

Case study

Mobility and speed underpin Shell Eco-marathon success



HP ElitePads and printers streamline data collection and distribution

Industry

Technology/Education

Objective

Enable technicians to upload, access and share data in real-time from across each race side

Approach

Worked with HP, the official technology partner, to determine the most appropriate hardware and support

IT matters

- Interacts with HP cloud and data analysis solutions to collect, upload and distribute event information in real-time from across each site
- Uses extension jacket for extended battery life and multiple peripheral connectivity
- Delivers high quality, environmentally friendly print that's in line with the event's whole ethos

Business matters

- Provides support for technical teams to increase the overall efficiency of each event
- Improves the experience and enjoyment for competitors, trackside visitors and online fans
- Enables Shell Eco-marathon to fulfil its original technical vision and to encourage technical innovation

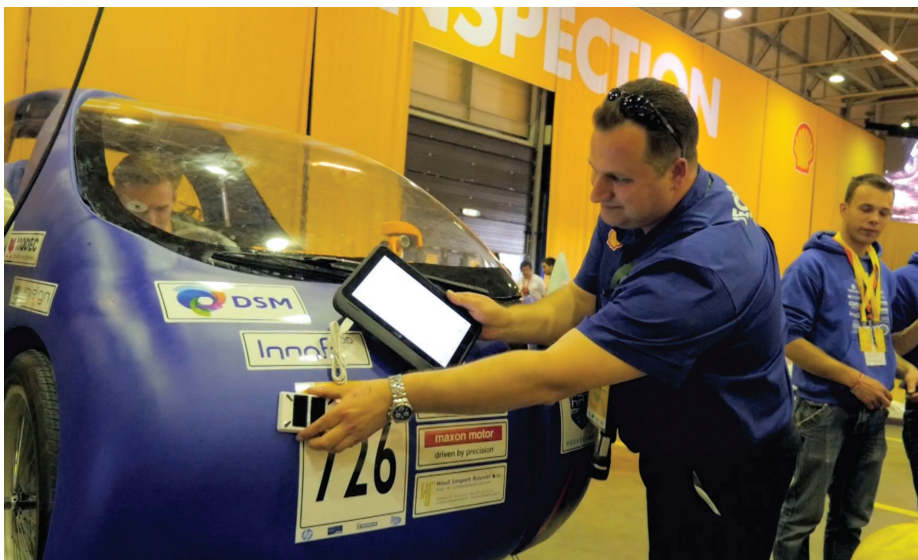


“HP equipment has allowed us to completely fulfil the technical vision for the event that we had three years ago. We can run the complete Shell Eco-marathon wirelessly and our users can do their job comfortably using the HP hardware. Thanks to HP technology, the information is then beamed seamlessly out to the rest of the planet without any interaction from users.”

– Oliver Hitchcock, senior technical expert, Shell Eco-marathon

HP equipment provides vital support

Shell Eco-marathon is a global series of events for design and engineering students, focused on automotive and energy innovation. Success at each event depends on the capture and distribution of huge amounts of data and HP tablets and printers deliver the key functionality to achieve this.



Challenge

Efficient data collection

In 1939 a group of Shell Oil employees in the USA made a friendly wager over who could travel furthest on the same amount of fuel. Now, the concept behind that old bet has been used for the Shell Eco-marathon, an annual design and engineering competition which challenges student teams from around the world to design, build and test ultra-energy-efficient vehicles.

The contest aims to inspire the engineers of the future and if improved results are anything to go by, it's a resounding success. In 1985, the winning team managed to travel 690km on a litre of fuel while the 2014 winning team from St Joseph La Joliverie, Nantes, managed an amazing 3,300km. The Shell Eco-marathon's success can also be measured by its popularity with over 3,000 students in 400 teams taking part in the 2014 season. Up to 50,000 spectators turn up at each of the three events held at tracks in Manila, Houston and Rotterdam and thousands more supporters want to follow online.

Huge amounts of data are generated at each event with the help of 300 staff including 75 technical inspectors. The first two days are taken up with a 10-step scrutineering stage of both vehicles and drivers with over 100 technical details input into checklists. Then even more data comes from the testing and live track performances. Both supporters and competitors are hungry to see all the latest competition details but in the early years organisers had difficulty capturing and publishing it quickly. Sixty people were there to collect the data but there were just two people, each with a laptop, to do all data capture and input.

“Due to the relatively user-centric desktop/laptop layout of the network it was not feasible to integrate the technical inspection process or driver safety briefings within the software infrastructure,” says Oliver Hitchcock, senior technical expert for Shell Eco-marathon. “It was difficult to produce any kinds of statistics on the presence of teams or their passage through technical inspections or driver briefings. In 2011 we began using a set of tablets produced by another supplier but our overall experience with the use and performance of their platform was particularly negative during the 2011 and 2013 seasons.”

A better solution was needed and it came when HP agreed to become an official global partner of Shell Eco-marathon 2014.

