

MAINCONCEPT

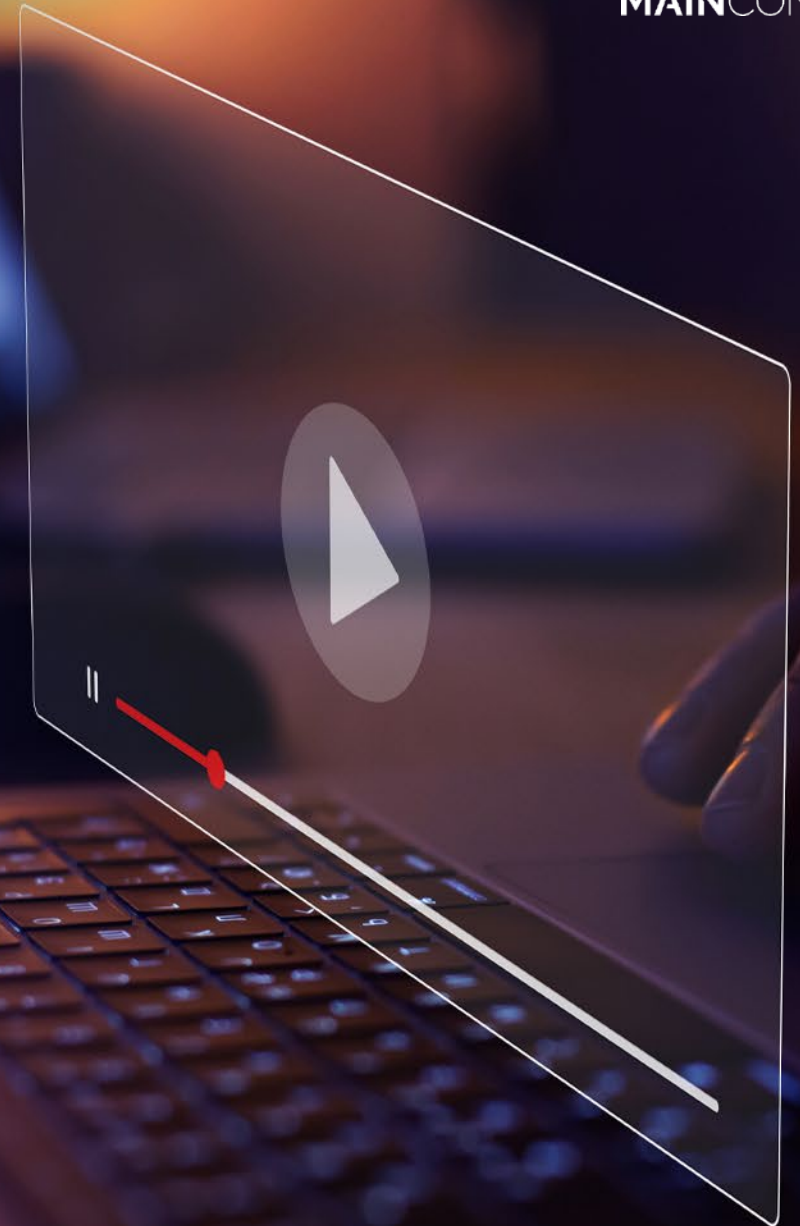
About MainConcept

October 2023



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Notable news

- Advertising advancement with HEVC and VVC
- Next-generation TV & OTT broadcasting standards
- First commercial integration of our VVC/H.266 SDK by MOG Technologies
- Partnerships with Fraunhofer on MPEG-H 3D Audio, InterDigital & Philips with Advanced HDR by Technicolor, V-NOVA with LCEVC
- MainConcept's 30th anniversary



MainConcept @ IBC 2023



UNIQUE CODEC FEATURES

90% of professionally produced video runs through MainConcept

SABET™

AutoLive Encoding

AutoMatch Encoding

CODEC-BASED AD TECHNOLOGY

Unique use of VVC and HEVC to deliver ads in new ways

Targeted and enhanced ads via server-side ad insertion

Bypass ad blockers

Advertisers serve immersive, personalized ad content to viewers



FUTURE BROADCAST TV

Next-generation broadcast standards with AVC, HEVC, VVC & LCEVC

Brazil trials with Fraunhofer IIS, InterDigital, Philips & V-Nova in support of SBTVD TV 2.5 & 3.0

Fraunhofer IIS: MPEG-H and xHE-AAC Audio collaborations



DID YOU KNOW?
 MainConcept technology
 is used to process most
 of the world's
 professional video.

 Production

 Broadcast

 Streaming

 Gaming

 Surveillance

 Medical

 Digital Signage

 Ad-Tech

The MainConcept Portfolio

PRODUCTS

SDKs

- VVC
- HEVC
- AVC
- MPEG-2
- AV1
- Apple ProRes
- Dolby Digital
- Fraunhofer
- Audio (AAC, PCM...)
- Streaming
- ...and many more

Plugins

- FFmpeg
- Blackmagic Design
- Adobe

Applications

- Live
- Cloud
- Transcoding

OPERATING SYSTEMS



FRAMEWORKS



SILICON



arm



INGEST

- MP4/ISO BMFF
- MPEG PS/TS/SS
- MXF
- ASF/WMV
- 3GP
- DV/DIF
- F4V
- MJ2
- DCI
- RTP/RTSP
- RTMP
- ICECAST
- DASH/HLS
- SRT
- Zixi
- AVCHD
- Sony XAVC
- Sony XAVC 2.0/XAVC HS
- Sony XDCAM
- Panasonic DVCPRO
- Panasonic AVC-ULTRA
- Canon XF-HEVC
- IMF RDD-45
- DVD/Blu-ray



DECODE

- AVC/H.264
- HEVC/H.265
- VVC/H.266
- MPEG-1/2
- JPEG 2000
- DV/DVCPRO 25/50/HD
- Avid DNxHD/DNxHR
- Apple ProRes
- MJPEG
- MPEG-4 Part 2/H.263
- VC-1

- DXVA MPEG-2
- DXVA AVC/H.264
- DXVA HEVC/H.265
- AVC/H.264 Intel QSV
- HEVC/H.265 Intel QSV
- AVC/H.264 NVIDIA NVDEC
- HEVC/H.265 NVIDIA NVDEC

- AAC & HE-AAC
- AMR
- Dolby Digital
- MPEG Audio Layer I-III
- PCM
- WMA



PROCESS

- Color Space Converter
- Framerate Converter
- SCTE-35
- Smart Rendering AVC/H.264
- Smart Rendering MPEG-2

- Audio Converter



ENCODE

- AVC/H.264
- HEVC/H.265
- AV1
- VVC/H.266
- LCEVC/MPEG-5 Part 2*
- EVC/MPEG-5*
- MPEG-1/2
- JPEG 2000
- DV/DVCPRO 25/50/HD
- Avid DNxHD/DNxHR
- MJPEG
- MPEG-4 Part 2/H.263
- VC-1

- AVC/H.264 Intel QSV
- HEVC/H.265 GPU Acceleration
- HEVC/H.265 Intel QSV
- AVC/H.264 NVIDIA NVENC
- HEVC/H.265 NVIDIA NVENC

- AAC & HE-AAC
- xHE-AAC
- MPEG-H
- AMR
- Dolby Digital
- MPEG Audio Layer I-III
- PCM
- WMA



FORMAT

- MP4/ISO BMFF
- MP4
- MPEG PS/TS/SS
- MXF
- ASF/WMV
- 3GP
- DV/DIF
- F4V
- MJ2
- DCI
- AVCHD
- Sony XAVC
- Sony XDCAM
- Panasonic DVCPRO
- Panasonic AVC-ULTRA
- JPEG-XS*



DELIVER

- MPEG DASH
- Apple HLS
- CMAF
- SRT
- Zixi
- OTT Live/VOD
- RTMP/RTMPS
- RTP/RTSP
- UDP



* Future products

Our Focus



CORE CODECS

VVC
HEVC
AVC



PACKAGING

Mux
Demux
File formats



OPTIMIZATION

ARM
GPU
Servers
Cloud



SERVICES

Support
OSS Integration
Customization
Legacy

Why MainConcept?



REDUCE COSTS

Leverage MainConcept support and professional services instead of increasing your staff



MINIMIZE RISK

Count on MainConcept experts to make sure you have the right tools to do the job



FUTURE-PROOF WORKFLOWS

Keep your content accessible today and every day with our expansive (and still growing) library of codecs

ENDEAVOR

OUR NETWORK

WWE

IMG

UFC

ON LOCATION.

