



Stretching the Boundaries of Computing

Technology Design for Non-Traditional Environments

Our world relies on computation that is increasingly moving outside typical office environments to virtually anywhere humans can go. Complex settings call for innovative designed solutions.

The evolution of computing

It wasn't long ago that computers took up entire rooms, tabulating quantities of data that had become too large for humans to manage in a reasonable amount of time. As humble machines evolved into today's modern computers, iterative innovation moved the technology through various environments. The one constant throughout rapid innovation is that the computer could count on being in a stable environment in the business and universities that used them. As computing power grew, it was being utilized in increasingly specialized locations, challenging the original stable environments to which it had grown accustomed.

Special environments are everywhere

Computation in rugged environments requires robust solutions and rigorous testing. In challenging situations, real world performance that's ready for anything can make or break outcomes. These environments can range from freezing temperatures at high altitudes to extreme heat and coastal humidity.

It also includes more exotic locales. Taking hardware closer to the battlefield allows for analytics and support in achieving mission critical success. This would also include capturing data with drones or processing data on a dusty Humvee that's speeding across terrain.



Some of these more rugged environments show up in locales even closer to home. From local coffee shop rewards programs, to updates on children in daycares, to digital maps at airports that help direct customers to their flights, unique environments are not uncommon.

Modern systems for legacy industries

Beyond rugged, there are many enterprises that operate far outside the boundaries of traditional technology. Major verticals like utilities, government facilities and medical require very specialized systems to function, and security is paramount. Industries that were once slow to adopt new technologies—often due to their sheer size and complexity—are now driving innovation across the board.

And while compute gets closer to the customer and is revolutionizing older industries, this compute is encountering unique regulations about what these industries consider to be safe. Compute must find ways to adapt to these regulations.



Sky-high innovation

When it comes to pushing boundaries at incredible speed, progress in aviation spans the globe and continues to revolutionize technology. Passengers streaming content to their own devices, for example, require a robust network right in the plane that allows for hundreds of people to utilize it at once.

Adding to the complexity are Federal Aviation Administration regulations and safety priorities that factor in to the creation and implementation of these servers. A seemingly small aspect of air travel—entertainment—is greatly sophisticated and subject to the same crucial standards as the rest of the aircraft. Power requirements, bandwidth, heat dissipation, stability during takeoff and landing, and evolving software are all things that are factored in to the design.

An ocean of complexity

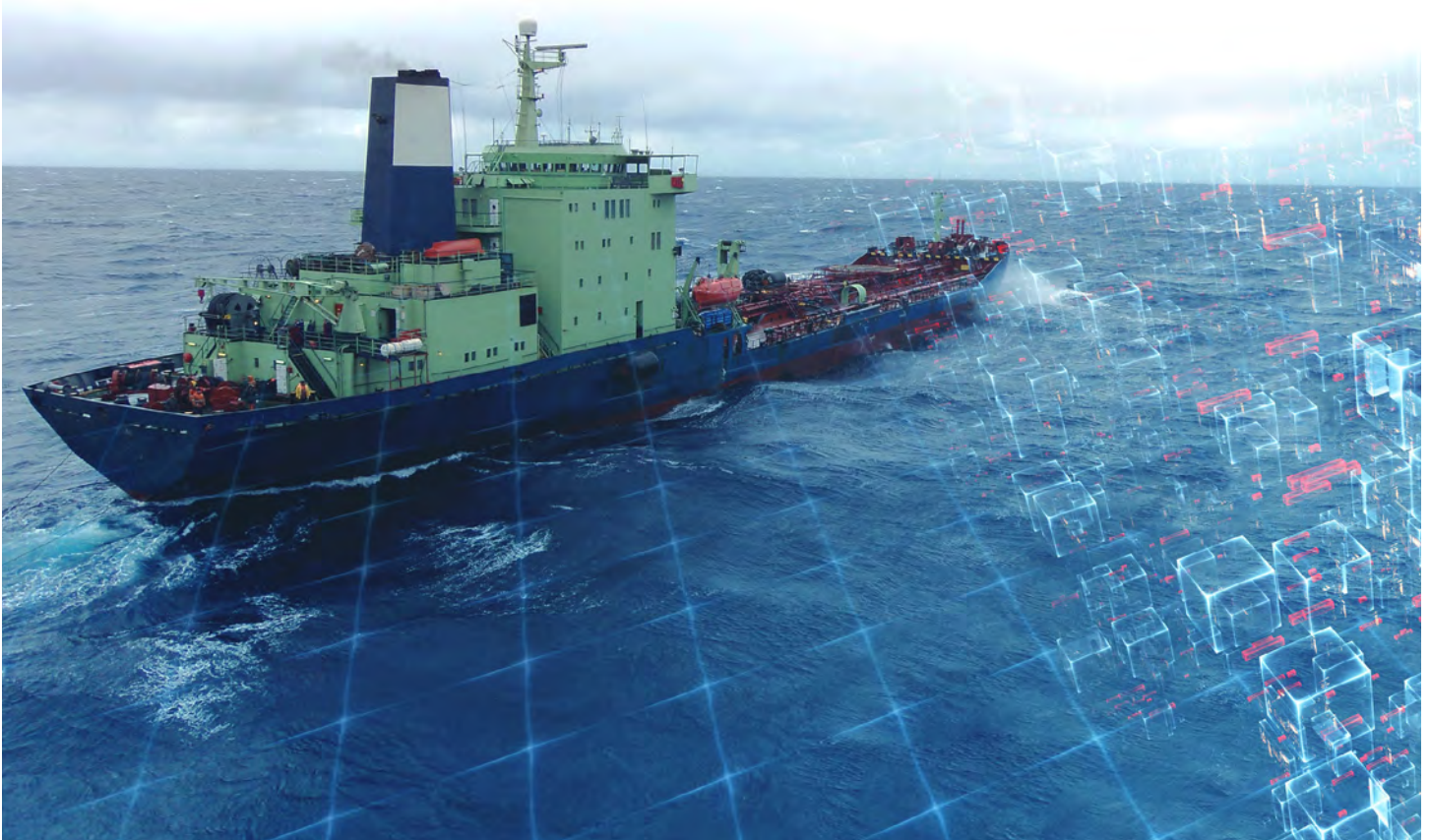
Marine is another specialized area, with distinct environmental challenges and high safety, quality and

