they now work on one unified platform they have access to CAD, e-mail and office functionality on one screen. There is also no need for special in-house developed programmes to cater to some of the multi-platform issues faced by the design office. With one single computing infrastructure from Lenovo, this issue no longer exists. Engineers can sit at their workstations with new, 24" monitors knowing that everything they need is available on the one platform and, for many, two screens.

"As part of the business-case justification for the switchover, we estimated that we would see a productivity increase of around 2.0%," Duerden explains. "In the short time that the Lenovo equipment has been running, we have come to realise that we may have massively underestimated this, in fact a figure ten times that might be a little nearer the mark in certain cases."

The powerful processing capability now at the fingertips of the Vodafone McLaren Mercedes engineers is just part of the story. As well as state-of-the-art components and impressive performance figures, Lenovo's environmental mandate, coupled with the energy-saving capabilities of its hardware, exhibited a lot of synergy with that of Vodafone McLaren Mercedes and indeed Formula One™ in general, which has been carbon neutral since 1997. A typical Ultra 45





workstation consumes 1kW and, in the words of some users, does not sleep very well, or at least particularly efficiently. The Lenovo ThinkStation S20 on the other hand, consumes just 78W in normal operation and a diminutive 7.8W in S3 sleep mode.

These enhanced energy capabilities have given Vodafone McLaren Mercedes two avenues for saving money. On the first hand, the less electricity consumed the lower the energy bill – by some £50,000 per year. Second, due to the cooler operating temperatures, less heat is generated and less demand is placed on the air conditioning systems – resulting in further energy savings. These savings merge very neatly into the McLaren Group's environmental strategy, which addresses the reduction of carbon emissions; the foundations of which were established with the innovative design of the McLaren Technology Centre, which itself incorporates a number of intelligent solutions employed by the McLaren Group to save energy and reduce impact on the environment.

Duerden is also extremely happy with the way the switchover took place. 123 ThinkStation workstations, 80 ThinkPad W500 mobile workstations and 200 ThinkVision monitors were put in place ahead of schedule – nine days instead of the budgeted 15 – and, thanks to the support of Lenovo's Daniel Kiernan and the Lenovo Services team, the deployment, roll out and migration were almost seamless. "Lenovo is always on the other end of the phone," Duerden concludes. "The support from the team has been superb. I work with many suppliers and I have jumped through so many hoops, often just to get a simple question answered. Lenovo is saving us days in processing time and, unlike some companies, it is not swallowing up these savings by making me wait for answers. A two or three day wait is not acceptable in our business – I much prefer the approach of two to three minutes."

THE VIEW FROM THE TOP.

Ian Robinson, McLaren Group IS Director, explains the impact of the Lenovo partnership and his opinions of the first stage of the switchover.

To date, Lenovo equipment is now in position in the race team and the design offices and is on the desks of key personnel and executives – Lenovo now has a very high-profile position within the McLaren Group. What is more, any new hardware installation due to upgrades or new positions will benefit from the Lenovo hardware.

"Overall, it has been tremendous," Robinson effuses. "The effort that has gone into this switchover to Lenovo surprised many of us. Getting that level of stock in such a short time, all in to one place was a real logistical effort, I was really impressed.

"The good news is that we have also had a very positive reaction from the design office. Everyone was looking forward to getting the new equipment and anyone who now has the new kit has certainly not been disappointed," he continues. "Many have dual screens, something they have wanted for a while and the single working environment is already beginning to show its advantages."

Commenting on the install phase of the project, Robinson is just as generous with his plaudits: "The migration went on without a hitch. The Lenovo teams were on-site with their back-up machines but they were not needed. I would go as far to say as this is a lesson on how to do a migration properly. Any problems could have caused some serious headaches but the planning was faultless and in the end, none of the contingencies both parties had in place had to be called upon.

"I will admit that past experience did bestow an element of nervousness," Robinson explains. "The racing group has very short lead times so any significant downtime would have caused immense problems. Thankfully, the lack of problems, the ahead of schedule install and the subsequent performance gains have left no doubt in my mind that we made the right decision. I was so impressed with the team spirit; on the day it was very hard to tell who was from McLaren and who was from Lenovo. Partnerships with this sort of relationship don't come along very often, so when they do, you know you are on to a good thing."





THE PORTFOLIO THAT PARTNERS THE VODAFONE McLAREN MERCEDES TEAM.

MISSION CONTROL – using ThinkVision L201p 20" monitors, combination with ThinkPad T400 notebooks and ThinkPad W500 mobile workstations with docking stations

DESIGN OFFICE – using ThinkStation S20 professional workstations or ThinkPad W500 mobile workstations and docking stations with ThinkVision L2440x 24" LED backlit monitors

VEHICLE DYNAMICS – using ThinkStation S20 professional workstations and ThinkPad T400 notebooks with dual ThinkVision L2240p 22" LED backlit monitors

SYSTEMS ENGINEERING – using ThinkStation S20 professional workstations and ThinkPad T400 notebooks with dual ThinkVision L2240p 22" LED backlit monitors

COMPUTATIONAL FLUID DYNAMICS (CFD) TEAM – using ThinkPad W500 notebooks and ThinkVision L2440x 24" LED backlit monitors

WINDTUNNEL – using ThinkStation D20 professional workstations

INSPECTION DEPARTMENT – using ThinkStation S20 professional workstations with ThinkVision L2240p 22" and L2440x 24" LED backlit monitors

COMPOSITES DEPARTMENT – using ThinkPad T400 notebooks and L2240p 22" LED backlit monitors

ON THE TRACK – using ThinkPad T400 notebooks, ThinkPad W500 mobile workstations and ThinkPad X301 notebooks



Mark Fletcher is a UK-based freelance technical writer with many years of experience as both an engineering design journalist and PR to a host of leading blue-chip international engineering clients. He is also the editor of www.MCADOnline.com, a website devoted to keeping design engineers up to date with the latest CAD news, views and reviews. He can be contacted at mark@technical-lucidity.co.uk

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