RIOOPEN

ONE
SIXTY
NINETY

 Euroleague
Basketball


THE SHOWS

frieze

 ENDEAVOR
STREAMING

MAINCONCEPT

IMGARENA

WWE
SPORTS



SAILGP

SPORT 24

Hyde Park *
WINTER
WONDERLAND

 IMG ACADEMY

IMG MODELS

IMG
MEDIA

 miami open
presented by 

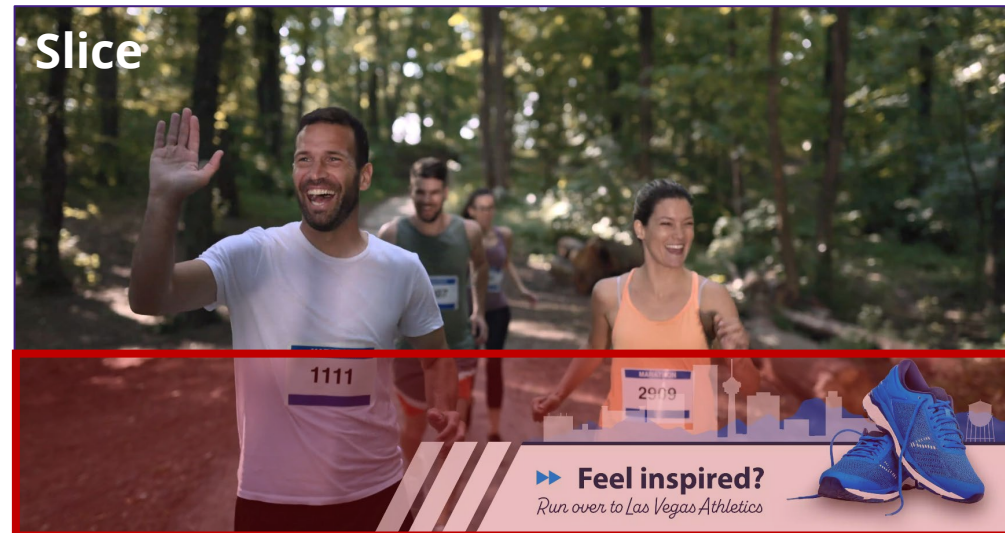
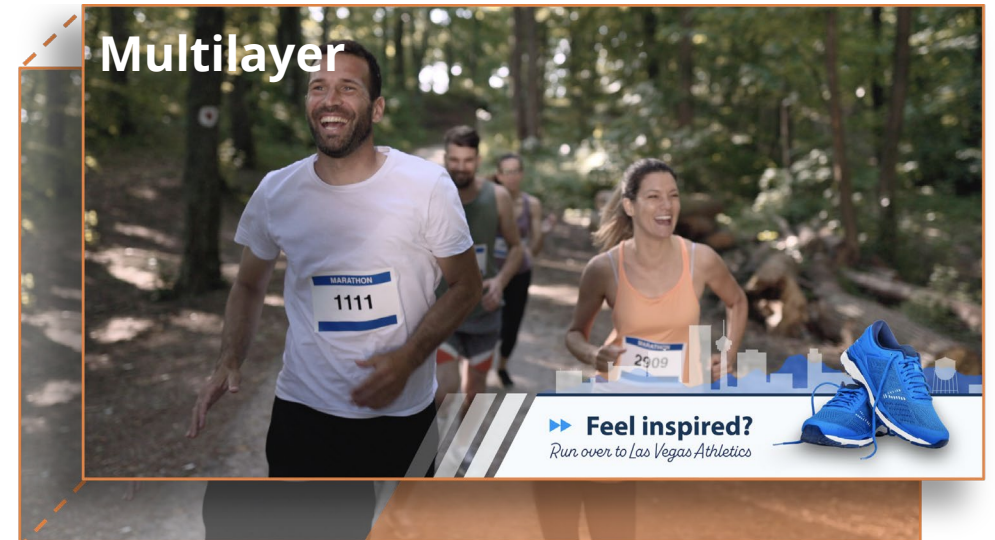
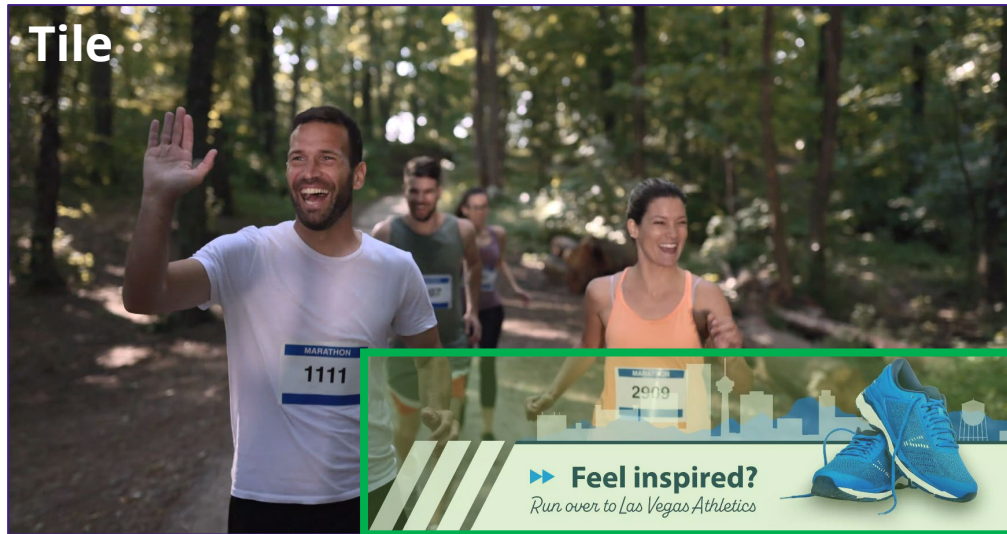


Codec-Based Video Advertising

Enhance your platform with more engaging ads

Ad insertion

Types

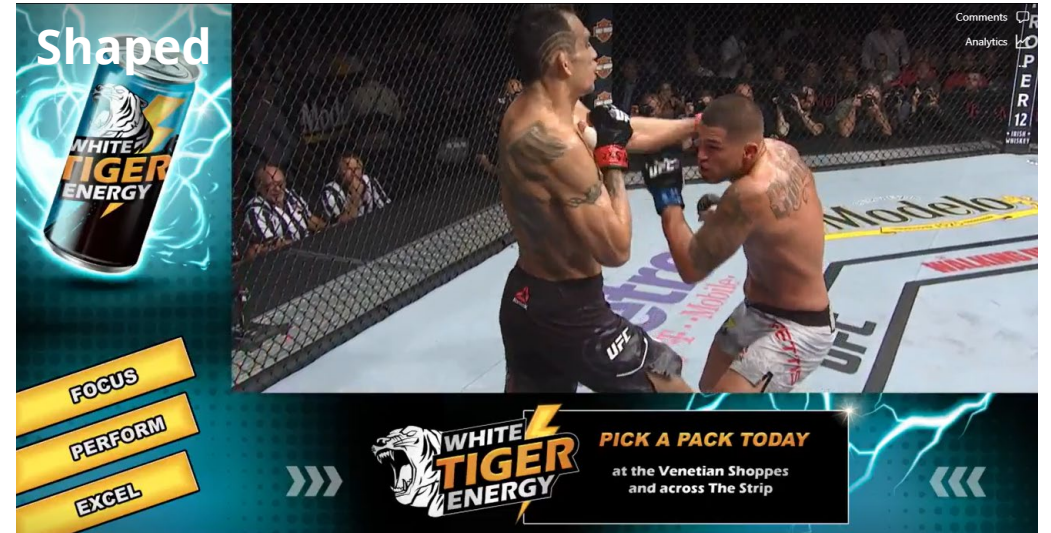
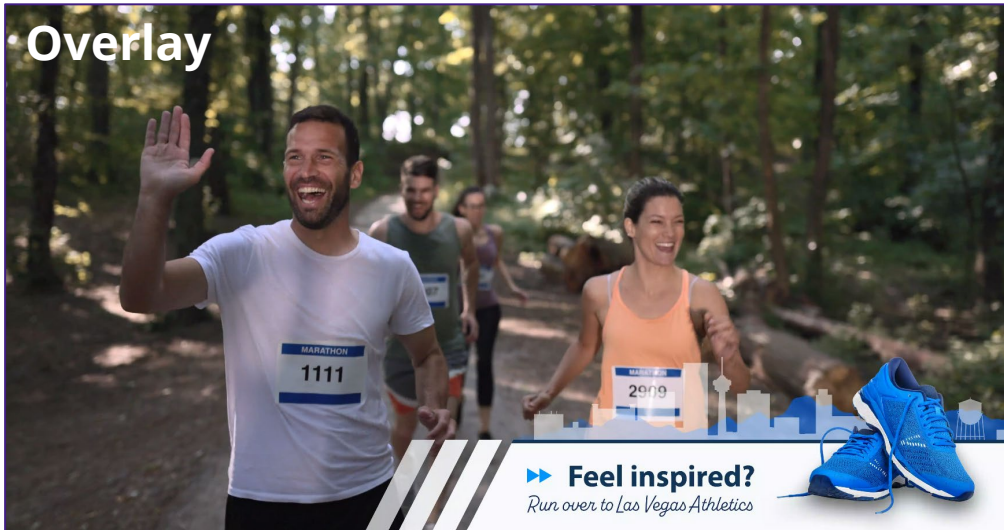