efficiency needs. Big cargo ships traveling across the world utilize server solutions that require regular communication upgrades. On an oil rig in the middle of the ocean, something as basic as sending an email requires a satellite uplink and layers of approvals to implement.

Maritime markets demand durability under wet conditions and extreme temperatures. In a highly regulated environment, failure is not an option, and neither is churn. Platforms need to be stable and last for years with advance visibility and ease of transition to keep the focus on innovation.

Safety is everything

Some environments are inherently hazardous. A mine, for instance, can have pockets of combustible gas. Devices not only need to withstand subterranean challenges, but must ensure no additional risk to the people using them. The technology must be uncompromising in its safety.



Going beyond environmental boundaries with innovative technology solutions

Doosan: Turning the world on to cleaner and safer power

Over the last 50 years, Doosan Heavy Industries & Construction (Doosan) has contributed to the growth of the Korean economy with leading energy solutions, serving customers in various sectors such as thermal power, nuclear power, renewable energy and water. Digital transformation was the next big step for the company.

Doosan created PreVision, a fault-detection and diagnostic solution, to reduce maintenance and equipment replacement costs as well as unexpected shutdowns while improving power-generation safety. With PreVision's machine learning and Internet of Things (IoT) technologies, plant managers would access graphical data on the real-time performance of machinery from sensors on the equipment and act at the first sign of a potential issue.

Doosan leveraged OEM Solutions to accelerate the release of PreVision while reducing the cost of development. Instead of taking on the expense and possible delays from designing, building, and testing its own hardware platform, it chose Dell PowerEdge R640 and R740 servers as the platform—a highly reliable hardware. OEM Solutions ensured PreVision software was installed before the servers left the Dell Technologies factory, saving time and effort when the hardware arrived at Doosan's offices. Finally, Doosan has benefited from the availability of Dell Technologies global support system.

Using PreVision, customers in South Korea are avoiding unexpected shutdowns—and potentially catastrophic failures—helping them meet their production targets. Machine maintenance and replacement costs are lower with potential issues identified early, so engineers aren't called out to make expensive emergency repairs.

Tracewell Systems: Powering enterprise class systems at the edge – and beyond

Businesses and government agencies are looking to develop edge strategies to support their mission-critical applications, such as real-time analytics, artificial intelligence (AI), machine learning (ML) and deep learning (DL). Tracewell Systems helps organizations deploy their edge applications by adapting enterprise-class systems into platforms optimized to deliver high-performance computing capabilities in edge environments.

With OEM Solutions, Tracewell has access to a deep portfolio of market-leading compute, storage, networking and other specialty technology. The company's expertise makes it possible to transform enterprise-grade technology to operate in a wide range of edge environments where size, weight, power and other environmental challenges cannot be met by standard technology.

Dell Technologies brings organizations enterprise-grade technology to make their edge applications a success, and Tracewell adapts those platforms to operate in the edge environments required to support their mission. Based on the Dell PowerEdge XE2420, the Tracewell T-XE2420 has all the benefits of the standard Dell EMC product plus groundbreaking GPU capabilities for powerful AI/ML at the edge. The Tracewell T-C6420, based on the Dell PowerEdge C6420 server, is a compute-intense device that complies with Airline Transportation Association regulations and fits in the overhead bin of a commercial airplane.

The unique jointly designed solutions address highly specific customer concerns about challenging environments at the edge.

