Spin Digital Live Encoder

Real-time VVC and HEVC software encoder optimized for high-end live applications in UHD broadcasting, Internet streaming, and immersive media.

Product Highlights

- State-of-the-art CPU-based encoder
- Real-time VVC encoding: 4Kp60, 8Kp30
- Real-time HEVC encoding: 4Kp120, 8Kp60, 12Kp30
- Higher compression efficiency than competing software and hardware encoders
- High-efficiency and low-latency encoding modes
- State-of-the-art rate control and perceptual coding
- SDI and IP input capture
- Contribution-to-distribution live transcoding
- Low-latency streaming: UDP, RTP, SRT, RIST, Zixi
- Adaptive streaming: HLS, DASH
- Next Generation Audio (NGA): MPEG-H Audio

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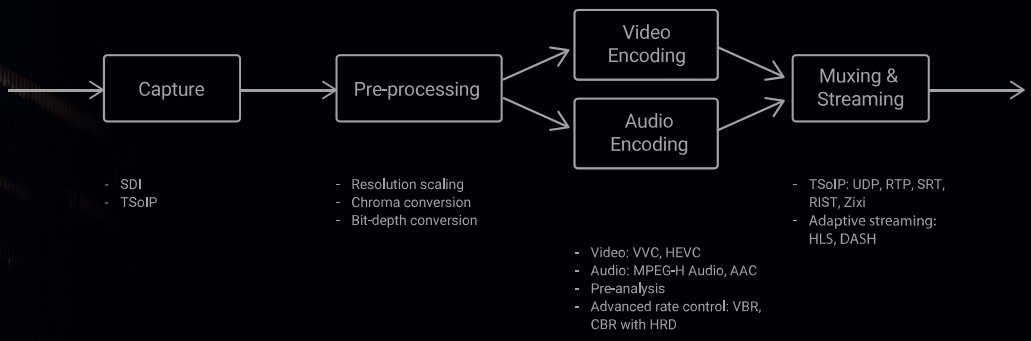
SPIN ENC LIVE

Complete application for live video encoding:

- Live SDI and IP input capture
- Real-time preprocessing filters
- HEVC and VVC video encoding
- AAC and MPEG-H audio encoding
- TS-over-IP and adaptive streaming



USE CASES

High-end 4K/8K UHD live streaming and broadcasting:

- High-quality and low-bitrate live 4K/8K encoding

Low-latency contribution encoding:

- 4:2:2 high-bitrate output format
- Live encoding with low delay

Contribution-to-distribution live transcoding:

- Live IP capture, decoding, and encoding on a single system
- 4:2:2 and 4:2:0 formats
- HEVC and VVC codecs

Adaptive bitrate (ABR) streaming over HTTP:

- Closed GOP coding: HEVC, VVC
- Open GOP coding: VVC

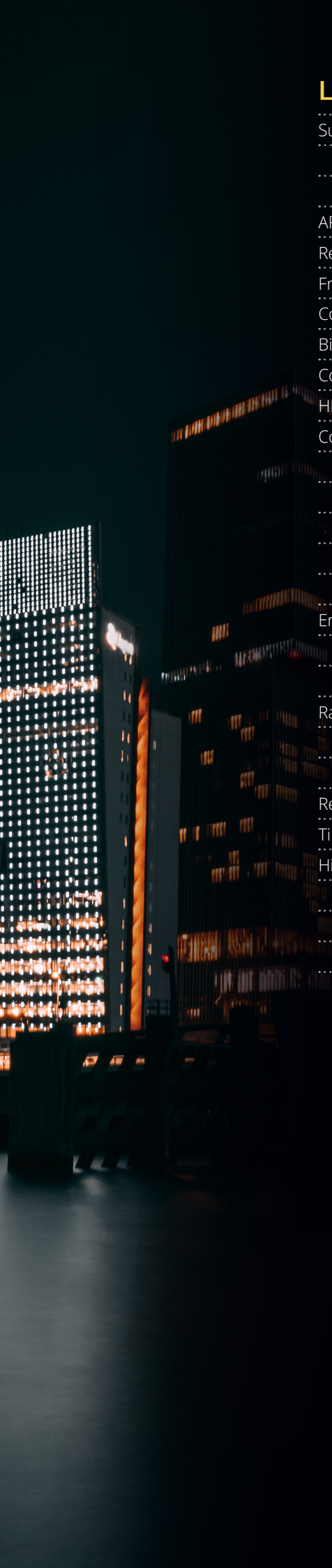
Immersive live VR:

- 8K/12K video with 3D audio

Live stream recording (live to file)

