Perception TeslaTrans™

Head-end IRD / IP Encode / IP Transcode Platform

Powered by NVIDIA GPU transcoding engine

Perception integrated NVIDIA GPU decoding & encoding API as integral part of the Perception TVCDN ecosystem. Encoding and transcoding is executed entirely on NVDEC/NVENC H.264/265 hardware processors with support for up to 8K profile. Streaming workflow is fully optimised to utilise advantages of Perception TVCDN Multicast Grid – a control and data distribution mesh network interconnecting all servers in the Perception TVCDN cloud in real time. **Perception TeslaTrans™** ubiquitous head-end transcoding solution automates transcoding workflow from the live contribution input, or files ingest, to the Perception TVCDN origin servers delivering the ultimate picture quality at low latency.

TeslaTrans delivers ultimate cost/performance ratio utilising encoding on the latest generation of **NVIDIA A16 GPU** hardware accelerator cards **with support for up to 8K resolution**. NVIDIA A16 features 4 on-chip hardware encoders (NVENC) and 8 decoders (NVDEC) on a single A16 board; up to four A16 cards per single 1U chassis deliver the highest encoding density per rack space unit. A16 GPU hardware provides the best decode / encode / transcode performance translating to a maximized number of video streams per transcoding server at very attractive price delivering industry best TCO.

TeslaTrans adaptive streaming multi-bitrate transcoder is enterprise level scalable platform delivering low latency real-time encoding and transcoding with support for HEVC/H.265, AVC/H.264, AV1 and MPEG-2 for the highest-quality video experience.

Application

IPTV SOLUTIONS

Head-end solution for encoding and multiplexing

- **OTT SOLUTIONS**
  OTT broadcasting with adaptive bitrate video streaming via HLS, MPEG-DASH and SRT protocols
- **DVB-T/C/S HEAD-END**
  Head-end solution for encoding and multiplexing

LOW LATENCY STREAMING

Real-time transcoding with a minimum possible delay: 280 ms for DVB and 120 ms for IP networks

- **LIVE BROADCASTING**
  4K video input from SDI for further broadcasting via various types of networks
- **POINT-TO-POINT VIDEO DELIVERY**
  Delivery of media content over IP with SDI/HDMI inputs and outputs with optimal compression and quality

Key Features

ANY ENCODING SCHEME WITH UNCONDITIONAL RELIABILITY

- Accelerated NVIDIA NVDEC/NVENC GPU-based decoding / encoding for the highest video quality and the industry highest rack U density possible
- Configure unique encoding schemes fitting your requirements and use the redundancy mode for uninterrupted service
- Encoding schemes configurator and centralized control over several encoding servers via GUI and web-interface
- Support of MPTS streaming to DVB/ATSC modulator
- Support of MPTS demultiplexing to SPTS
- Support of SPTS multiplexing to MPTS
- Logo overlay
- Audio level correction
- Audio resampling
- Frame rate conversion
- Deinterlacing
- Denoising
- Cropping
- Picture resizing
- Hardware transcoding on NVIDIA graphics card
- Adaptive streaming support over SRT/HLS/MPEG-DASH protocols
- 4K HEVC distributed transcoding
- SCTE-35 ad triggers passthrough

CENTRALIZED CONTROL

- Managing several encoding servers via GUI and web-interface
- Redundancy mode - immediate automatic changeover to a redundant source in case pre-defined errors occur
- Mechanism of responses to events occurring with an input stream using the integrated monitoring system
- Distributed transcoding support
- Mechanism for quick back up in N+M Mode
- SPTS monitoring functions enabling to spot CC errors
- Error notifications via e-mail or using SNMP protocol

Software Specifications

INPUT FORMATS

Interfaces:

- Ethernet IP
- SDI, HD-SDI
- DVB-ASI
- HDMI
- Analog
- NDI®

Streaming:

- MPEG-2 TS UDP/RTP/SRT
- HLS
- RTSP
- SRT
- RTMP
- RIST

Video:

- HEVC/H.265
- AVC/H.264
- MPEG-2
- MPEG-4.2
- Uncompressed (RGB, YV12, YUY2)

Audio:

- AAC/HE-AAC v1
- MPEG-1/2 Layer I/II/III
- AC3 (pass-through)
- Analog AES/EBU
- PCM
- Any (pass-through)

OUTPUT FORMATS

Video:

- **HEVC/H.265- up to 8K resolution**
- **AVC/H.264 - up to HD resolution**

Audio:

- AAC
- HE-AAC (v.1)
- MPEG-1/2 Layer I/II
- AC3 (pass-through)
- Any (pass-through)

Interfaces:

- Ethernet IP
- SDI, HD-SDI
- DVB-ASI
- HDMI
- NDI

Streaming:

- MPEG-2 TS UDP/RTP/SRT
- HLS
- MPEG-DASH
- RTMP
- SRT
- RIST

CONTROL

- Managing via GUI and web-interface
- Management and monitoring via HTTP
- SNMP
- Command line
- System information monitoring
- SCTE-35 pass-through

