



HEVC STATMUX

Statistical Multiplex of HEVC Live Encoders

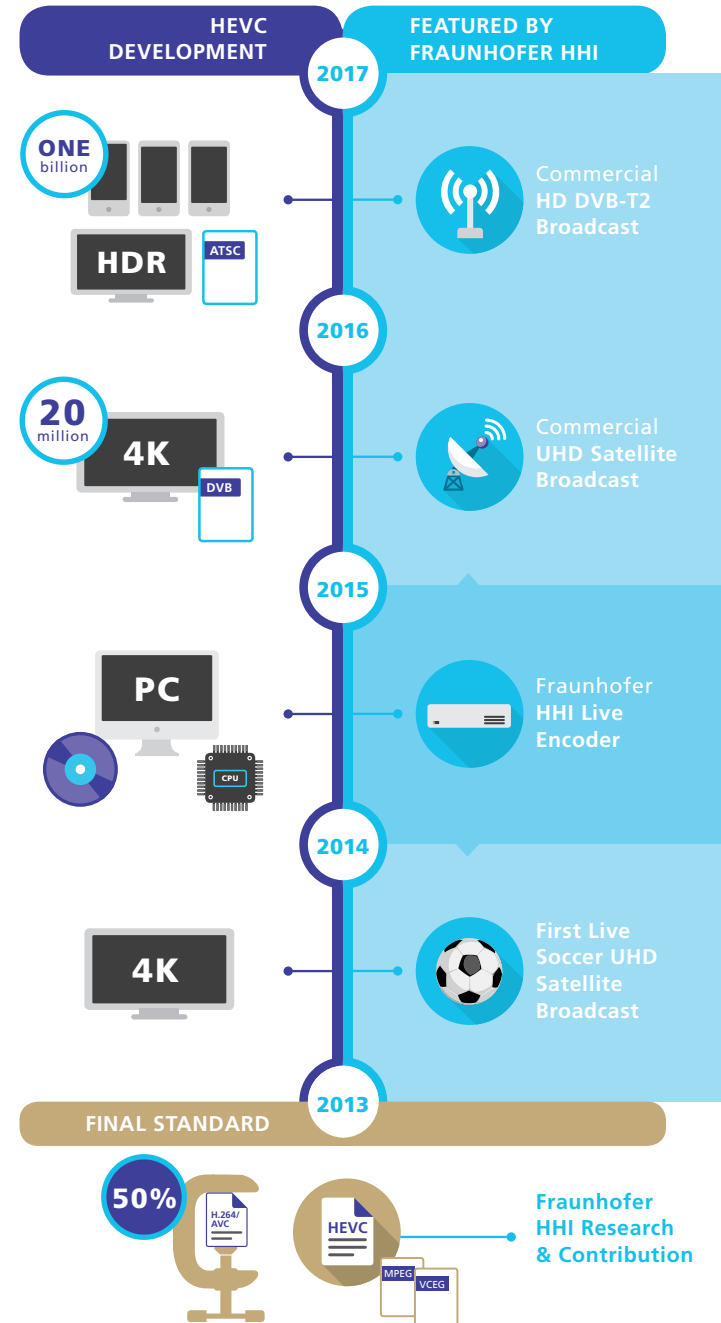
Fraunhofer HHI has developed a highly efficient live Statistical Multiplexer (Statmux) for optimized bitrate allocation between multiple Fraunhofer HHI HEVC live encoders. The bitrate of each encoder is adjusted in a closed-loop Statmux to optimize the bandwidth usage and improve the video quality.

Specifications

- Most efficient usage of available throughput
- Content-aware channel bitrate adjustment
- Scales over multiple servers with increasing number of channels
- Joint optimization of HD and UHD channels
- Special operating mode of the HHI HEVC Live Encoder SDK
- One HHI HEVC Live Encoder instance per channel

