

## Need to test a jet engine without destroying it? Try HPC

Powered by DXC Technology and Dell Technologies, HPC managed services enable novel simulations to solve aerospace and engineering challenges



### Business needs

DXC Technology leverages HPC in novel ways. HPC's modeling and simulation capabilities are ideal for high stakes, highly sophisticated aerospace and engineering applications. To answer that need, DXC Technology provides a hybrid infrastructure HPC, delivered as-a-service with tailored configurations and services built around each specific customer's needs.

#### Solutions at a glance

- HPC and AI as a Service
- HPC solutions built on Dell Technologies

Customer profile



HPC in aerospace, automotive, engineering | Worldwide



“HPC is like a highly tuned Formula One racecar. DXC Technology is like the pit crew for HPC built on Dell Technologies infrastructure. We help ensure success by tailoring the architecture and providing proven, experienced support based on customer needs.”

**Andrew Cusick**

HPC Managed Services, DXC Technology

### Business results

- Accelerate engineering innovations and solve complex design and validation challenges in high-stakes industries
- Provide access to HPC via a managed services model to reduce budgetary requirements
- Customize HPC architecture to specific use case applications to meet regulatory and/or security requirements
- Achieve 24x7 HPC operation to maximize benefits of modeling and simulations
- Replace multi-million dollar physical tests with HPC tests, which deliver faster results and allow more testing at much lower costs

A collaboration between DXC Technology and Dell Technologies is facilitating breakthroughs in HPC (high performance computing). Through a novel, proprietary “bricks” model, underpinned by Dell Technologies infrastructure, DXC Technology provides HPC managed services along with deep expertise to help solve aerospace and engineering’s most difficult issues.

Through DXC Technology, HPC modeling and simulations help engineers address the two primary challenges of finite element analysis (FEA) and computational fluid dynamics (CFD). The outcomes are significant. For example, HPC enables hundreds and hundreds of highly advanced jet engine simulations, or tests, without destroying a single [\\$10-40 million](#) jet engine. The results are highly accurate, extremely detailed and deliver extraordinary levels of sophistication. These HPC results are used to validate designs, provide proof of performance and pursue regulatory certifications.

Built on over 60 years of innovation, DXC Technology has an impressive global reach, supporting 240+ Fortune 500 customers in 70+ countries with 130,000+ employees. Leveraging its Dell Technologies’ partnership, DXC Technology employs several HPC clusters in customizable configurations, which are frequently updated to sustain state-of-the-art HPC capabilities. The latest infrastructure upgrade was deployed using Dell Technologies.

## Providing next-level simulations and modeling

To validate designs based on billions of research dollars, the automotive and aerospace industries rely on HPC modeling and simulations in the areas of FEA and CFD. For example, in the automotive industry, FEA is used to analyze how vehicles deform in car accidents so that designs can improve vehicle performance during a range of conditions. HPC-powered CFD is typically used for wing-lift calculations in the aerospace industry, enabling extraordinary levels of sophistication to be integrated into jet engine designs.

HPC modeling and simulations have evolved to remarkable levels of accuracy and detail due to the speed and volume of simulations that can be conducted. Today, HPC simulations are so good, that they are replacing physical tests in automotive and jet engine testing. To illustrate, consider the jet engine bird strike test. Aircraft engines must be built to withstand bird strikes within certain operating parameters to enable a safe emergency landing if needed. HPC simulations can extensively test an engine’s ability

to withstand a bird strike – before a live physical test is needed. These simulations reveal exactly how a jet engine is going to perform under stress conditions.

“Our HPC services help sophisticated jet engine manufacturers design better products, which in turn boost consumer safety. Next-generation engines will likely require much less physical testing due to the accuracy and validity of simulation data, which is now suitable proof of performance. So much so, that today, simulation data is used for regulatory certifications,” says Andrew Cusick, HPC Managed Services, DXC Technology.