Ad placement

Immersive



Overlay



Codec-based Ad features

Codec	Insertion Type			Placement		
	Tile	Multilayer	Slice	Overlay	Shaped	Immersive
VVC	√	√	√	√	√	√
HEVC	√		√	√	√	√
AVC			√	√		
AV1	√		√	√		√

SCTE-35 is used for marking start and stop times of ad placement no matter the codec

Server-Side Ad Insertion

Benefits



DEVICE INDEPENDENT

Deliver ads to any device, even legacy



BYPASS ADBLOCKERS

Better prevents ad skipping or forwarding

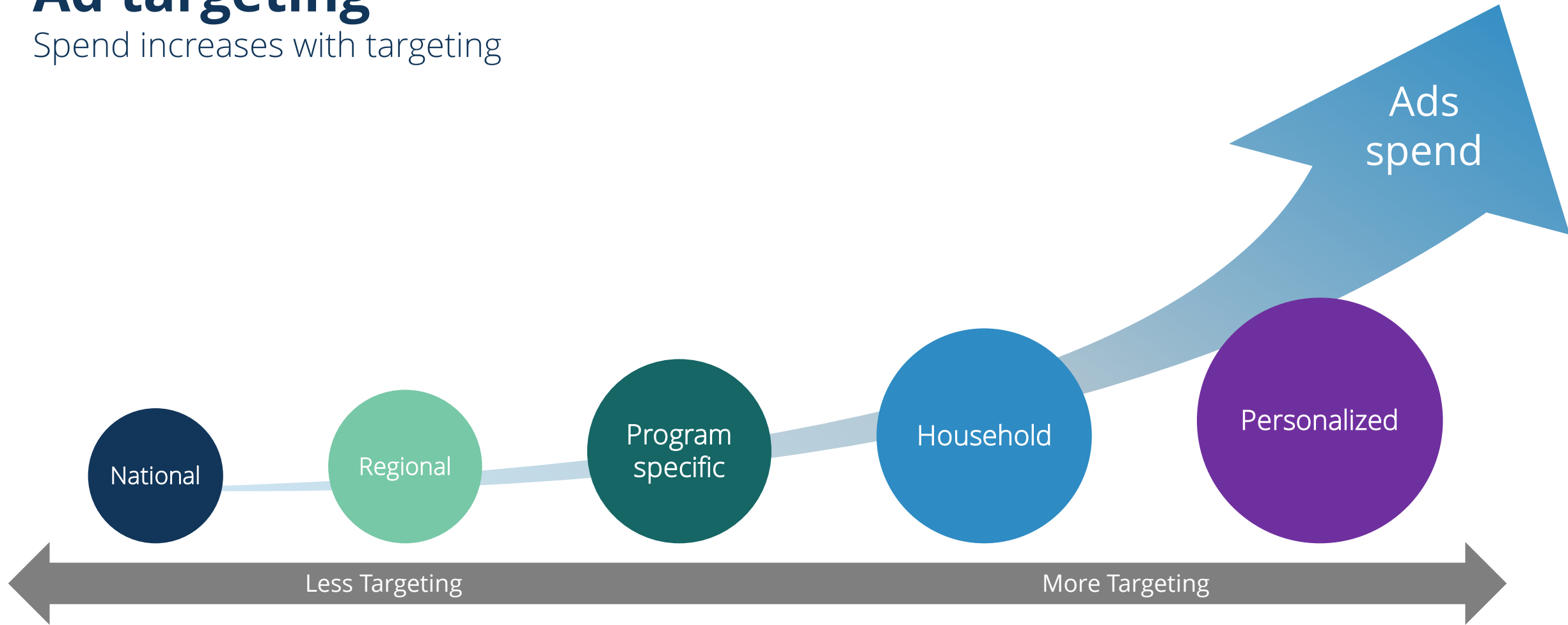


ALLOWS CONTENT-SPECIFIC AD PLACEMENTS

Enables the highest level of ad immersion

Ad targeting

Spend increases with targeting



Broadcasters want better targeting and greater personalization

How are you using ad tech today?



Immersive Broadcast TV

Adopt next-generation standards with VVC, LCEVC and MPEG-H

Immersive Broadcast TV

Innovations in linear and streaming delivery



Live in the cloud

Employing the future-ready VVC codec to the promise of high quality, higher efficiency and reduced bandwidth

- VVC in 8K60, 4K60 and 1080p60, an industry 1st
- MPEG-H 3D Audio
- MainConcept Live Encoder
- Also enabled with AVC & HEVC
- Contribution & Distribution encoding

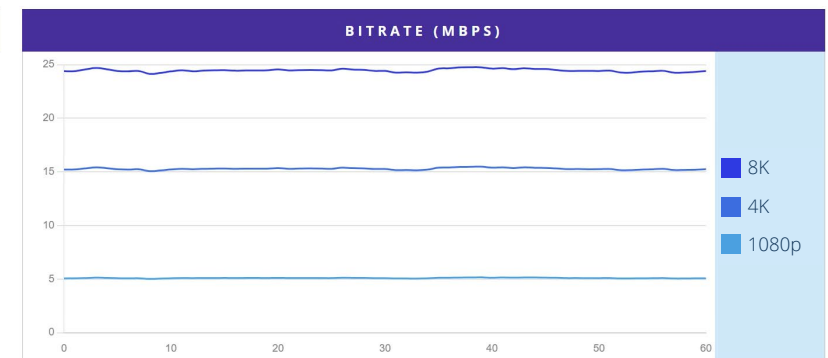
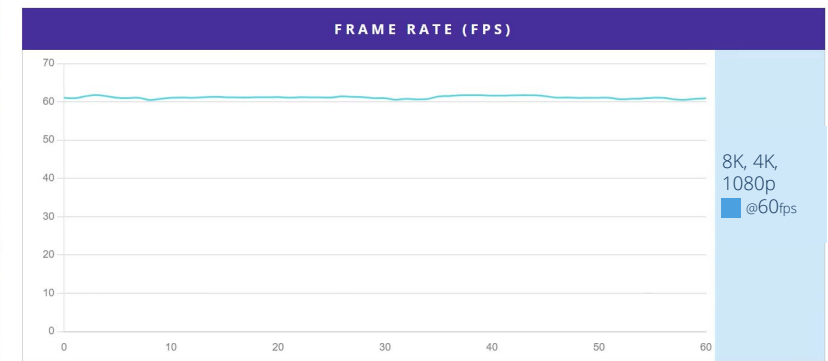
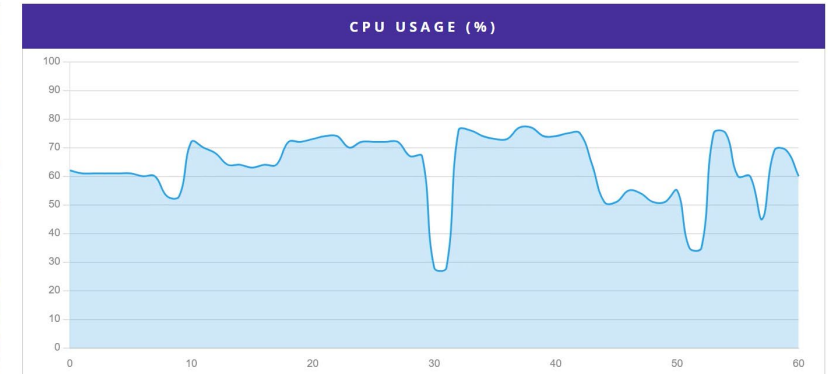
Enhanced linear

Bringing higher quality video and audio to the billions of households accessing linear programming

- Upscaled AVC SDK
- Next generation VVC SDK
- MPEG-H 3D Audio
- Advanced HDR by Technicolor
- MainConcept Live Encoder
- SBTVD TV 2.5 & TV 3.0 compliant

