DELLTechnologies

CREATING STRATEGIC ADVANTAGE
from Base to Battlefield

By 2025, 75 percent of enterprise-generated data will be created and processed at the edge, according to analyst firm Gartner. For the Department of Defense (DoD), that includes enormous volumes of data from engagement platforms, connected devices, sensors, training facilities, test ranges, and business systems.

To gain tactical and strategic advantage, military decision-makers need the ability to rapidly combine and analyze data gathered in the field and across multiple domains. To do that, the DoD will need new network, compute, and storage infrastructures, much of them delivered at the tactical edge.

Data has historically traveled from the field to the command post, where it has been combined with other sources and analyzed. Today, however, emerging technologies and standard platforms purpose-built for the edge make it possible to push data collection and analysis to forward operating bases and even the far edge – soldiers in the field. The result is faster, more accurate decision-making when and where it matters most. Advances in technology make it possible to analyze petabytes of data at the edge today.

EDGE COMPUTING APPLIED FOR TACTICAL ADVANTAGE

A reconnaissance force needs to observe where, how, and when bad actors are moving; and the conditions around them, such as weather.

With emerging technologies, such as sensors to gather data, forces are better protected and data analysis can be conducted as close to the data collection as possible. For example, artificial intelligence (AI) can be applied to sensor data for image classification in the field. The data analysis can then be sent to the forward operating base for review and decision making – without putting personnel at risk.

INTEROPERABILITY SPEEDS DATA ANALYSIS

Siloed applications present a considerable hurdle that must be overcome to enable decision making in near real time. Data such as location, weather, and vehicle and troop movements are often gathered in separate applications. That data needs to be securely transmitted into a single environment as quickly as possible. Doing so requires interoperable hardware and software. Achieving interoperability requires developers to build hardware and software on a common framework so systems can share information in real time.

The Sensor Open Systems Architecture (SOSA) Consortium answers this need. The consortium is creating open system reference architectures applicable to military and commercial sensor systems. The architectures incorporate both hardware and software components in a modular design and use consensus-based, nonproprietary standards for key interfaces to enable reconfigurable and affordable Command, Control, Communications, Computers (C4) Intelligence, Surveillance and Reconnaissance (ISR) capabilities. Developers that use SOSA architectures will support demanding data processing requirements, reduce total cost of ownership, and promote competitive acquisition with minimal system reworks.

5G IS A STRATEGIC AND TACTICAL GAMECHANGER

Fifth generation mobile networks (5G) promise to be a gamechanger for military decision making. They bring increased data rates and ultra-low latency, which speeds transmission of large volumes of data and lowers costs. They make it possible to use next-generation AI and machine learning from the command post to the edge, in locations as varied as a closed network on an airborne aircraft and all-terrain vehicles.

5G networks also bring the ability to segment workloads in order to prioritize specific communications. For example, information gathered in the field about a known potential threat may be prioritized over vehicle data. Or, audio data may be prioritized over video data, so that keyword analysis can be conducted quickly and AI can be applied to look for linkages with other data.

Because of the increased bandwidth that 5G brings, new use cases for technology at the edge are emerging. For example, personnel can now use augmented reality (AR) to "see" the battlefield from protected positions. AR headsets overlaid with key information such as mapping data and the location of friendly and enemy forces give them a 360-degree view of the battlefield inside a tank. They also provide the ability to engage combatants, which are automatically tracked using AI image recognition systems that determine who is an enemy and who is not.

SOSA AT WORK

Software-defined radios may run on multiple networks – unclassified, classified, and secret – and they may all run on different pieces of hardware, which uses increasing amounts of compute power. SOSA enables the radios to run on the same hardware, reduces costs and allows data sharing across networks.

5G IN ACTION

Today, pulling data off an aircraft may be a manual exercise in which hardware is removed from the plane, taken to another site, offloaded, and then analyzed. With 5G and edge technologies, data can be offloaded wirelessly and in near real-time. 5G can even enable secure communications between radically different technologies, such as a laptop using a video conferencing platform in an office and a radio in the field.

MEETING SIZE, WEIGHT AND POWER REQUIREMENTS

Defense environments and missions demand unique size, weight and power specs without compromising quality or capability. Dell Technologies OEM solutions powered by Intel excel in confined spaces and in varying locations.

SIZE

Designs for various-sized enclosures, mounting options and orientations to ensure the right fit.

WEIGHT

Lighter systems that do not compromise rigidity or performance.

POWER

Available power connections that minimize EMI noise and optimize power consumption.

Short depth **400** mm

Lighter Lids

AC/DC

XR11 (1U) – 400mm
XR2 (1U) – 514mm
R740xd (2U) – 678mm
C6420 (2U) – 763mm

ENABLE INTELLIGENCE AT THE TACTICAL EDGE WITH DELL TECHNOLOGIES OEM SOLUTIONS

Defense units must be able to work without internet connectivity, to move locations quickly, and to collect and analyze data in real time. In remote locations, they need the ability to rapidly access and move data. This may require portable, hardened hardware that is optimized for size, weight, and power. They also need enough compute power and storage capabilities to process critical data on location – with or without internet access. Lastly, they need equipment that is easy to set up and operate by field personnel without IT training. Automation of operations can help personnel get the job done efficiently, even in the harshest environments.

Dell Technologies OEM Solutions supports DoD agencies with hardware platforms that range from rugged laptops and rugged servers for the far edge and forward operating bases to compute and storage at command posts and agency offices. Working with the Dell Technologies OEM team, agencies can design a turnkey solution that facilitates data capture, transport, analysis, and storage from the rugged edge to the data center – all managed via a single pane of glass. Agencies benefit from Dell Technologies' broad portfolio and integrated security and manageability tools, as well as the ability to customize the platforms to meet unique mission requirements.