SUBTITLES

- Closed Captions EIA-608, EIA-708
- DVB subtitles
- Teletext subtitles

SUPPORTED DVB IRD PCIe CARDS

- TBS6508 – DVB-S2X/S2/S/T2/T/C2/C/ISDB-T multi-standard tuner card with support for 8x different satellite transponders decoding with 4x independent RF inputs
- TBS6909-X V2 - DVB-S/S2/S2X annex M tuner card with support for 8x different satellite transponders decoding with 4x independent RF inputs
- TBS6903-X - DVB-S2X/S2/DVB-S QPSK, 8PSK tuner card with support for 2x different satellite transponders decoding with 2x independent RF inputs
- TBS6900 - DVB PCIe card with 2x common interface (CAM) slots for pay TV decryption

NOTE: *In case large number of DVB IRD inputs are needed then IRD cards can be installed into a separate 1U server chassis.*

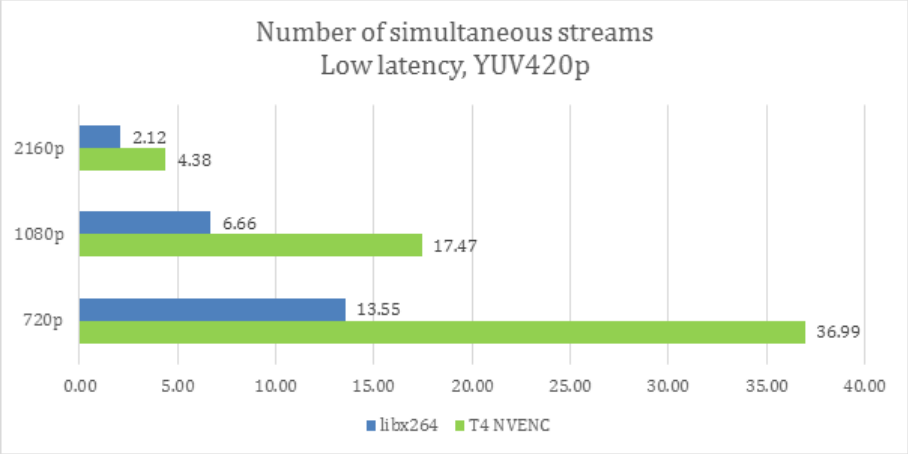
PERFORMANCE

The maximum number of streams, encoded in parallel, per GPU, is dependent on GPU processing power and the complexity of the chosen encoding profile (codec, resolution, bitrate, etc.) therefore the below numbers are for information guideline only, illustrating performance when encoding low latency single pass profile.

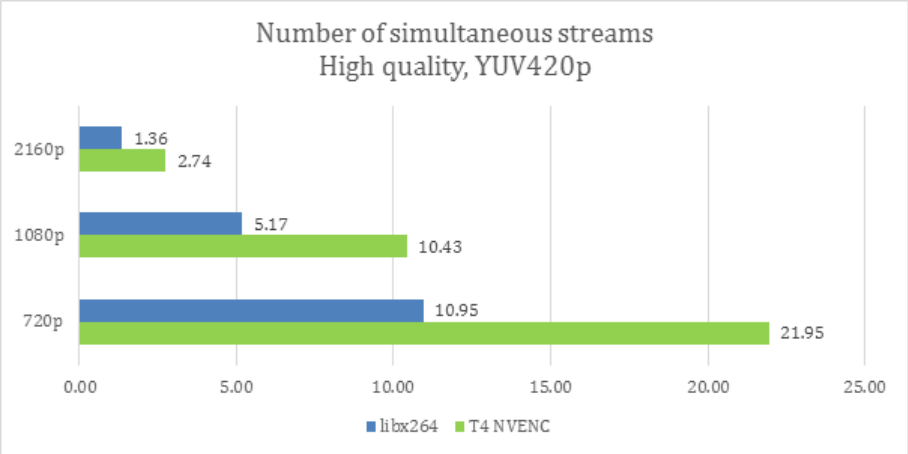
Estimated encoding performance for 4x NVIDIA A16 64GB GPU 1U server
(Total of 32x NVDEC & 16x NVENC processors):

- 115 input streams (1080i or 720p H.264 @30fps)
- transcoded into 576 MBR output streams (H.264 @30fps in Low Latency mode)

NVIDIA reference test results below are for a single T4 NVENC Turing architecture processor while A16 NVENC is the latest Ampere architecture which is even more efficient:



Number of streams encoded simultaneously at 30 FPS in Low Latency mode



Number of streams encoded simultaneously at 30 FPS in High Quality mode

Video Encode and Decode NVIDIA GPU Support Matrix info:
https://developer.nvidia.com/video-encode-and-decode-gpu-support-matrix-new

Hardware Specifications

RECOMMENDED SYSTEM REQUIREMENTS

- 1U SuperMicro Dual Processor SYS-120GQ-TNRT server with 4x PCIe DFHFL GPU slots and 2x 10GE NIC
- 2x INTEL XEON SILVER 4310 2.1GHz 12 core CPU
- 8x 16GB DDR4 3200 ECC Reg RAM module
- 2x M.2 1TB NVMe Enterprise SSD
- 4x NVIDIA A16 64GB GPU accelerator card with 8x NVDEC & 4x NVENC
- Windows 10 Server 2019 (64 bit) or Perception OS (custom version of RedHat Enterprise Linux/CentOS)