VVC live at 60fps in 8K, 4K and HD

Industry 1st: simultaneous multilayer VVC/H.266 live encoding



NEXT-GENERATION DELIVERY CODEC FOR OTT & BROADCAST

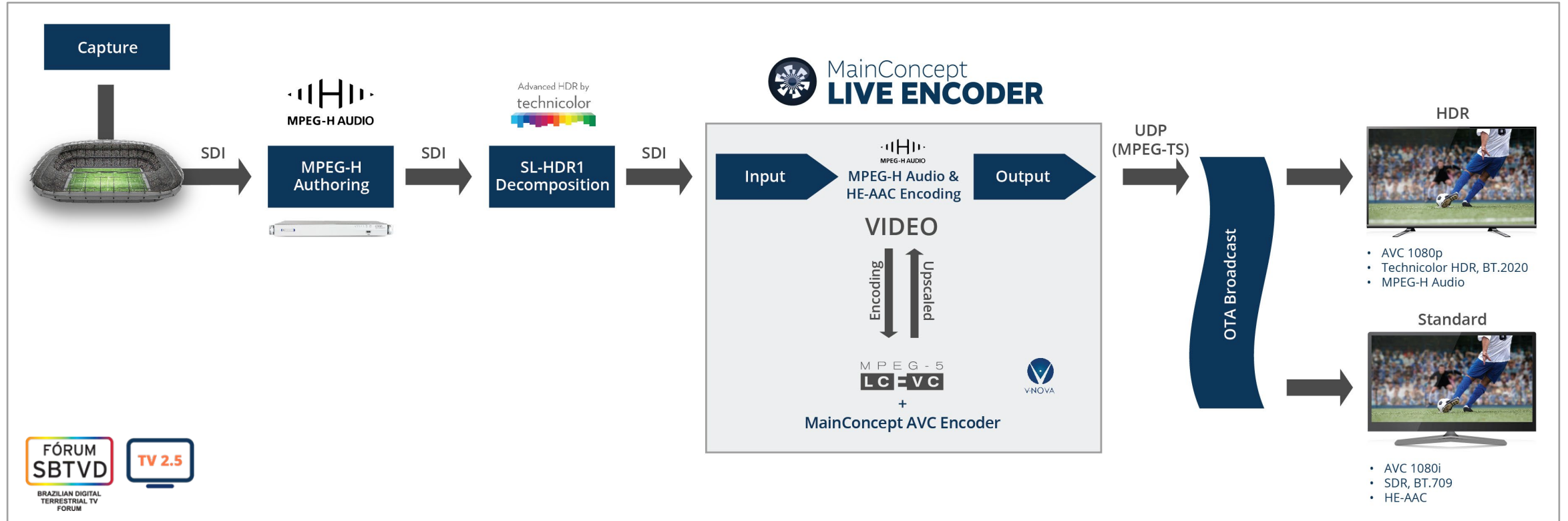
Cloud-enabled VVC Live & VOD Encoding Solutions

- Multi-layer DASH VVC 10-bit encoding in AWS
- Future format embedded in SBTVD TV 3.0 and DVB specifications
- Huge cost savings compared to HEVC/H.265 & AVC/H.264
- Available as an SDK, FFmpeg Plugin and with MainConcept Live Encoder



Traditional+ Workflow

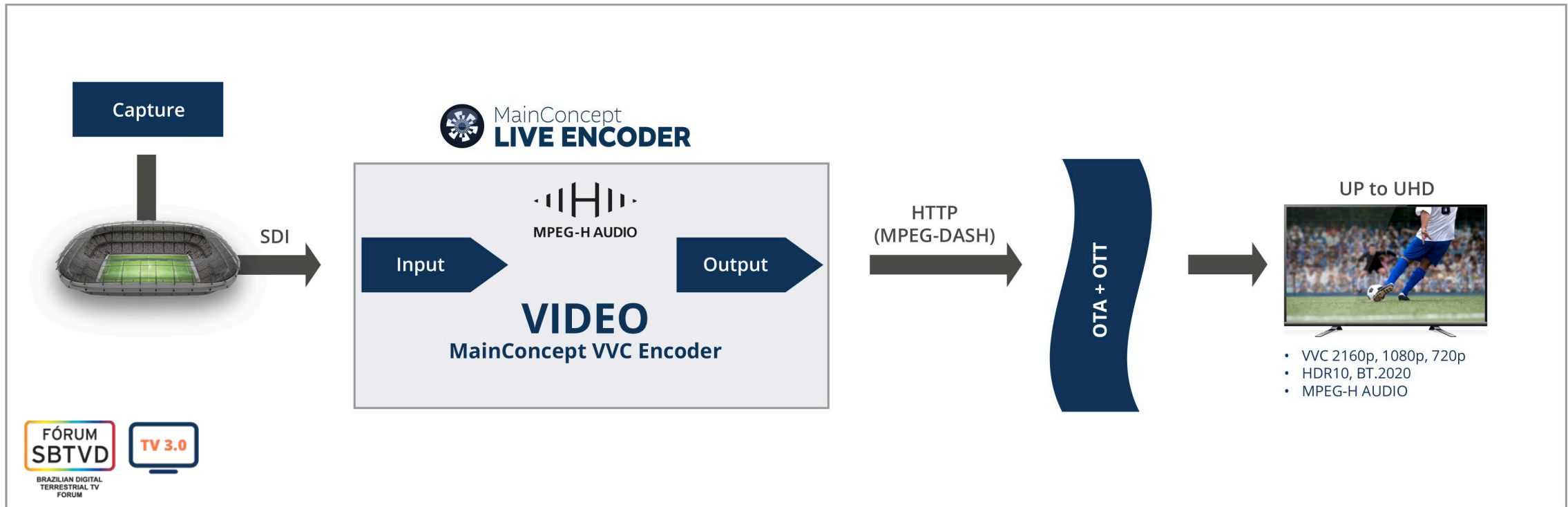
MPEG-H Audio + SL-HDR1 + AVC + LCEVC



- MainConcept Live Encoder with AVC SDK processes the video and audio content
- Allows higher video and audio quality on existing playback devices
- Part of the SBTVD TV 2.5 standard in Brazil