LIVE VVC ENCODER

- Support for the VVC standard: Main 10 profile
- Resolutions (pixels): 1920x1080, 3840x2160, 7680x4320, custom
- Frame rates (fps): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60, 100, 119.88, 120
- Color format: 4:2:0
- Bit depths: 8-, 10-bit
- Color spaces: BT.601, BT.709, DCI-P3, BT.2020
- HDR support: ST2084 transfer function (PQ), ST2086 HDR metadata, HLG
- Coding configurations:
  - Intra-only, random-access, low-delay, chunk-based
  - Hierarchical GOP sizes: 1, 2, 4, 8, 16, 32 frames
  - Presets: slower, slow, balanced, fast, faster
  - Configurable HRD buffer
  - Perceptual encoding mode
- End-to-end latency:
  - High-efficiency mode: 2917 ms + network latency
  - Low-delay mode: 1000 ms + network latency
- Rate control:
  - Broadcast-level CBR
  - Constrained VBR
- Real-time operation mode
- Timecode SEI insertion
- Highly optimized for recent CPUs:
  - SIMD processing: SSE4.1, AVX2, AVX-512, VNNI
  - Scalable multithreading: wavefront, frame parallelism, pipelining
  - Memory optimizations



LIVE HEVC ENCODER

- Support for the HEVC standard:
  - Main and Main 10 profiles
  - Range Extensions (HEVCv2) profiles
- ARIB STD-B32 version 3.9 (8K with 4 slices)
- Resolutions (pixels): 1920x1080, 3840x2160, 7680x4320, custom
- Frame rates (fps): 23.98, 24, 25, 29.97, 30, 50, 59.94, 60, 100, 119.88, 120
- Color formats: 4:2:0, 4:2:2
- Bit depths: 8-, 10-bit
- Color spaces: BT.601, BT.709, DCI-P3, BT.2020
- HDR support: ST2084 transfer function (PQ), ST2086 HDR metadata, HLG
- Coding configurations:
  - Intra-only, random-access, low-delay, chunk-based
  - Hierarchical GOP sizes: 1, 2, 4, 8, 16, 32 frames
  - Presets: slower, slow, balanced, fast, faster
  - Configurable HRD buffer
  - Perceptual encoding mode
- End-to-end latency:
  - High-efficiency mode: 2884 ms + network latency
  - Low-delay mode: 650 ms + network latency
- Rate control:
  - Broadcast-level CBR
  - Constrained VBR
- Real-time operation mode
- Timecode SEI insertion
- Highly optimized for recent CPUs:
  - SIMD processing: SSE4.1, AVX2, AVX512, VVNI
  - Scalable multithreading: Wavefront, frame parallelism, pipelining
  - Memory optimizations

VIDEO PREPROCESSING FILTERS

- Scaling, format and color conversion, cropping/padding, overlays
- Automatic filter chain generation
- High-performance CPU implementation: real-time 8K processing

AUDIO CODING

- Codecs: AAC, MPEG-H Audio
- Channel formats:
  - AAC: 2.0, 5.1, 7.1, 22.2
  - MPEG-H Audio: baseline profile up to level 4

INPUT INTERFACE

- Live SDI capture:
  - 3G-SDI, 6G-SDI, 12G-SDI
  - Multi-channel tiled capture for single large surfaces:
    - Flexible input layouts
    - Example: 15360x2160 (4x1 4K) pixels over a 4x12G-SDI interface
  - Simultaneous multiple video link capture:
    - Multiple video channels to be captured simultaneously
    - Allow for frame-synchronized encoding and playback
- Live TS-over-IP capture:
  - Transport formats: UDP, RTP, SRT, RIST, Zixi
  - Video codecs: HEVC, VVC
- File input: YUV (video), PCM (audio)

OUTPUT INTERFACE

- TS-over-IP streaming:
  - Transport formats: UDP, RTP with optional FEC, SRT, RIST, Zixi
  - Video codecs: HEVC, VVC
- Adaptive streaming over HTTP:
  - HLS, DASH
  - MPEG-2 TS, fMP4
  - Multi-resolution encoding and streaming