Solution

Real-time wireless connectivity

Thanks, in part, to the problems experienced with the previous tablets, the organisers were able to provide HP with a clear specification of what they wanted and a central component for the success of the 2014 event was a collection of HP EliteBook 840 and 850 Notebook PCs, ElitePad 900 and EliteBook 900 Revolve Tablet PCs. HP also provided print-power with HP Officejet Pro X and Officejet Enterprise X printers.

The ElitePads and EliteBooks are used by the technical team for multiple data entry and review roles. These include student registration and the technical inspection which includes over 100 safety and technical points that have to be verified on each vehicle and for each driver before teams can go on the track. Data logged onto the tablets also includes pre and post-race energy system measurements and final race result calculations.



The tablets provide a vital link with the HP server infrastructure that synchronises data across all hardware and with the cloud server for syndication with Internet and mobile platforms.

There are many reasons why the HP mobile computers are ideal for an event such as Shell Eco-marathon. The ElitePads are equipped with HP expansion jackets which extend their battery life to over ten hours and also provide additional USB ports. These ports are used for a number of peripherals used at the events including web cameras and Near Field Communication (NFC) readers. All vehicles are fitted with NFC tags and drivers have NFC bracelets, and the readers track their locations and presence for safety purposes.

Each tablet is also supplied with a docking station to swiftly upload information to the central servers using HP HAVEn, a platform comprised of software, services and hardware which is designed to collect both structured and unstructured data from many sources then analyse it.

The docks also provide convenient battery charging and the flexibility to switch to a cabled LAN if a particular event site makes the use of Wi-Fi difficult or impossible. All the tablets and laptops run Windows® 8.1 with standard drivers and the Shell Eco-marathon's technical team removed a number of Windows services and applications to further improve performance. The team's bespoke software, network synchronisation and infrastructure monitoring tools all run on each device.

Benefits

Versatile functionality

“The HP ElitePads have a number of performance advantages when compared with other tablets we tested,” adds Hitchcock. “Their superior connectivity allows us to conduct the event wirelessly, as designed. The wireless cards in the previous machines we used from another supplier were unable to cope with the intense communications loading which meant we had to change to a cabled network.

“The longer battery life, with the extensions jackets, allows us to almost complete an entire event day of 10 to 14 hours without recharging and the HP tablets are lighter with more reactive touch screens than the previous hardware we used.

Using NFC has also increased the efficiency of the events as Hitchcock explains: “During the 2012 and 2013 seasons we experimented with the use of optical barcode readers for the rapid identification of team members, vehicles and transponders. We found that the performance of barcode readers didn't adapt well to the frenetic environment and they were also unwieldy and difficult to manipulate in certain circumstances. For the 2014 season we decided to test the use of NFC - a decision that was partially driven by the presence of NFC readers in each of the HP ElitePad tablets.

“Equipping all drivers with NFC bracelets and placing NFC tags on all participating vehicles means we have greatly reduced the scan times and the small readers are far less cumbersome. All technical team software users are also authenticated using NFC badges.

Customer solution at a glance

Hardware

- HP EliteBook 840 Notebook PC
- HP EliteBook 850 Notebook PC
- HP ElitePad 900 Tablet PC
- HP EliteBook Revolve 810 Tablet PC
- HP Officejet Pro X Printers
- HP Enterprise X Printers

“Our ability to run the event over a completely wireless network, thanks to the use of ElitePads, means that all event data is available almost instantly across the entire event network and via the cloud. The use of NFC has greatly accelerated the process of driver briefings and getting the teams in and out of the technical garage and race areas. In addition, the increased battery life allows the technical team to free resources that would otherwise have been responsible for recharging and distribution of tablets.”

Having test results readily available to print off and review enables students to work on improvements to their vehicles. Also, using the rugged HP equipment at track-side to collect results, fuel levels and transponder data in real-time and then upload it means that rankings and results are quickly available.

HP Officejet Pro X and Enterprise X printers were particularly suited to the Shell event because of their professional-quality, low cost per page printing, speed and their ability to cope with large print jobs. With their eco-friendly design, the HP machines are also in tune with the whole innovative concept of the Shell Eco-marathon.

Tests have shown that they use 50 per cent less energy and generate 80 per cent less supplies waste than competing machines and their versatile functionality allows such things as automatic two-side printing to reduce paper usage. Breakthrough HP PageWide Technology means the HP Officejet Pro X Series printers and MFPs deliver up to twice the speed at half the printing cost compared with colour laser printers.

One popular use for the HP printers was the use of a wide-format model to generate full colour prints of each team as a memento of the event. These were a huge hit with teams, organisers and volunteers.

“The HP wide-format printers were impressive, not only for the quality and size of the prints but also because, in many cases, this was the first time that participants had come into contact with printers of this size,” adds Hitchcock.

Shell Eco-marathon technical director, Norman Koch concludes: “HP technology is central to the success of the event. HP Officejet Pro and Enterprise printers enable us to print results quickly and clearly and HP ElitePads allow our technicians to access and upload data in real-time from anywhere on site.”

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