

[EVT-AN02-MVA]

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Overview

This application note describes in detail the advantages of using Myricom NICs and MVA with Emergent Vision cameras. It describes the way in which MVA gains its significant advantages and provides a comparison to scaled up versions of the Intel Pro 1000 GigE Vision NIC and driver which is the current choice for 1 Gigabit machine vision applications and software.

The Intel Pro 1000 works by receiving packets on its 1 Gigabit Ethernet interface, processing them as any other NIC would, and providing the packets to the application with 1 fewer copy of the data when compared to standard NDIS filter drivers and 2 fewer copies when compared to the standard Windows/Linux processing stack. Note that this technology still works with packets up to the application level and thus still incurs the overhead of the individual packet transfers, the interrupts related to the individual packet transfers, and also the massaging of the data of the individual packets into image frames. All things considered, this is not the most efficient method of providing images from the camera to the application and applications will suffer significant degradation in CPU utilization and latency.

Emergent Vision Technologies has partnered with world class 10GigE NIC provider Myricom Inc. to provide a solution that addresses these deficiencies and provides the absolute highest performance solution for 10GigE cameras. This becomes a critical point for many ultra high speed camera applications as the processing power required can be high depending on the application.



Myricom MVA

Figure 1: Myricom MVA seen below shows the architecture of the platform. MVA processes the packets completely and provides complete image frames to the application buffers with only one interrupt per frame.

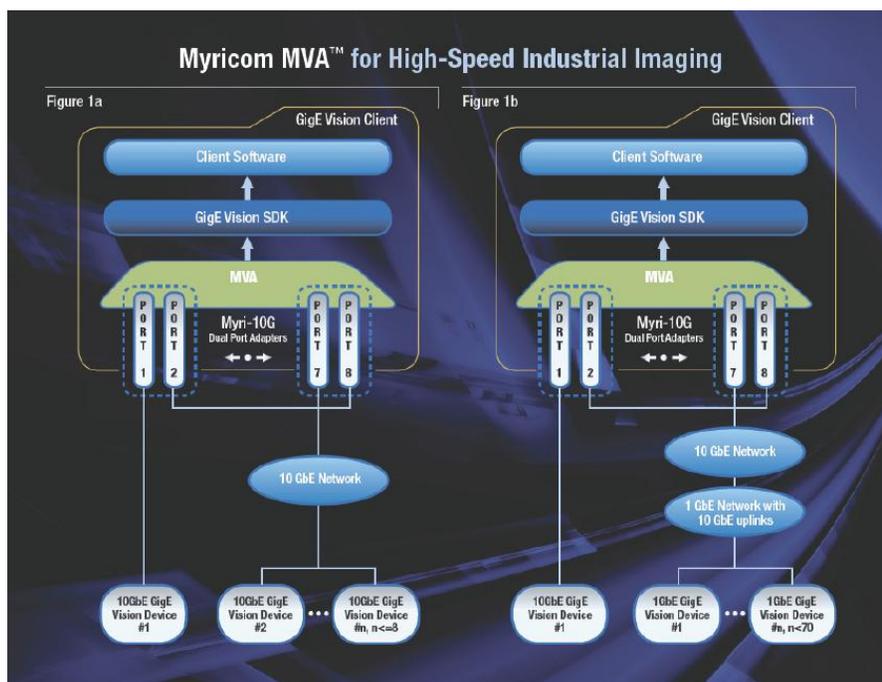


Figure 1: Myricom MVA

MVA runs primarily on the NIC and DMAs frame data as packets are processed. Once the last packet is processed, an interrupt is sent signalling completion of the received frame. Unlike all commercially available solutions, the NIC is GigE Vision protocol aware and we effectively offload all GigE Vision GVSP (streaming protocol) related tasks to the NIC. In the figure, Emergent's eSDK is at the GigE Vision SDK layer. Emergent's eCapture uses the eSDK and thus sits at the application (or Client Software) layer in the figure.

