CASE STUDY

Harnessing the Power of AltiVec in Modern COTS Applications

CURTISS-WRIGHT

DEFENSE SOLUTIONS

Challenge

- Aging fast jets needed Power Architecture® tech refresh
- Customer wanted to use existing AltiVec based algorithms in tech refresh
- Wanted more performance along with less power consumption

Solution

- Power Architecture T2080 replacing legacy 7447A processor
- Three SBCs configured in a mesh using PCIe as dataplane
- Identical AltiVec instructions between legacy and new system

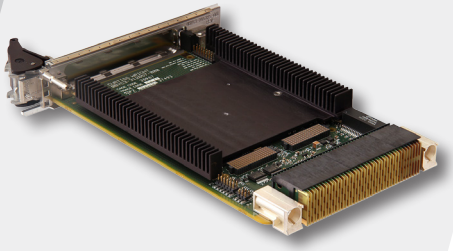
Results

- Triple the performance with half the power consumption
- Reuse of existing algorithms with the same AltiVec instruction set
- Cost savings on tech refresh using COTS modules

Challenge

A customer approached Curtiss-Wright with a requirement for a radar processing tech refresh for their aging fleet of fast jets. With an existing Power Architecture-based system using AltiVec® vector algorithms, they did not want to spend the time or resources switching to an alternate architecture, which would not only cause potential performance issues, but necessitate the recreation of new algorithms with the movement to a different vector processor.

Despite wanting to keep Power Architecture as their architecture of choice, their 7447A processors were legacy – low performance and power hungry. They were looking to upgrade to a cost-effective next-gen Single Board Computer (SBC) with faster execution, additional memory, and lower power consumption that would enable them to reuse their current AltiVec vector library.



VPX3-133 3U VPX SBC with NXP
Power Architecture T2080 Processor

Solution

Power Architecture's T2080 processor in Curtiss-Wright's VPX3-133 SBC met this customer's needs. Instead of connecting the SBCs with 10G Ethernet as the dataplane, we used a new piece of middleware developed by a software partner to configure PCI Express® (PCIe) as the dataplane. We suggested the customer use a mesh of 3 SBCs, all interconnected using PCIe. In this configuration, the cards share data over an interconnected network, allowing them to do the required vector processing and quickly execute algorithms. With 3 cards in the mesh, our customer had 12 AltiVec engines boosting calculation performance, and greatly reducing processing time. Not only that, but in sharing the data, all the units can execute algorithms and process data in parallel. More importantly, the customer could reuse their current vector algorithms because the AltiVec instructions are identical to their legacy system; AltiVec units have not been modified in the newer VPX3-133 SBC, and the instruction set is consistent.

Results

Our customer's new Power Architecture system based on the T2080 chip provides their application with more performance, and allows the reuse of their existing algorithms and AltiVec instruction set. Using COTS hardware also greatly reduced their time to market over redesigning their system. Four 7447A processors consume double the power of one T2080 processor, yet only allow the system to run at approximately half the T2080's speed. This means that by keeping the same number of SBCs in their system, the T2080 reduces our customer's power consumption by over half over their legacy 7447A processors, and more than triples their performance in the same footprint. Using COTS modules in their system saved our customer a lot of money on their tech refresh over the cost of their original system, and with our Total LifeCycle Management services offering longevity of supply protection on their modules, they can rest assured their system will be a reliable workhorse for years to come!

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