EXECUTIVE SUMMARY

As the Media and Entertainment industry continues to experience an explosion of high definition UHD 4K and 8K content, a digital transformation must follow. Everything from cameras to content delivery, to servers and processors, and the underlying video transport network must keep pace to deliver the enhance video quality consumers are demanding. The explosion in video data rates and data processing requirements is causing a workflow shift from proprietary workstations with SDI (serial digital interface) connectivity to industry standard servers with IP networks and an Ethernet Video Fabric. Meeting this challenge requires a world-class server platform with massive processing power and network infrastructure that can deliver massive throughput, deterministic performance, and efficiency. Together AMD & Mellanox meet this challenge head on.

THE AMD EPYC PROCESSOR

The new AMD EPYC™ 7702 CPU delivers unmatched video processing capabilities, capable of unleashing giant performance gains for UHD workloads to address these challenges. The new AMD EPYC processors offer 64 multithreaded cores per chip for a total of 128 processing threads in a single socket server or 256 processing threads in a dual socket server, producing render farm-like performance. Alongside the high core count on EPYC™ 7702, there’s also support for 4TB memory capacity per socket and support for the PCI Express (PCIe) 4 specification to provide twice the available bandwidth as PCIe 3 supported products.

AMD and Mellanox Enable Higher Performance & Efficiency for IP Video Processing

AMD EPYC Processor:

Mellanox Ethernet Video Fabric:
• http://www.mellanox.com/solutions/media-entertainment/

Mellanox End-to-End Ethernet:
• http://www.mellanox.com/ethernet-storage-fabric/
PCI EXPRESS 4.0
As the first commercially available X86 compatible server CPU with support for PCIe 4, the 2nd Gen AMD EPYC doubles the bandwidth of a typical server supporting PCIe 3, creating a superhighway to increase its data handling capacity. This dramatically enhances data access capabilities and helps ensure a smooth transition to 4K and 8K video. Mellanox ConnectX family of network adapters exploit the advantages of PCIe 4 which can support a 200Gb Ethernet adapter to future proofing servers. With multiple times the performance packed into the same infrastructure footprint, end-users satisfy the most data intensive application demands and remove fears of becoming I/O-bound.

KERNEL BYPASS TECHNOLOGY
Video processing is a very CPU-intensive operation; however, the CPU doesn’t only have to handle video processing tasks, it must also perform networking activities. Mellanox ConnectX adapters utilize RDMA to remove the CPU from I/O tasks and enable the industry’s lowest latency. This allows for more efficient data movement for the network, storage devices and video editing workflows, resulting in more CPU cycles available to accelerate application processes.

PACKET PACING
Uncompressed video broadcasting and streaming applications are bursty and bandwidth-intensive, and can easily cause network congestion. The SMPTE ST 2110-21 specification (also known as Packet Pacing), overcomes this challenge by increasing the efficiency of each flow. With packet pacing, traffic is evenly spaced to minimize queuing and delays. Mellanox’s Rivermax offloads the SMPTE ST 2110-21 specification from software applications to the ConnectX-5 (and higher) adapter and bypass the kernel’s IP stack. This enables the application to send the video content directly to the ConnectX-5 for processing and eliminates the CPUs from involvement in this complexities of the full network stack and allows CPUs to handle application tasks.

HIGH-PERFORMANCE ETHERNET SWITCHING
Mellanox Spectrum open Ethernet switches deliver the industry’s highest performance and lowest latency to support throughput required for all video requirements including 4K, 8K, HFR and HDR. They are the only switches tested and validated for the new SMPTE 2110 video over IP standard. Offering powerful buffers and zero-packet loss, they provide predictable network performance critical for video frame delivery. Consistent and very low port-to-port latency and minimum jitter through QoS & DSCP features ensure the ultimate experience whether its streaming live video or completing post-production work in a studio.

As the leader in data center networking within the high-performance computing market, hundreds of customers have deployed Mellanox switches to support mission-critical applications. Many of these applications require hundreds or thousands of server and compute nodes for crunching data to process millions of messaging streams within nanoseconds, stream hundreds of real-time broadcast, video, and movie streams across the Internet, or reliably move large data files between data centers at wire speed.

CONCLUSION
Studios and post-production facilities are now working with digital UHD, 4K and 8K resolutions. High-performance data processing and access capabilities are required to keep pace with the massive amount of digital data. AMD EPYC processors are perfect for CPU-intensive operations that are typical for media and entertainment workloads. Mellanox IP-based interconnects provide a proven and scalable solution that enhances the efficiency of AMD EPYC processor-powered server platforms to optimize performance throughout the entire media and production workflow.