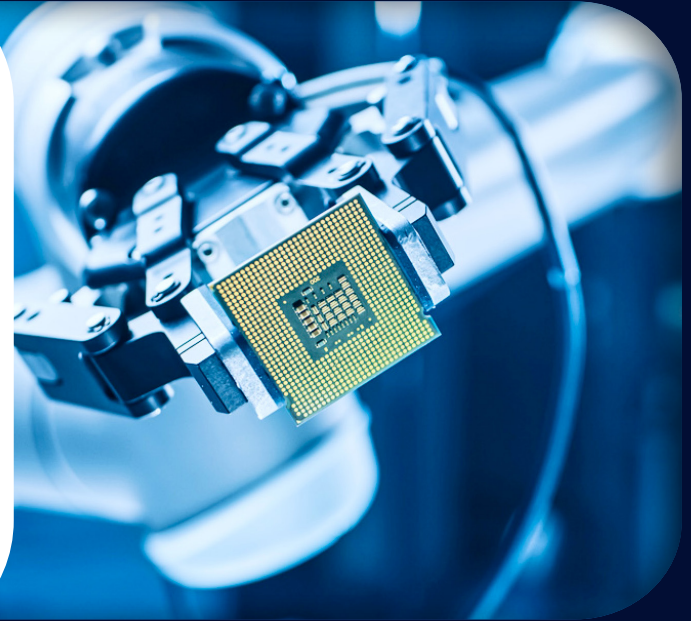


# Semiconductor Innovator Optimizes AI/ML Offload Chip Integration for Data Center Efficiency



## Client Overview

Cavium, acquired by Marvell Semiconductors, specializes in designing and producing semiconductor chips for computer networking applications. Bluehatsoft was enlisted to contribute to the firmware stack design of their AI/ML processor, leveraging previous successful collaborations on Cavium's Octeon line of processors.

## The Problem

Cavium encountered several hurdles while designing firmware for their innovative AI/ML offload chip:



Needing to ensure PCI Express compliance for smooth integration into data center servers.



Customizing the firmware stack to align with the requirements of virtualized deployment scenarios common in data centers.

## The Solution

Bluehatsoft worked closely with Cavium's hardware engineers, providing a comprehensive solution that included:

- ✓ Developing a customized Secure Boot ROM tailored for ARMv8 A35 architecture.
- ✓ Modifying the open-source boot loader u-boot for seamless firmware loading.
- ✓ Designing Linux Kernel components to facilitate PCI Express communication, SR-IOV support, and bandwidth throttling for efficient resource allocation.

## Business Benefits

Cavium's implementation of the solution resulted in:

- ✓ Ensured seamless integration into data center environments by achieving PCI Express compliance for the offload engine.
- ✓ Enhanced data center efficiency with fully compliant SR-IOV drivers and firmware, featuring bandwidth throttling capabilities to enable pay-per-use AI/ML instances.
- ✓ Avoided significant delays and cost overruns by resolving issues with a vital hardware component, eliminating the need for IP vendor changes.