



Media Transcoding

Video is becoming the media of choice as organizations look to disseminate information internally to their employees or externally to their customers and prospects.

INTRODUCTION

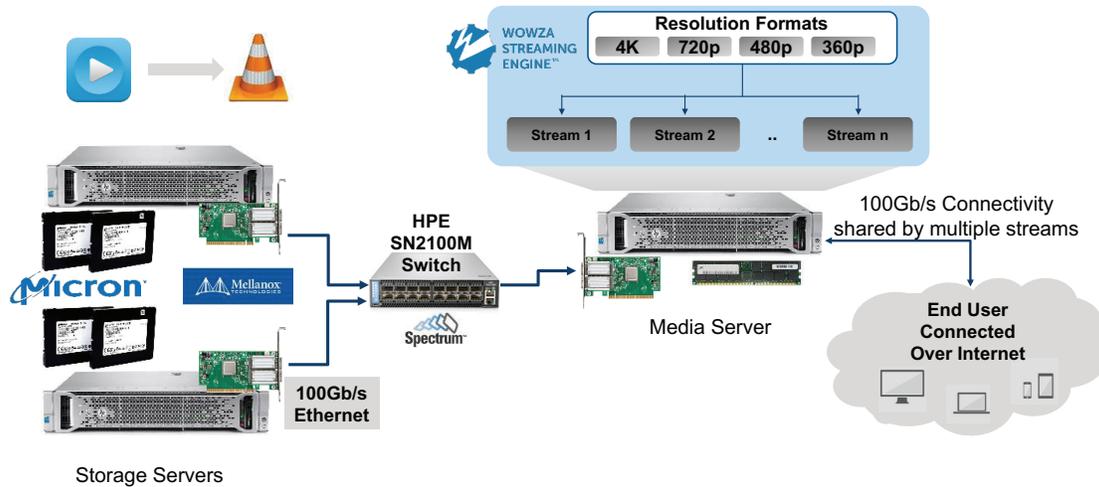
Video is becoming the media of choice as organizations look to disseminate information internally to their employees or externally to their customers and prospects. As technology is becoming more accessible, new streaming content providers, both large and small, are emerging. Sporting events and religious services at the local level can now be streamed live and educational institutions can provide online lectures, streaming of graduation ceremonies and sporting events. In addition, enterprises rely on live streaming media for webinars and company meetings. However, the challenge of delivering is exacerbated by the users demanding anywhere, any device access to their video streams. They want to be able to view through their smartphones, tablets, high definition TVs just to name a few. And that means every video stream needs to support multiple devices, multiple formats, evolving CODECS, bitrates and resolutions. Videos have to be transcoded and done so effectively and efficiently to deliver the desired user experience.

DEMO OVERVIEW

Video processing comprises of video capture, video transcoding, and streaming delivery. Video transcoding, the process in which video is converted from one format to another for optimal viewing across multiple devices and screen sizes, is the most compute-intensive part of video processing. It entails compressing video and audio feeds to work on the target devices while minimizing the use of bandwidth and delivery infrastructure. Hewlett Packard Enterprise, Mellanox Technologies and Micron Technology have together showcased how video transcoding can be delivered using the Wowza Streaming Engine™, a leading provider of video and audio streaming technology.

SOLUTION HIGHLIGHTS

- **Stream boldly:** Deliver to any device in any format
- **Caching the Uncachable:** Most advanced solution in the industry with Micron storage and Mellanox network
- **Build the Storage to Your Advantage:** RDMA-powered Microsoft Storage Spaces Direct
- **Future-Proof Solution backed by industry experts:** HPE, Mellanox, Micron, Microsoft & Wowza



Demo Setup:

The demo setup consists of three servers: two storage servers and a media server running Microsoft Server 2016 operating system. While the media server is configured to run Wowza live streaming application, the two storage servers are configured to run Microsoft Storage Spaces Direct delivering encoded video streams at different resolutions to the media server. Storage Spaces Direct is a highly scalable software defined storage at a fraction of cost of traditional SAN or NAS arrays. Using VideoLAN VLC media player on one of the storage serves, the video feed is multicast to the media server running Wowza live streaming applications. In addition, with native RDMA support, it not only enables faster data replication across storage tiers but also faster video stream access from the media server. The servers are interconnected with 100Gb/s connectivity using HPE StorFabrics M-series switches (HPE SN2100M).

Test Details:

Two types of tests were run: transcoding and transrating. In both the cases, the input was a stream from a high, single bitrate media file and the output was one or more sets of multiple bitrate H.264 streams at 4 different resolutions: 160p, 240p, 360I and 720p

Further, the tests were run starting with a single ingestion channel to multiple channels (multiple transcoding streams), until at least one of the following saturation criteria are met:

1. CPU Utilization = 80% & Memory Utilization > 80%
2. Frame errors in the streaming engine: Skipped frames / All Frames On / Keyframe alignment error
3. Video quality problem during playback

