



# HOW ASTON MARTIN RED BULL RACING DESIGNS TO WIN

## Industry

Formula One Racing

## Objective

A Formula One aerodynamics team is slowed down by the need to use two different workstations, each with a separate OS in CFD.

## Approach

Aston Martin Red Bull Racing decided to work with HPE and Citrix on a joint hyperconverged virtualized solution, which enables users to operate between two OSs on a single machine.

## IT matters

- Manipulate simulation outputs as well as the pre- and post-processing
- Drag and drop data between the two virtual desktops
- Increase responsiveness and flexibility
- Simplify management

## Business matters

- Improve productivity
- Work more efficiently
- Accelerate speed of decision-making
- Reduce management overhead



**Aston Martin Red Bull Racing designers improved their productivity by leveraging an innovative, high-performing, and easy-to-use virtualization solution from HPE and Citrix®—avoiding the inefficient requirement to run two separate workstations in the process of optimizing its car for each race.**

**Aston Martin Red Bull Racing is a Formula One racing team based in the UK. To be competitive, the team optimizes its car for every race. This results in over 30,000 design changes a year. To deliver so many design updates quickly and accurately to the car each season, the team's aerodynamics engineers use computational fluid dynamics (CFDs) to simulate airflow over the car. This acts as a virtual wind tunnel, enabling new designs to be tested and improved before going into production.**



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**“BY ENABLING OUR AERODYNAMICISTS TO USE A UNIFIED WORKSPACE TO SUPPORT THE DESIGN PROCESSES, THEY NOW HAVE THE ABILITY TO WORK FASTER AND PRODUCE MORE DESIGN ITERATIONS. THIS RESULTS IN A MORE OPTIMIZED DESIGN FOR EACH CIRCUIT AND BETTER RESULTS ON TRACK.”**

– Matt Sorrell, principal aerodynamicist at Aston Martin Red Bull Racing.

**Aston Martin Red Bull Racing designers improved their productivity by leveraging an innovative, high-performing, and easy-to-use virtualization solution from HPE and Citrix.**



### **THE CHALLENGE: EFFICIENTLY HANDLING FAST AND FREQUENT DESIGN CHANGES**

Putting CFD to work in Formula One racing takes diverse compute and storage. The team's CFD process is complex. It requires hundreds of steps that cross between applications on Linux® and Microsoft Windows operating systems (OSs). As a result of this split between applications, the aerodynamics engineers required two workstations on their desks, each running its own OS.

This was a highly inefficient approach. It meant manually porting data from one workstation to another. Two workstations translated into a design process that was slower than it needed to be. The setup was also cumbersome to maintain. Adding to the challenge, the input and outputs to CFD 3D modeling are very graphic intensive. The workstations for such workloads have to be extremely high powered, with high-spec GPUs.

### **THE SOLUTION: HYPERCONVERGED, HIGH-END VIRTUALIZATION FROM HPE AND CITRIX**

Aston Martin Red Bull Racing decided to work with HPE and Citrix to address the need to provision two high-spec

workstations to each Aerodynamics Engineer. The first step was to offer a Citrix Workspace™ with Linux VDA for the engineering team. This allowed users to avoid having two physical machines running separate OSs to execute the full CFD process.

The Citrix Workspace, which includes virtual apps and desktop services, is hosted on HPE SimpliVity 380. The solution's hyperconverged architecture enables the team to have a high-performance platform to deliver high-end, virtualized Linux workstations powered by Citrix. A single workstation can now run both the Windows- and Linux-based applications needed for CFD.

The team's aerodynamics engineers now use Citrix Virtual Apps and Desktops along with the Citrix Linux Virtual Desktop Agent (VDA) with HDX 3D capabilities. With these new tools, they can now manipulate the simulation outputs as well as the pre- and post-processing of the CFD simulation in an interactive 3D environment.

The pre-processing tasks (complex 3D geometry) and post-process analysis (video and complex 3D geometry) are now rendered and edited within the same Citrix Workspace solution, rather than using a separate physical machine. End users can drag and drop data between the two virtual desktops to support their CFD workflows.



## Case study

Aston Martin Red Bull Racing

## Industry

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### Customer at a glance

Aston Martin Red Bull Racing is a Formula One racing team based in the UK. Aston Martin Red Bull Racing depends on IT to deliver high performance for everything from its business processes to vehicle design to on-site track support on race days.

#### Solution

- Citrix Workspace with Linux VDA hosted on HPE SimpliVity 380

#### Hardware

- HPE SimpliVity 380

#### Software

- Citrix Linux Virtual Desktop Agent (VDA) with HDX 3D capabilities
- Citrix Virtual Apps and Desktops

### BENEFITS: COMPETITIVENESS THROUGH DESIGN ITERATIONS

Aston Martin Red Bull Racing is now gaining the benefits of having a joint solution from HPE SimpliVity and Citrix working together. Engineers can work more efficiently without the sub-optimal arrangement of manually toggling between two physical workstations. They no longer need KVM switches at their desks. Instead, they can do the CFD work on an existing user laptop that runs the Citrix Workspace app.

By leveraging HPE SimpliVity and Citrix Virtual Apps and Desktops, Aston Martin Red Bull Racing's aerodynamics engineers gain added agility. The work goes faster. They can react quickly to requests for increased compute resources in the HPE SimpliVity virtualized environment powered by Citrix.

No workload is limited, as was the case in the earlier double workstation environment. By running CFD workloads directly in the data center, the engineers benefit from improved response and rendering times, as well as better overall graphical visibility.

As Matt Sorrell, principal aerodynamicist at Aston Martin Red Bull Racing, explained, "By enabling our aerodynamicists to use a unified workspace to support the design processes, they now have the ability to work faster and produce more design iterations. This results in a more optimized design for each circuit and better results on track."

The IT infrastructure team benefits from removing physical workstations and KVM switches from desks. They no longer have to support these demanding machines. This reduces management overhead and ensures that the aerodynamics engineers have the data they need. In addition, IT can quickly snapshot, clone, backup, and recover end-user workloads from the virtual machines (VMs). Deduplication means the organization's high-end Linux workloads with CFD use HPE SimpliVity storage more efficiently. They now reduce costs by leveraging compute-only nodes.

### CONCLUSION

Formula One racing is competitive in the extreme. Winning requires gaining every possible advantage, including race-specific design modifications. To make this happen, Aston Martin Red Bull Racing needs to perform numerous CFD processes. Their previous approach, which required two separate workstations, was not efficient. A joint solution from Citrix and HPE makes it possible for the team to run CFD operations faster on a single workstation that utilizes a virtualized solution. By leveraging the joint solution, Aston Martin Red Bull Racing can iterate their design innovations quickly enough to become more competitive.

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