Next-Generation Workflow

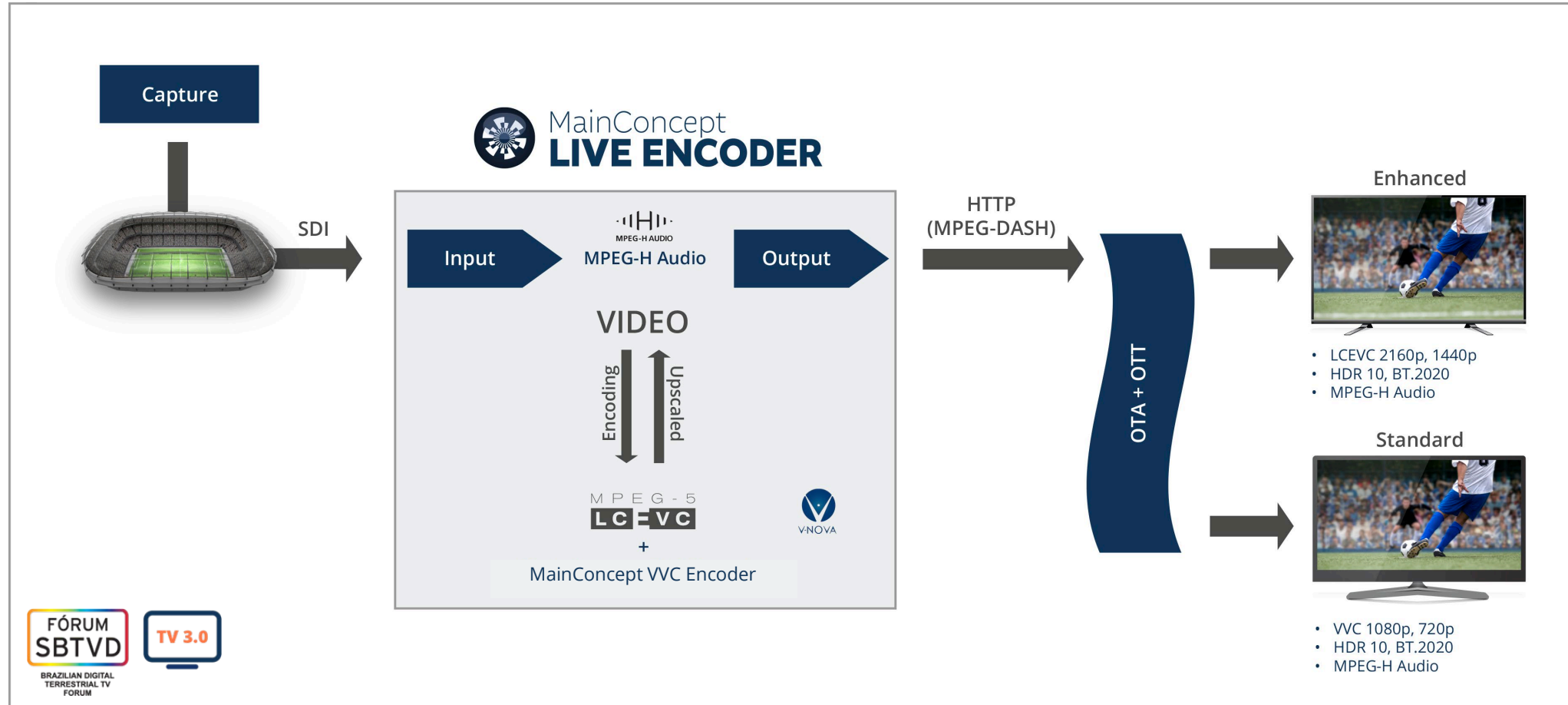
Option 1: VVC



- MainConcept Live Encoder with VVC SDK processes the video and audio content
- Allows higher video and audio quality on existing playback devices
- Part of the SBTVD TV 3.0 standard in Brazil

Next-Generation Workflow

Option 2: VVC + LCEVC



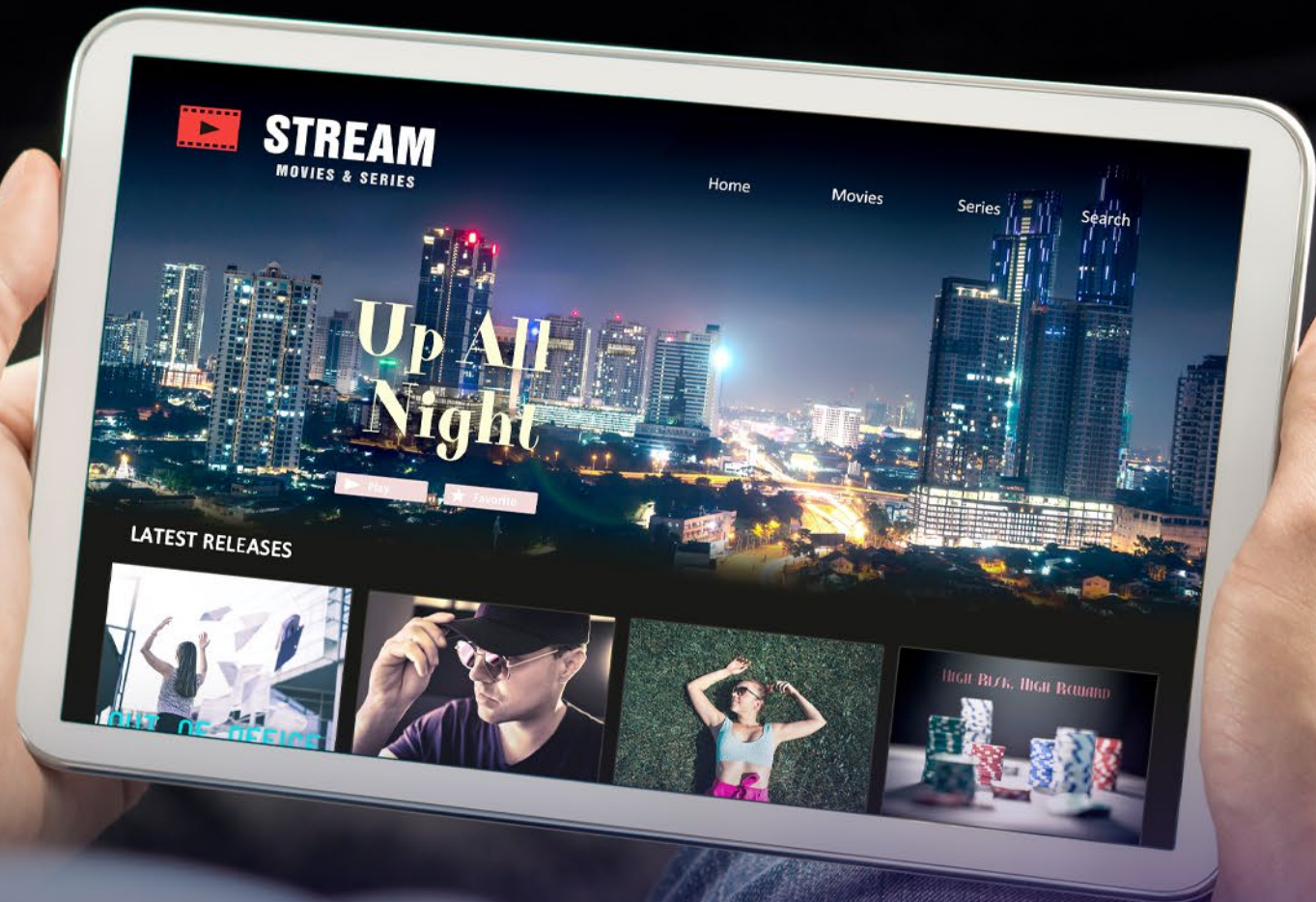
- MainConcept Live Encoder with VVC SDK processes the video and audio content
- Allows higher video and audio quality on existing playback devices
- Part of the SBTVD TV 3.0 standard proposal in Brazil

Broadcast TV Standards



Standard	SBTVD	ATSC	ARIB	DVB
Resolution	SD, HD, UHD	SD, HD, UHD, 8K**	SD, HD, UHD	SD, HD, UHD, 8K**
Video	VVC (+LCEVC) AVC (+LCEVC)	HEVC	HEVC VVC*	HEVC VVC*
Audio	MPEG-H Dolby AC-4	MPEG-H Dolby AC-4	HDR	MPEG-H AC-3
Enhancements	Advanced HDR by Technicolor (SL-HDR1) Dolby Vision HDR	HDR Advanced HDR by Technicolor**		HDR Advanced HDR by Technicolor (SL-HDR2)*