CLOUD STREAMING AND DELIVERY

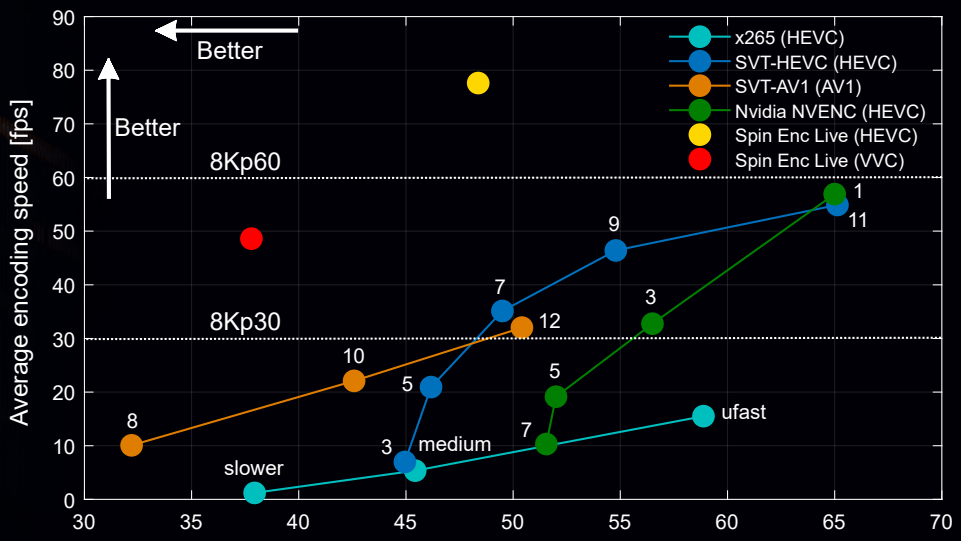
- TS-over-IP streaming: compatible with AWS MediaConnect
- Adaptive streaming: AWS S3, AWS Elemental MediaStore, Cloudfront

COMPRESSION AND PERFORMANCE FOR REAL-TIME 8K

Key performance indicators:

- Higher compression efficiency than software and hardware encoders under real-time conditions
- Highest encoding performance allowing high-end applications such as 8Kp60

Encoding speed at equal quality (bitrate that produces the same PSNR)



TEST SETUP

Encoders:

- Spin Enc Live v2.0 - HEVC, VVC - preset: fast
- x265 v3.5 - presets: slower, medium, ultrafast
- SVT-HEVC v1.5.1 - presets: 3, 5, 7
- Nvidia NVENC v12.0 - tune: hq - presets: 1, 3, 5, 7
- SVT-AV1 v1.4.1 - presets: 8, 10, 12

Encoding settings:

- Tuned for live content distribution: CBR, 1-s buffer, 1-s intra period, long GOP
- 8K-UHD distribution format: 7680x4320 pixels, 4:2:0, 10-bit, HDR

Encoding system:

- CPU: 2x Intel Xeon Platinum 8368 (2x 38 cores)
- Memory: 128 GB (16x 8GB, DDR4-3200)
- GPU: Nvidia RTX 3070

spin enc live

RECOMMENDED PLATFORMS FOR VVC ENCODING

Use case	Format	Max bitrate	Platform
4K distribution	4Kp60 4:2:0 10 bit	30 Mbps	CPU: 2x Intel Xeon Gold 6330 (2x 28 cores) Memory: 128 GB (16x 8GB, DDR4-2933)
8K distribution	8Kp30 4:2:0 10-bit	40 Mbps	CPU: 2x Intel Xeon Platinum 8368 (2x 38 cores) Memory: 128 GB (16x 8GB, DDR4-3200)

RECOMMENDED PLATFORMS FOR HEVC ENCODING

Use case	Format	Max bitrate	Platform
4K distribution	4Kp60 4:2:0 10 bit	80 Mbps	CPU: Intel Xeon Gold 6312U (24 cores) Memory: 64 GB (8x 8GB, DDR4-3200)
4K contribution	4Kp60 4:2:2 10-bit	100 Mbps	CPU: Intel Xeon Gold 6330 (28 cores) Memory: 64 GB (8x 8GB, DDR4-2933)
4K HFR	4Kp120 4:2:0 10-bit	100 Mbps	CPU: 2x Intel Xeon Gold 6354 (2x 18 cores) Memory: 128 GB (16x 8GB, DDR4-3200)
8K distribution	8Kp60 4:2:0 10-bit	120 Mbps	CPU: 2x Intel Xeon Platinum 8368 (2x 38 cores) Memory: 128 GB (16x 8GB, DDR4-3200)

ENCODER PACKAGE

Live encoder software with web-based graphical user interface

Product documentation

PLATFORM SUPPORT

OS:	Red Hat Linux 8/9, Ubuntu Linux 20.04/22.04
CPU:	X86_64. SIMD instructions: SSE 4.1, AVX2, AVX512, VNNI
SDI:	AJA Kona 5 (3G, 6G, 12G), AJA Corvid 44 (3G, 6G, 12G), AJA Corvid 88 (3G)

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