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CONTACT

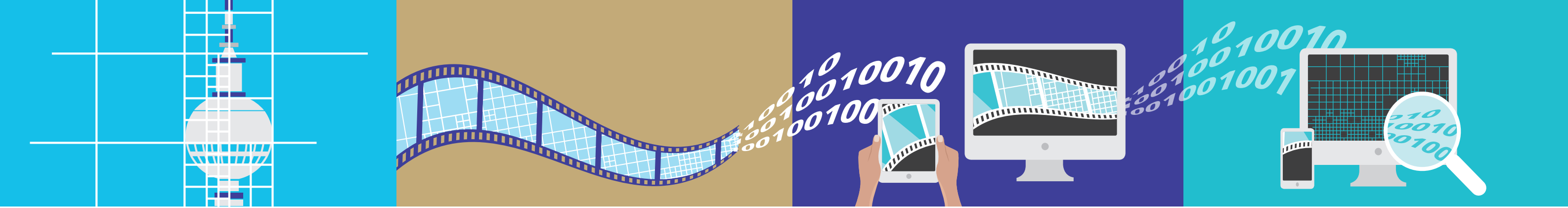
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ABOUT THE FRAUNHOFER HHI TEAM

The Image & Video Coding Group (IVC) has contributed significantly to the entire development process of two generations of video coding standards including their major enhancement extensions: H.264/MPEG Advanced Video Coding (AVC) and H.265/MPEG High Efficiency Video Coding (HEVC).

IVC has made substantial contributions to the field of video coding with a high impact in academia, international standardization, and industry.

The current work is oriented towards the research and development of next-generation video coding algorithms. In addition, the scientists and engineers are developing HEVC-based solutions, demonstrating the benefits of the latest standardized video coding technology.

HEVC 4K LIVE SOFTWARE ENCODER

Live software encoding up to 2160p60

Fraunhofer HHI has developed an encoding solution that fully exploits the unbeaten compression potential of HEVC. The Fraunhofer HHI shoot-out winning HEVC live encoder powers the field-proven Rohde & Schwarz HEVC turnkey broadcast solutions. Numerous DVB-T2 HD and DVB-C/S2 UHD broadcast channels are currently on air with the Fraunhofer HHI HEVC live encoder.

Specifications

- HEVC Main and Main 10 Profile conformance
- 2160p60 10-bit live encoding for OTT or UHD broadcast
- I, P and hierarchical B pictures
- CPU optimizations (SSE4.1 to AVX512)
- Look ahead processing
- HRD conformance for VBR and CBR
- HDR support according to ITU-R Rec. BT.2100 incl. PQ10
- Available as SDK for Microsoft Windows, Linux & Apple macOS
- Ffmpeg plugin for versatile offline encoding/transcoding

HEVC LIVE SOFTWARE DECODER

Live software decoding up to 10Kp60

Fraunhofer HHI has developed a resource efficient, multithreaded HEVC software decoder that enables live decoding up to 10Kp60 ultra high resolution video. It perfectly suits the ever-growing need for high resolution video in applications such as mobile web streaming for panoramic video and high-quality TV broadcasting.

Specifications

- HEVC Main, Main 10 Profile conformance
- Optional HEVC Range Extensions conformance
- 10Kp60 10-bit live decoding for panoramic video, OTT or UHD broadcast
- CPU optimizations (SSE2 to AVX512 and NEON for ARM)
- Robust error resilience and sophisticated error concealment
- HDR support according to ITU-R Rec. BT.2100 incl. PQ10 and HLG10
- Available as SDK for Microsoft Windows, Linux, Android, Apple macOS & iOS
- Fraunhofer HHI Linux player for reliable playback with dedicated HDMI/SDI output

HEVC 4K BITSTREAM TEST SUITE

Conformance testing up to Main 10 Profile, Level 5.1

To achieve high coding efficiency, the HEVC standard allows much more flexibility in encoding decisions and bitstream variations compared to previous video coding standards. For HEVC decoder products, it is important that they are developed fully conform to the standard with the aim to avoid update or replacement costs if incompatibilities are found later. The Fraunhofer HHI HEVC bitstream test suite is a set of specially crafted coded video sequences that test the functionality of all individual components of an HEVC decoder and their interactions.

Specifications

- Low level syntax and decoding process test bitstreams
- High level syntax test bitstreams
- Stress test bitstreams
- Pathological test bitstreams to test error resilience/concealment
- Main 10 Profile test streams
- Targeted at 2160p60 Main and Main 10 Profiles (both at Level 5.1 Main Tier)
- Includes reference decoder to verify the decoding results