## HPC is like a Formula One racecar

DXC Technology uses the metaphor that HPC is like a Formula One racecar, tuned to the utmost degree. In this metaphor, DXC Technology is the “pit crew,” providing service for incredibly high-powered HPC clusters. A pit crew is needed to fully and properly leverage HPC because it requires specialized skills. In addition, the architecture and physical build of HPC infrastructure and configurations are crucially important for optimized HPC performance. DXC Technology is adept at providing this full suite of capabilities to customers, most notably in high-stakes industries.

As a special type of IT, HPC also needs to be approached in novel ways. DXC Technology, using infrastructure from Dell Technologies, does exactly that. Historically, the lack of robust HPC expertise has been a single point of failure in the industry. To ensure success, DXC Technology has assembled a rich pool of expert resources with deep HPC skills to support customers. In addition, DXC Technology has developed an internal automation and tool kit that runs with HPC, allowing for the tailored integration of multiple platforms (e.g., on prem, cloud, hybrid), architectures and infrastructures. Lastly, DXC Technology’s proprietary Bricks model facilitates a comprehensive approach to tailor full customer support in the deployment of HPC.

The result? Providing customers with high levels of performance and availability while working with them to develop an HPC strategy.

## HPC success in Aerospace

One of DXC Technology’s HPC customers, a world leader in the design, manufacture and service of gas turbine engines. The customer wanted to scale efficiently and turned to DXC Technology for help in developing a

strategy for the deployment of HPC.

DXC Technology's proprietary HPC managed services model, called the Bricks model, is a customized construct that weaves together modular services (e.g., infrastructure, solution design, HPC functional support, security and application management). Using the Bricks model, an HPC strategy and solution were built entirely around the customer's specific needs. HPC infrastructure is a major CapEx investment that requires frequent updating and a large amount of physical space. By turning CapEx into OpEx, DXC Technology was able to provide a financially feasible solution via managed services.

Today, several hundred engineers are doing CFD and FEA simulations on their HPC clusters to continuously improve and validate new jet engine designs. HPC is available and operational 24x7 to maximize the benefits to the customer. When additional capacity is required, it is supported via the hybrid model put in place by DXC Technology. As shown in Figure 1, the hybrid HPC model integrates dedicated facilities, on demand capacity, and multi-cloud environments to provide flexible computing resources when needed.

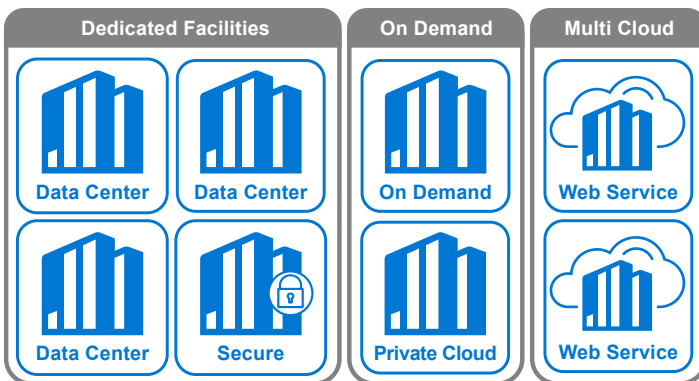


Figure 1: Hybrid HPC model

## DXC Technology + Dell Technologies

The partnership between DXC Technology and Dell Technologies catalyzes a rich approach to HPC. The underlying principle of “composable HPC” where HPC jobs are aligned with the proper architecture and supported with a breadth of HPC-skilled resources provides a unique advantage for HPC users.

For example, in aerospace applications, regulatory compliance is very stringent. The HPC infrastructure itself must be authorized; any change in the base configuration will invalidate the results. In another example, one customer has jobs that span jet engines, nuclear submarines, and defense base systems, each of which has a different security requirement. Therefore the jobs must be properly partitioned within the HPC architecture. This is where the power of DXC Technology and Dell Technologies is most evident. The two companies align to evaluate and bring together the right HPC architecture at the right price point for customers.

“The alignment of Dell Technologies and DXC Technology is transforming HPC use cases and outcomes in some of the most stringent, high-stakes industries in the world. Enabling better design of jet engines, automotive developments, and defense systems through HPC is something we take great pride in doing. Having Dell Technologies as our ally creates next-level possibilities for HPC, our customers and people around the world” shared Cusack.

