

## Server Solutions for Defence Applications

### Requirement Summary

A particular defense sector application required convergence of compute, storage and networking resources into an x86 architecture with Linux® based processor and storage virtualization. In a conventional environment this would likely be addressed with rack mount servers but areas of limitation that needed addressing for use in this environment included Size, Weight, and Power-Cost (SWaP-C) optimization.

### Requirement Specifics

The customer wanted scalability, the capability to have multiple processor connects and a high bandwidth connection between processors, within a compact space envelope. Although this type of server solution would typically be located in a benign air-conditioned environment, there was a requirement for a solution that could potentially be located in more demanding environments, where the system may be subjected to extremes of temperature or shock and vibration. The customer had previously used VME and CompactPCI® parallel bus interconnects but was new to the high speed serial switched fabric interconnects provided by modern open standard systems.

### The Solution

The requirements were addressed by using a solution based upon VPX™, a scalable COTs technology which provided the customer with the flexibility to select resources from a wide range of manufacturers. The wide scale adoption of VPX by defense equipment manufacturers ensures that users and integrators have access to a healthy ecosystem of interoperable components, providing the benefits of best of breed, shorter time-to-market, comprehensive road-maps ensuring low risk upgrade paths and a competitive marketplace. Ultimately Concurrent Technologies, a UK based manufacturer of embedded computers was chosen as the lead supplier after providing excellent support and feedback.

OpenVPX™ (VITA 65) provides serial switched fabric interconnects and to mimic standard server interconnections a 10 Gigabit Ethernet data plane fabric was selected. This allows multi-processor solutions to be easily constructed by slotting in additional processor boards, meeting the requirement for scalability and addressing the need for a high performance connection between compute modules without any application software changes. Additional modular I/O functionality is provided by PCI Express® Gen 3 expansion plane connectivity within the VPX specification, enabling further resources in the form of multiple serial channels to be added to the system by utilizing 3U VPX XMC module carriers and XMC serial modules.



**Concurrent Technologies Plc** 4 Gilberd Court, Colchester, Essex, CO4 9WN, UK  
Tel: +44 (0)1206 752626 Fax: +44 (0)1206 751116  
**Concurrent Technologies Inc.** 400 West Cummings Park, Suite 1300, Woburn, MA 01801, USA  
Tel: (781) 933 5900 Fax: (781) 933 5911  
email: [info@cct.co.uk](mailto:info@cct.co.uk) <http://www.cct.co.uk>

TR C4x/msd, an 8-core 2.0 GHz 3U VPX compute module, was selected based on the Intel® Xeon® Processor D-1500 family providing server grade performance with excellent storage connectivity and supporting Intel® Virtualization Technology (Intel® VT) meeting the fundamental system requirement. In the future, should any requirement demand a performance uplift, the customer can easily migrate to a 12 or 16-core processor variant of the same TR C4x/msd board without any changes to the system design. Furthermore this family of products provides extended temperature and ruggedization levels for more extreme operating environments giving the customer the flexibility they may need.



## Challenges Faced

The customer was unfamiliar with OpenVPX and to assist with the learning-curve, Concurrent Technologies was able to offer a development system comprising chassis, high performance, Intel® based compute modules, XMC modules and 10 Gigabit Ethernet switch. This enabled the customer to investigate the benefits of a technology new to them, but with the assurance that comes from having supplier ownership of the package.

## The Future

The scalability of the VPX system allows for expansion of the compute system for future requirements. Concurrent Technologies continue to develop best-in-class solutions ensuring that the customer has long-term access to the latest Intel processor technologies utilized on VPX.



Written by  
John Butcher