Storage Server 1 & 2

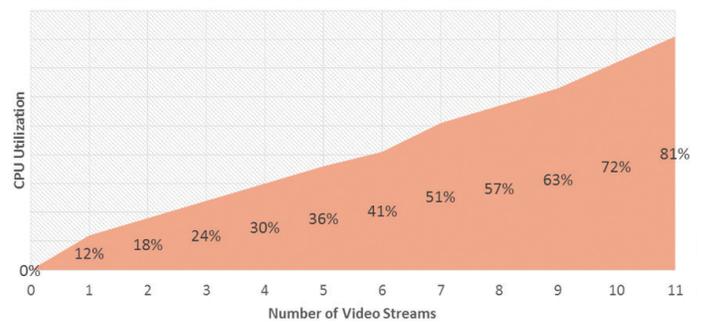
- Server: HPE ProLiant DL380 Gen9
- Processor: Xeon E5-2697v4 36 cores
- Memory: 32 GB
- SSD: Micron Technology's 5100 SATA SSD
- OS: Windows 2016 Server RS3, running Microsoft Storage Spaces Direct
- Network: Mellanox ConnectX-4® 100GbE RDMA capable adapters
- Application software: VideoLAN VLC Media Player

Media Server

- Server: HPE ProLiant DL380 Gen9,
- Processor: Xeon E5-2697v4 36 cores
- Memory: 256GB (8 X 32GB), plus 8GB NVDIMM
- SSD: Micron Technology's 5100 SATA SSD
- OS: Windows 2016 Server RS3
- Network: Mellanox ConnectX-4® 100GbE RDMA capable adapters
- Application software: Wowza Streaming Server with the transcoding add-on.
- Performance monitoring software: SAR

Table 1: System Under Test (SUT)

Test Results



ENTERPRISE GRADE INTEGRATED SOLUTION WITH PARTNERS YOU CAN RELY ON

Microsoft Virtualization and Storage Stack:

Microsoft Hyper-V and Storage Spaces Direct bolster IT efficiency and flexibility with faster virtualized application deployment and maintenance. Built on Hyper-V, included in Windows Server®, Microsoft virtualization solutions help reduce costs by consolidating more workloads on fewer server and increase IT agility and flexibility across on-premises and cloud resources. Storage Spaces Direct uses industry-standard servers with local-attached drives to create highly available, highly scalable software-defined storage at a fraction of the cost of traditional SAN or NAS arrays. Its converged or hyperconverged architecture radically simplifies procurement and deployment, while features like caching, storage tiers, and erasure coding, together with the latest hardware innovation like RDMA networking and NVMe drives, deliver unrivaled efficiency and performance

HPE Servers:

HPE ProLiant DL380 Gen9 servers support industry standard Intel Xeon E5 processor and powered by Micron's SATA SSD and Mellanox Ethernet adapter. With more streams per server, less cost per stream and less power per stream, content creators can expand their offerings and satisfy subscriber demands for richer video contents, without the need for massive expansion of data center space and power

Micron Storage:

Micron Technology's 5100 SATA SSD family provides consistent performance, robust reliability and low TCO — along with rich feature sets that provide market-leading security and endurance, flexibility, and simplification through a common platform. In addition, the new FlexPro™ architecture enables tunable performance to match different applications and workloads, providing the flexibility required to thrive in modern data centers. Micron 5100 SSDs include AES-256 encryption and TCG enterprise protection, deliver consistently high performance and are available in capacities up to 8TB in three configurations – Eco, Pro and Max to give enterprises the right cost-performance mix for their workloads.

Mellanox Networking:

Streaming live HD video feeds from a fast storage system needs a high speed networking. Mellanox delivers end-to-end networking solutions with 100Gb/s connectivity including Spectrum-based switches, HPE 840QSFP28 adapter (based on Mellanox ConnectX-4) and LinkX cables. In addition, with Microsoft Storage Spaces supporting RDMA technology, Mellanox delivers superior video transfer out-of-box between the faster flash based storage servers and Wooza media server.

Wowza Streaming Engine:

The Wowza Streaming Engine is unified streaming media server software that supports streaming video and audio content for multiple screen delivery, i.e., simultaneously supporting many display types from smart phones to high definition television in multiple sizes, bitrates and delivery protocols. The software provides adaptive bitrate encoding so that the bitrate delivered to a device dynamically changes as bandwidth capability changes. The media server is used to deliver both live and on-demand content over internet protocol networks.

About Mellanox

Mellanox Technologies is a leading supplier of end-to-end InfiniBand and Ethernet interconnect solutions and services for servers and storage. Mellanox interconnect solutions increase data center efficiency by providing the highest throughput and lowest latency, delivering data faster to applications and unlocking system performance capability. Mellanox offers a choice of fast interconnect products: adapters, switches, software, cables and silicon that accelerate application runtime and maximize business results for a wide range of markets including high-performance computing, enterprise data centers, Web 2.0, cloud, storage and financial services.

To find out more, visit our website: www.mellanox.com

About Micron Technology

Micron Technology is a global leader in the semiconductor industry. For more than 35 years, Micron has dedicated itself to collaborating with customers and partners to engineer technology that drives innovation and transforms what's possible. Micron offers the industry's broadest portfolio of silicon-to-semiconductor solutions—starting with foundational DRAM, NAND, and NOR Flash memory, and extending to SSDs, modules, MCPs, HMCs, and other semiconductor systems. This best-in-class technology powers leading-edge computing, enterprise server and storage, networking, embedded, automotive, industrial, and mobile products. As the only U.S.-based DRAM manufacturer, Micron leverages an expansive global footprint and proven technology leadership to make it easier for customers to try new things and gain competitive advantages in their markets.

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