* Proposed
** Future possible

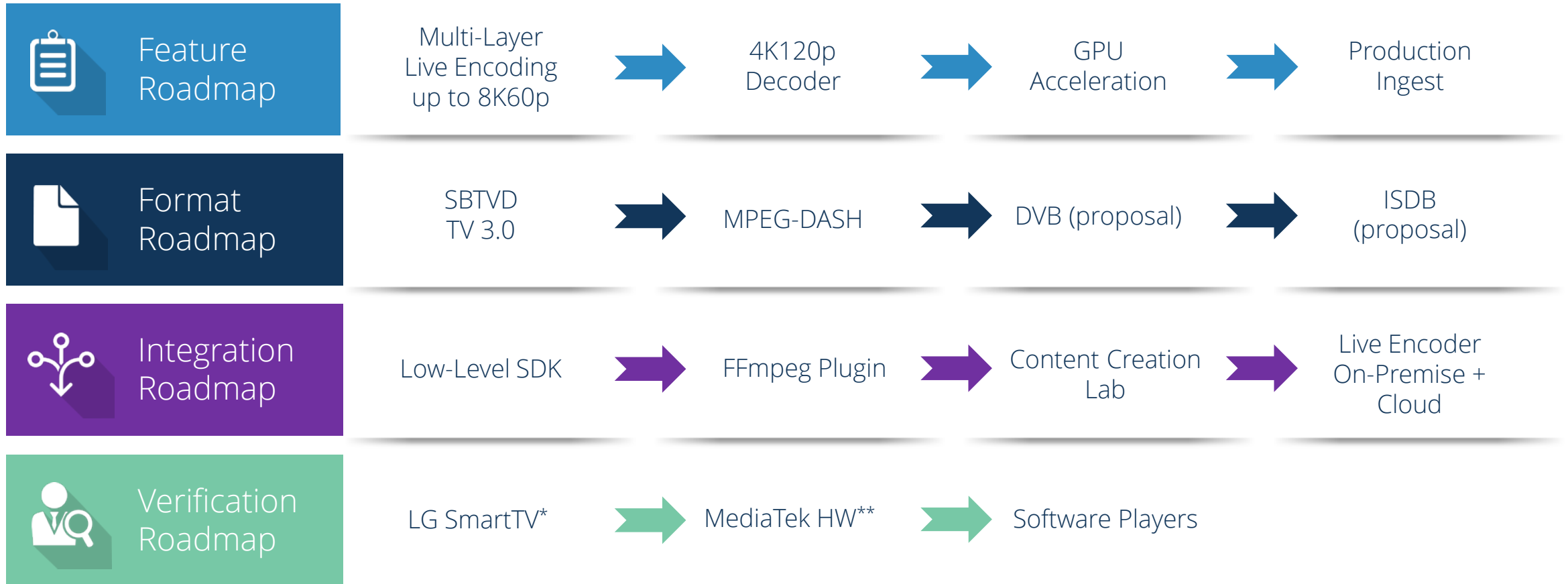


SDKs and more

VVC, HEVC, AVC, MPEG-2, WebAssembly, GStreamer

MainConcept VVC/H.266

Codec Evolution for the Next Level of Broadcast Experience



* Requires firmware update to support VVC

** Pre-release MediaTek development hardware up to 8K

VVC/H.266 Encoder & Decoder

Next-generation 4K and 8K delivery



FAST

Real-time right from the start



INNOVATIVE

Extended resolution at same bitrate over existing channels



BROADCAST AND OTT

Ready for distribution

TODAY

Encoder

- Live & VOD 10-bit in up to 8K
- HDR signaling
- SABET multi-layer encoding
- Embedded in SBTVD and DVB
- Coding tools for up to 8K resolution
- MPEG-2 TS & MP4 multiplexing
- MPEG-DASH output & MPD generation

Decoder

- 4:2:0 10-bit real-time playback
- Multi-layer streaming of 8K, 4K, 1080p

COMING SOON

Encoder

- GPU acceleration
- Additional Rate control modes
- MMT multiplexing
- Scalability Profiles 2K/4K, 4K/8K

AVAILABLE NOW

VVC Encoder SDK
VVC Decoder SDK
VVC Encoder Plugin for FFmpeg
Live Encoder with VVC (Beta)

COMING SOON

Live Encoder with VVC
Live Encoder with LCVVC + VVC

HEVC/H.265

Unmatched quality and performance



EFFICIENT

30% more efficient than open source¹



VERSATILE

Decode & Encode add-ons deliver even higher performance



FLEXIBLE

Optimized for low-, adaptive-, and high-bitrate 8K quality

FEATURES

- 8K60 Hybrid GPU accelerated 10-bit live video encoding²
- 4:2:2 10-bit sampling
- HDR decoder with support for HLG/PQ and SDR conversion
- Extended HDR format signaling for DVB Video encoding
- Available for x86 and ARM chipsets
- NVIDIA & Intel QSV hardware encoding & decoding

PACKAGES

HEVC Encoder SDK

- + 4:2:2 support²
- + Hybrid GPU acceleration²
- + SABET

HEVC Decoder SDK

- + Canon XF-HEVC Ingest
- + HDR Conversion
- + WebASM²

¹ Source: MSU 4K codec performance comparison

² Optional add-on

AVC/H.264

High-definition video has never been faster or looked better!



FAST

2x faster than open source¹ & 20% faster than previous generation²



FLEXIBLE

2-pass encoding & support for UHD and HDR



SCALABLE

NVIDIA & Intel QSV hardware encoding & decoding

FEATURES

- Precise bitrate adherence for encoding to on-demand video targets
- HDR support for HLG and PQ/HDR-10 encoding
- Unrivaled range of encoding presets
- Professional camera support for Sony XAVC & Panasonic AVC-ULTRA
- Frame-accurate smart rendering for AVC Intra and other pro formats
- One API for software or hardware (NVIDIA NVENC & Intel QSV) encoding

PACKAGES

AVC Encoder SDK
AVC Broadcast Encoder SDK
+ SVR360²
+ Smart Rendering²

AVC Decoder SDK
AVC Broadcast Decoder SDK

¹ According to recent encoder test data comparing MainConcept AVC against x264

² Compared to previous version of MainConcept AVC

MainConcept + LCEVC

Enhancing current and next-gen codecs



LIGHTWEIGHT

Reduces processing time for encoding and decoding



FLEXIBLE

Enhances any base codec up to 45% in compression efficiency



COMPATIBLE

Playback even on legacy devices

ENCODING

- Integrated with MainConcept AVC, HEVC and VVC
- Supports MPEG-DASH live streaming
- SBTVD TV 2.5 & TV 3.0 approved

DECODING

- Device support for Smart TVs and STBs
- Software players for PC/Mac and x86/Arm
- Browser players
- Mobile device players for iOS and Android

AVAILABLE SOON

- Live Encoder
- Content Creation Test Lab
- SDK
- FFmpeg Plugin



MPEG-5
LC=VC

FÓRUM
SBTVD

MPEG-2

Fast, flexible and feature-rich



FAST

2x faster than the prior generation



COMPATIBLE

Supports legacy formats and frameworks



FEATURE RICH

2-pass encoding, 4:2:2
10-bit support

PRE-CONFIGURED ENCODING PROFILES

- MPEG-2 based digital TV formats like DVB and ATSC
- Professional camcorders like Ikegami GF and Sony XDCAM
- Real-time decoding of consumer, professional & broadcast MPEG-2 formats

STREAM TYPES & FORMATS

- **Elementary Stream:** Generic MPEG-1 and MPEG-2 Elementary Streams
- **Transport Stream:** Blu-ray Disc, HD DVD, DVB, ATSC, ATSC-HI, DVHS, D10 & HD configs
- **Program Stream:** VCD, SVCD, DVD MPEG-1
- **System Stream:** Generic MPEG-1 System Streams
- **MP4:** Sony XDCAM EX
- **MXF:** Sony XDCAM HD, Sony XDCAM IMX, Ikegami GFCAM, D10

PACKAGES

MPEG-2 Encoder SDK
MPEG-2 Decoder SDK
MPEG-2 Smart Rendering SDK

WebASM HEVC Decoder

Browser-based preview, playback, editing and monitoring



SCALABLE

Broad browser, OS and device support



SECURE

Safe viewing of videos anywhere



EFFICIENT

Industry leading HEVC decoder

ADD HEVC PLAYBACK TO ALMOST ANY BROWSER TO GET

- High quality video in up to 8K 14-bit 4:4:4
- Minimized bandwidth via high compression
- Optimized CPU usage with multi-threading support
- Simple sample player for quick evaluation

IDEAL FOR

- Low latency playback
- Previewing live IP camera feeds within a secure internet browser
- Low-bandwidth and mobile data connections

Browsers



Devices



Performance Gains v2.1 vs. v2.0



up to 20%



up to 35%

GStreamer

A complete encoding and transcoding pipeline for OTT and broadcast workflows



SIMPLE

Develop & deliver live and on-demand video content



FLEXIBLE

Deliver content to any device



SCALABLE

NVIDIA NVENC & Intel Quick Sync Video hardware encoding

BROADCAST DELIVERY

- Closed caption support
- PID for elementary stream
- Program names in SDT tables
- DVB subtitles support
- SCTE-35 messaging

Includes

- HEVC/H.265 video encoder
- AVC/H.264 video encoder
- Fraunhofer AAC and MPEG audio encoders
- MPEG-2 TS multiplexer

OTT CONTENT CREATION

- CMAF-DASH, MPEG-DASH and Apple HLS
- OTT ladder presets
- Multi-language track
- Intel QSV and NVIDIA NVENC
- Hybrid GPU for HEVC (optional)

Includes

- HEVC/H.265 video encoder
- AVC/H.264 video encoder
- Fraunhofer AAC encoder
- CMAF/DASH/HLS presets
- Multiplexers and file generators

PRODUCTION FORMAT CREATION

- Professional production format presets up to 4:2:2 10-bit
- Sony XDCAM and XAVC
- Panasonic P2 AVC-ULTRA & AVC-Intra
- Generic MPEG-2 and AVC/H.264 encoding profiles

Includes

- MPEG-2 video encoder
- AVC/H.264 video encoder
- PCM audio encoder
- MXF and MP4 multiplexer

MainConcept on ARM

Seamless Transition / Optimized Performance / Pro Camera Support

DESKTOP COMPONENTS

Video

HEVC
AVC
MPEG-2
MPEG-4
DVCPRO
DV25/50
DV
Subpicture Decoder
DNxHR (macOS)