For example, Dell Technologies OEM Solutions:

- ◆ Provide rugged technology to withstand the harshest conditions
- ◆ Accelerate data processing at the edge by adding or replacing graphics processing units, FGPAs, and smart NICs
- ◆ Change form factors to fit transit cases or any environment
- ◆ Install and configure partner software prior to solution shipment
- ◆ Offer TAA-compliant solutions
- ◆ Ensure MIL-STD 810 certifications meet DoD requirements on hardware
- ◆ Deliver a complete secure supply chain.
- ◆ Create custom configurations to meet requirements such as disabling or removing cameras and microphones
- ◆ Install non-standard components to meet mission needs. All done in our TAA-compliant facilities

With Dell Technologies' commercial off-the-shelf computing equipment as a base, agencies avoid lock-in to proprietary compute platforms, thus conserving budget and preserving the ability to modify the solution to meet future needs.

XR11 AND XR12 RUGGED SERVERS ARE PURPOSE-BUILT FOR THE EDGE

Dell Technologies PowerEdge XR11 and XR12 servers are rugged, certified 1U and 2U single-socket servers, purpose-designed to reduce latency, provide scalability, and deliver analytic insights at the edge.

Designed to meet the military's size, weight, and power requirements at the rugged edge, the PowerEdge XR11 and XR12 servers are small enough to fit in transit cases and powerful enough to complete high-volume data processing in the most challenging conditions. They provide a field-ready, highly configurable mobile data center to support field operations and reconnaissance.

Key capabilities:

- High performance, high capacity
- Reversible I/O and power for easy serviceability
- Agent-free local and remote embedded server management, customizable to meet unique telemetry, monitoring, and environmental requirements
- Integrated security with threat-resilient architecture that includes real-time firmware scanning for malicious attacks and SSL certificate management

MECHANICAL & ELECTRICAL CUSTOMIZATION
Ensuring fit and function to specific customer requirements
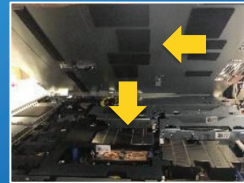
Request: Required countermeasures to meet shock & vibe specifications

Solution: Developed foam pads for DIMM and CPU retention. Screwed downconnectors. Developed top cover latch.

Request: Non-standard FPGA & GPUs to help accelerate workload.

Solution: Developed FPGA & GPU solutions to help accelerate workload. Delivered thermal validation in partnership with industry partners, AMD & NVIDIA.
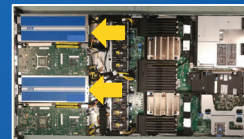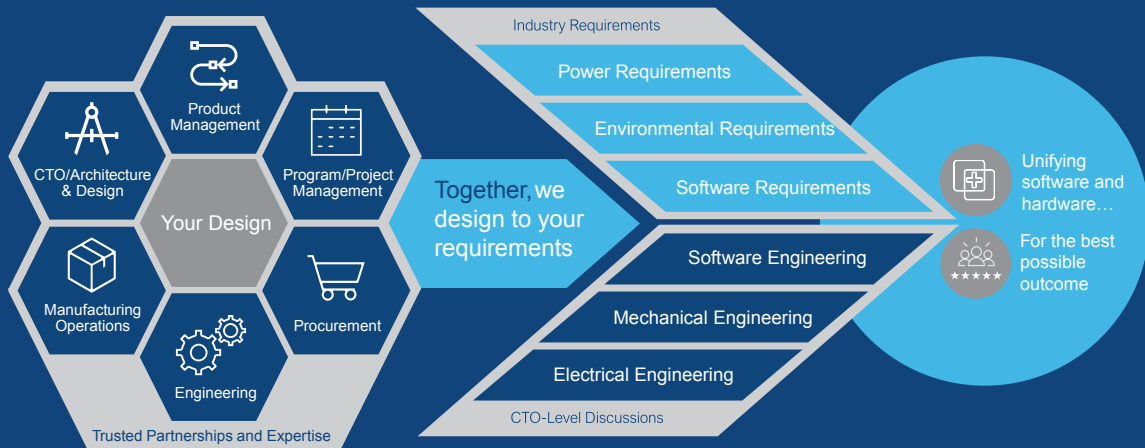

Request: Custom cabling & functional testing of third party bridge card.

Solution: Created custom cabling & managed testing of third party bridge card. Executed thermal validation and system integrity testing.

ENGINEERED TO PERFORM
Gain direct, dedicated access to a 100% in-house engineering organization.

Your Design
- Product Management
- CTO/Architecture & Design
- Program/Project Management
- Manufacturing Operations
- Procurement
- Engineering

Trusted Partnerships and Expertise

Together, we design to your requirements

- Industry Requirements
- Power Requirements
- Environmental Requirements
- Software Requirements
- Software Engineering
- Mechanical Engineering
- Electrical Engineering

CTO-Level Discussions

- Unifying software and hardware…
- For the best possible outcome

THE DELL TECHNOLOGIES OEM SOLUTIONS ADVANTAGE

- Trade Agreements Act-compliant solutions
- U.S. citizen-based technical support
- Reduced time to deployment with ATO, RMF, and testing assistance

DELL TECHNOLOGIES OEM SOLUTIONS FIELD-READY CERTIFICATIONS

- MIL-STD-810H
- MIL-STD-901D
- MIL-STD-461F
- NEBS Level 3
- ETSI
- DNV GL Compliance
- IEC 60945

To learn more about how Dell Technologies OEM solutions can help DoD agencies put data to work at the tactical edge, visit **Dell.com/En-Us/Dt/OEM/Military.htm**.