MVA, thus completely offloads the associated tasks of receiving frames to the Myricom NIC thus providing a solution which addresses all of the shortcomings of competing solutions.



Comparisons

Data collected from fully optimized Intel Pro 1000 systems indicates an approximate 5% total dual-core CPU utilization for a 450Mbit/s video stream.

If we extrapolate this to a 9Gbit/s we would end up with 20 times the CPU utilization or 100% of the full dual-core CPU.

In strong contrast, to receive the same 9Gbit/s stream with Myricom's MVA and the Emergent software we are looking at a miniscule <2% single-core CPU utilization or 1% total dual core as indicated in the chart below.

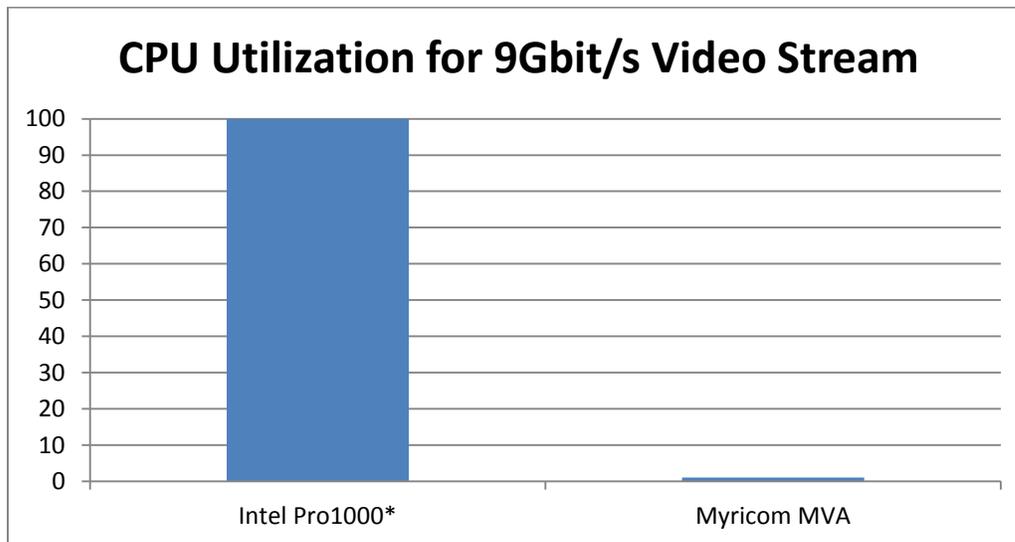


Figure 2: CPU Utilization Comparison



Conclusion

It becomes immediately apparent that without a solution such as MVA that CPU utilization can become completely unmanagable and that MVA becomes the only option for ultra high datarates.

The ultra high data rates of 10GigE require special attention to CPU utilization and MVA addresses the key aspects of this easily providing the best in class performance for 10GigE machine vision applications.

KEY FEATURES AND BENEFITS

Low CPU overhead: Dramatic reduction in CPU utilization means more CPU cycles for image processing.

Lower latency: Timely notification of frame completions means lower latency and less jitter.

Fewer dropped frames: Lower CPU overhead means higher throughput and more responsive applications, leading to fewer dropped frames due to application buffer overflows.

Interoperability with Ethernet driver: Multiple GigE Vision applications can receive images from multiple devices while the standard Ethernet driver is still available for non-GigE Vision GVSP traffic.

CPU load balancing: De-multiplexing of GVSP at the Myri-10G adapter allows each imaging device to be steered to the appropriate buffer for each application.

Operating System Support: Windows and Linux

More information:

http://www.myricom.com/images/stories/downloads/MyricomMVA_GigEVision.pdf

<http://www.myricom.com/solutions/industrial-imaging.html>

<http://www.myricom.com/support/downloads/mva.html>

<http://www.myricom.com/support/documentation/software/mva.html>

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Document History

Version	Date	Description
1.01	24 Oct 2013	Initial Version