Audio

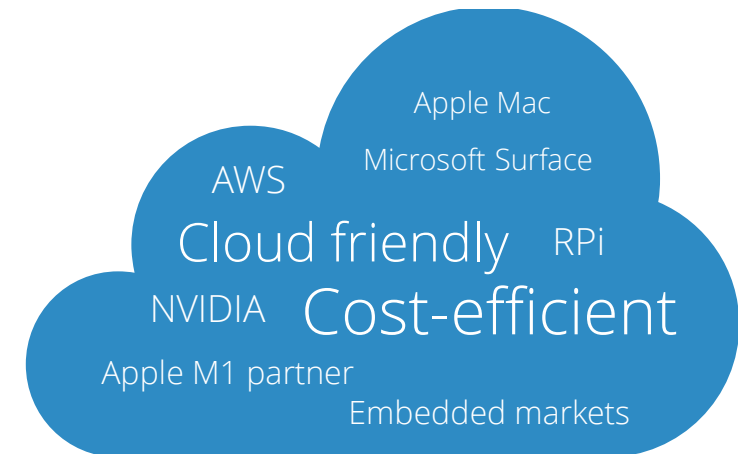
AAC
MPEG-Audio
PCM

Format

MP2
MP4
MXF
MPEG-DASH
CMAF
HLS

Transform

Audio Converter
Color Space Converter
HDR Converter
Framerate Converter





MainConcept Live Encoder



Live Encoder

Real-time AVC/HEVC video encoding for adaptive streaming in up to 8K 10-bit



EFFICIENT

All-in-one Contribution and Distribution live encoder



FLEXIBLE

Deployment via intuitive web UI or powerful REST API



SCALABLE

Works on-premise, in-the-cloud and with hybrid workflows

FEATURES

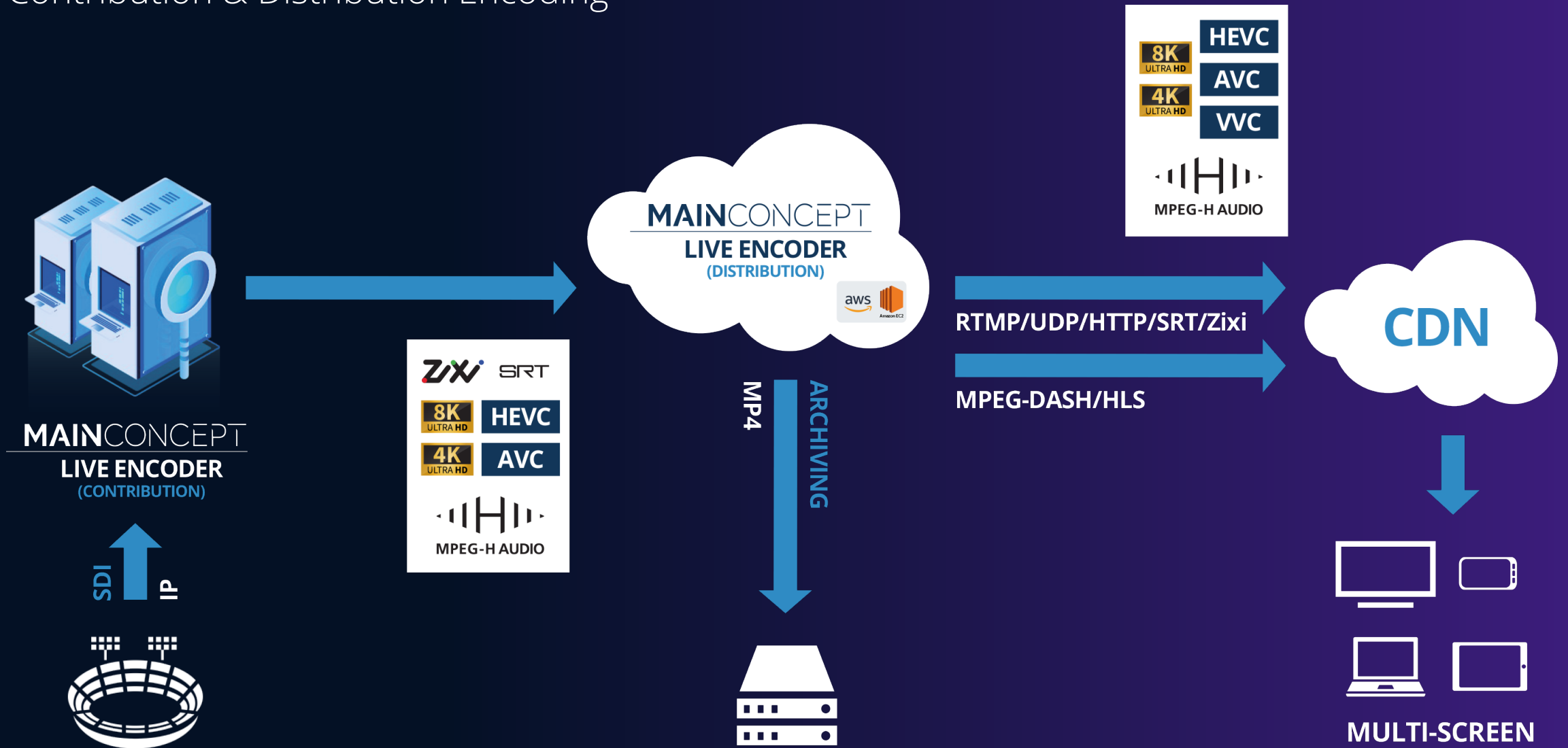
- Common SDI and IP input sources
- Intel & NVIDIA powered hardware and MainConcept software decoding for ingest
- AVC & HEVC hardware and software encoding modes
- GPU accelerated HEVC 8K60p encoding on NVIDIA RTX boards
- Object-based MPEG-H 3D audio creation
- MPEG-DASH, Apple HLS, Zixi, SRT, RTMP, RTSP, HTTP, etc. output
- TS over UDP/HTTP output, incl. Program / Service Name, ID, Provider support
- Integrated CDN support for Akamai & Amazon CloudFront
- Redundancy & failover management
- Available for Windows and Linux

COMING SOON

- VVC/H.266 live encoding up to 8K
- LCEVC plus AVC, HEVC & VVC
- SBTVD TV 2.5 & TV 3.0 presets
- Advanced HDR by Technicolor (SL-HDR1 & SL-HDR2)
- Accelerated AV1 live encoding
- Full AWS, Google Cloud and Microsoft Azure deployment
- CMAF-DASH low latency encoding and packaging

