Executive Summary

With the birth of the metaverse and interactive streaming video applications such as cloud gaming and video conferencing, streaming video platforms face operational pressure to improve encoding performance and power efficiency while minimizing their environmental footprint.

The Supermicro 4K Video Transcoding Solution future proofs hyper-scale real-time streaming video platforms with higher performance levels than CPU-based software-encoding systems. With NETINT Codensity ASIC-powered video processing units, video services provide can reduce their TCO and server footprint by 5x (80 channels vs. 16 channels) while also reducing carbon emissions significantly as compared to CPU-powered software video transcoders. This increase in encoding density expands the number of channels that can be encoded without increasing the rack footprint. Reduced power and HVAC cost mean a lower TCO and higher density can be achieved without sacrificing video quality or latency.
The Supermicro NETINT Solution

The Supermicro 4K Video Transcoding Solution is built on the Supermicro A+ Server 1114S-WN10RT platform and features advanced encoding capability enabled by ten NETINT T408 Video Processing Units. The T408 VPU is powered by the Codensity G4 ASIC video transcoder and supports HEVC and H.264 video encoding at up to 4K resolution and with 10-bit HDR.

The high throughput of the Supermicro 4K Video Transcoding Solution enables ultra low latency encoding of 40 broadcast quality 1080p60 streams in a compact 1RU form factor.

Figure 1 - Supermicro 4K Real-time streaming solution (AS-1114S-WN10RT and NETINT Codensity T408 Video Transcoder)

Figure 2 - NETINT Codensity T408 Video Transcoder as PCI-E or NVMe form factor
Key Benefits of Supermicro 4K Streaming Solution

- Ultra-High Density: Ten times increase in video encoding density as compared to the software encoding approach
- Real-Time Encoding: Optimized for live streaming and interactive video applications
- Low Latency: Enables Interactive video applications, including Cloud Mobile Gaming, AR, and VR
- 4K/UHDTV/HDTV: Supports a wide variety of streaming applications.
- HEVC, H.264: Multi-format Transcoding, Encoding, and Decoding support
- Scalable: High capacity encoding throughput for rapid deployment of additional channels (streams).

Total Cost of Ownership (TCO)

The Supermicro 4K Video Transcoding Solution enables a reduction in TCO for hyperscale cloud platforms and video service providers.

Power Consumption

Using Codensity ASIC-powered video processing units, video services, and platforms can reduce their TCO and server footprint significantly. The Supermicro 4K Video Transcoding solution can process 80 streams compared to the software only 16 streams simultaneously, a 5X improvement. The ASIC-powered solution used only 323 watts compared in this test, compared to 460 watts for the software solution, a 30% improvement. With reduced power consumption, carbon emissions are lowered as well. This increase in encoding density expands the number of channels that can be encoded without increasing the rack footprint. In addition, with reduced power, the HVAC costs are reduced, meaning a lower TCO without sacrificing video quality or latency.

See below for the testing result comparing between traditional x86 server (using 3rd Gen AMD EPYC™ cores) and the Supermicro 4K streaming solution (with 10 NETINT408 modules) while doing the H.264 to H.264 transcoding.

![CHANNEL VS POWER CONSUMPTION](image-url)
**Channel Throughput**

Regarding the video quality and performance, please refer to the below chart. This metric represents the FPS (frame per second) on every single channel. Supermicro 4K streaming Solution can support higher density channels with lower power consumption and performs with a much better FPS rate than the traditional SW transcoding approach. With support for up to 64 channels simultaneously, the Supermicro 4K streaming solution can still support up to 1080p at 32 FPS rate.

![Figure 4 - Performance Comparison of The Supermicro 4K Video Transcoding Solution vs. Software Only](image)

**Simple integration**

Leveraging FFmpeg, the Supermicro 4K Video Transcoding Solution provides an open-source suite of video processing tools. Video operators can easily and quickly integrate the Supermicro 4K Video Transcoding Solution into their existing encoding infrastructure. Supermicro partner NETINT also provides excellent documentation support such as Quickstart Guide, System integration, and programming guide to help the whole evaluation process. The complete API Guide allows the customer to seamlessly integrate such high-performance, low-cost streaming servers into their systems.

Integrating NETINT’s next Gen product, Quadra, with Supermicro system management software is ongoing to provide a more intuitive hardware health status via the Supermicro server Web GUI interface.

**Summary**

The Supermicro AS-1114S-WN10RT server with NETINT Codensity T408 Video Transcoder offers a higher performance with less resource requirements than software only 4K streaming solutions that are currently available. It is well-suited for high-resolution video streaming markets showcased by these test results. In addition, the fully integrated system has solved the challenge of high power costs caused by growing video demand. With a workload optimization mindset in mind, Supermicro
once again brings the faster, better, and greener solution to the market, and $200 for a single High definition channel stream is no longer a dream.

Specifications of the Supermicro AS-1114S-WN10RT with NETINT Codensity T408:

<table>
<thead>
<tr>
<th>Compute</th>
<th>AMD EPYC™ 7002/7003 Series Processor</th>
</tr>
</thead>
<tbody>
<tr>
<td>Memory</td>
<td>Up to 4TB (16 DIMMS)</td>
</tr>
<tr>
<td>NVMe Support</td>
<td>10x</td>
</tr>
<tr>
<td>PCI-E Expansion</td>
<td>Up to 3 x PCI-E Slots</td>
</tr>
<tr>
<td>Network Options</td>
<td>Dual 10GBase-T LAN</td>
</tr>
<tr>
<td>Maximum Power</td>
<td>700W: 100 -140Vac</td>
</tr>
<tr>
<td></td>
<td>750W: 200 – 240Vac</td>
</tr>
<tr>
<td></td>
<td>750W: 200 – 240Vdc (for CCC only)</td>
</tr>
<tr>
<td>Transcoders</td>
<td>10 x NETINT T408</td>
</tr>
<tr>
<td>Transcoding Capacity</td>
<td>4K @ 60 FPS</td>
</tr>
<tr>
<td>Codec Support</td>
<td>H.264 – Encode &amp; Decode</td>
</tr>
<tr>
<td></td>
<td>H.265 – Encode &amp; Decode</td>
</tr>
</tbody>
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Table 1 - Supermicro 4K Streaming Solution Specifications

Additional Resources

https://www.supermicro.com/en/Aplus/system/1U/1114/AS-1114S-WN10RT.cfm