Live Encoder Workflow

Contribution & Distribution Encoding

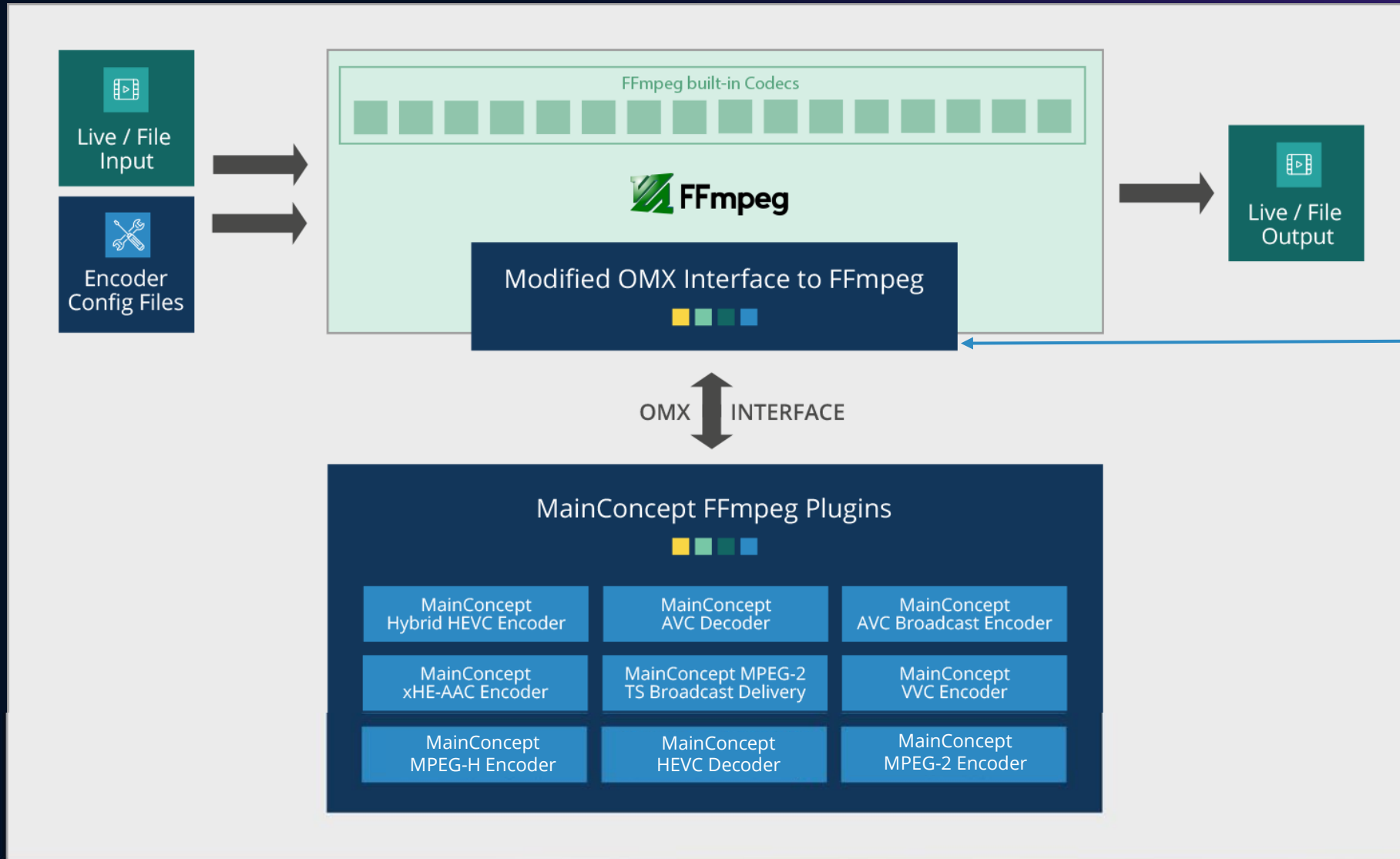




Plugins

- FFmpeg
- Blackmagic Design

MainConcept FFmpeg Plugins — Architecture



MainConcept provides source code for the interface on public GitHub, so you can build your own version of FFmpeg with our modifications.

MainConcept FFmpeg Plugins

The world's best codecs available in FFmpeg



Video Encoding

Hybrid HEVC Encoding

- Leading HEVC codec outperforming x265
- MPEG-DASH, HLS, Main, Main 10, 4:2:0, 4:2:2
- GPU-accelerated encoding modes for up to 8K 10-bit live
- Options for Intel Quick Sync Video & NVIDIA NVENC

MPEG-2 Production Format Encoding

- Use MainConcept's industry leading MPEG-2 software encoder and MXF Multiplexer natively in FFmpeg
- Pre-configured profiles for professional Sony XDCAM HD and XDCAM IMX camcorder content creation
- Ready-to-use encoder presets for Sony XDCAM EX, DVB, ATSC, DVD, HDV, D10, etc.

Video Encoding

AVC Broadcast Encoding (Encoding +)

- 4:2:2 10-bit and level 6.2 (8K)
- Verified presets for Sony XAVC & Panasonic P2 AVC-ULTRA
- Optimized for low bitrate encoding with superior quality & speed
- MPEG-DASH & Apple HLS
- Options for Intel Quick Sync Video & NVIDIA NVENC
- 2-pass encoding for best VOD quality

VVC Encoding

- VVC/H.266, next-generation codec for OTT and Broadcast
- Live and VOD workflows
- VVC/H.266 Main 10 profile, 8-bit and 10-bit, 4:2:0 up to 8K

Video Decoding

HEVC Decoding

- Decode and transcode workflows in superior quality and speed
- Main, Main 10, Main 12, Main 4:2:2 (& 10), Main 4:4:4 10 & 12 profiles
- Interlaced decoding support, including deinterlacing
- Hardware acceleration by Intel Quick Sync Video & NVIDIA NVDEC

AVC Decoding

- Decode and transcode workflows in superior quality and speed
- Baseline, Main, High, High 4:2:2/4:4:4 profiles, 8-bit/ 10-bit/12-bit
- Hardware acceleration by Intel Quick Sync Video & NVIDIA NVDEC

MainConcept FFmpeg Plugins

The world's best codecs available in FFmpeg



Audio Encoding

MPEG-H Encoding

- Integration of Fraunhofer's MPEG-H software encoder in FFmpeg
- Immersive, object-based MPEG-H 3D audio
- Live encoding workflows
- Baseline and Low Complexity Profiles
- Automatic Fallback mode in case of Control Track loss or interruption
- Standard adopted by ATSC, DVB, TTA, SBTVD and ATSC 3.0 (South Korea) TV standards

xHE-AAC Encoding

- Integration of Fraunhofer's xHE-AAC software encoder in FFmpeg
- xHE-AAC, legacy LC AAC, HE-AAC v1 and HE-AAC v2 audio formats
- VOD and live encoding workflows
- Bitrates of 12-500 kb/s for stereo
- Loudness and dynamic range control

MPEG-2 TS

Broadcast Delivery

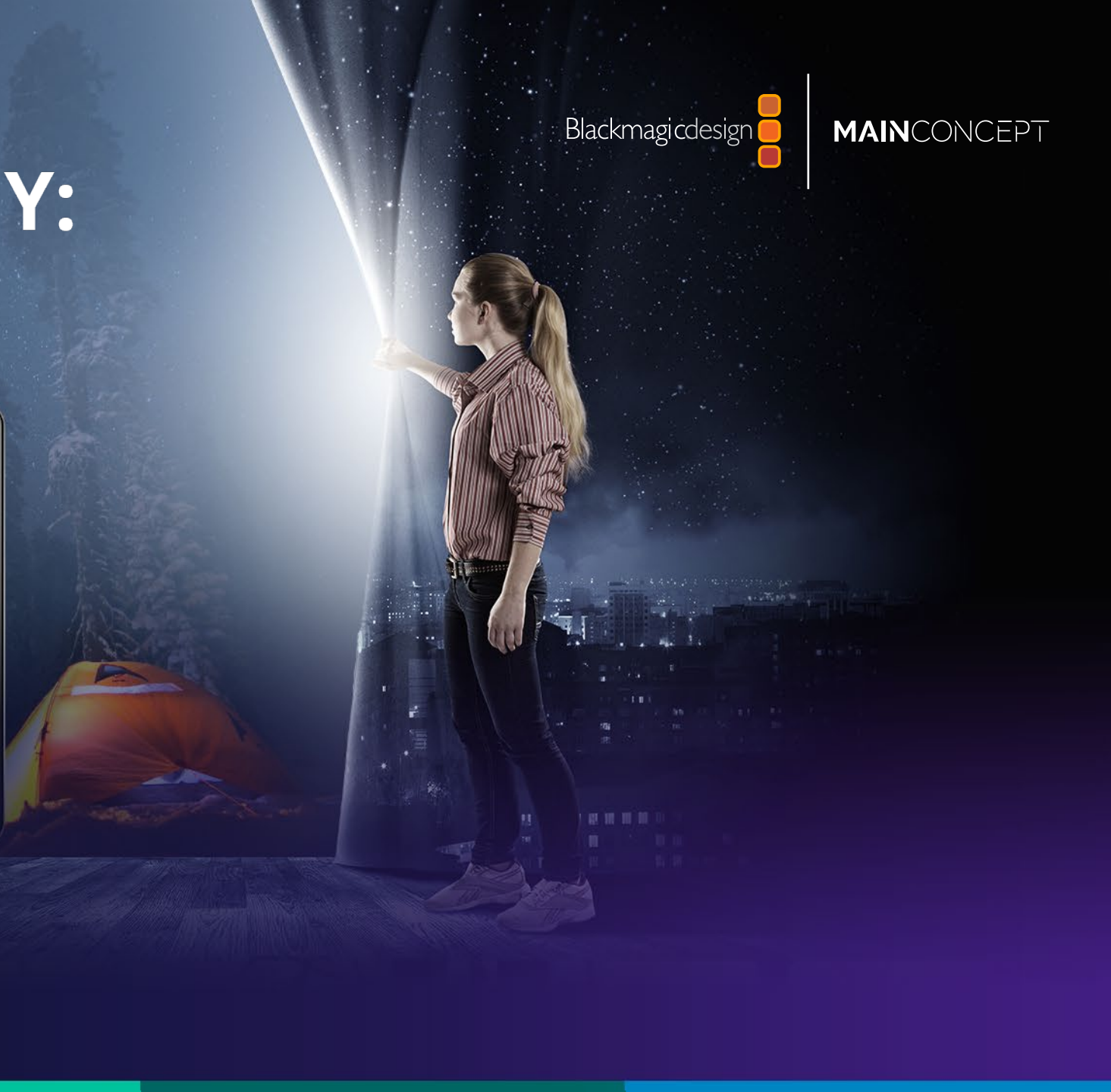
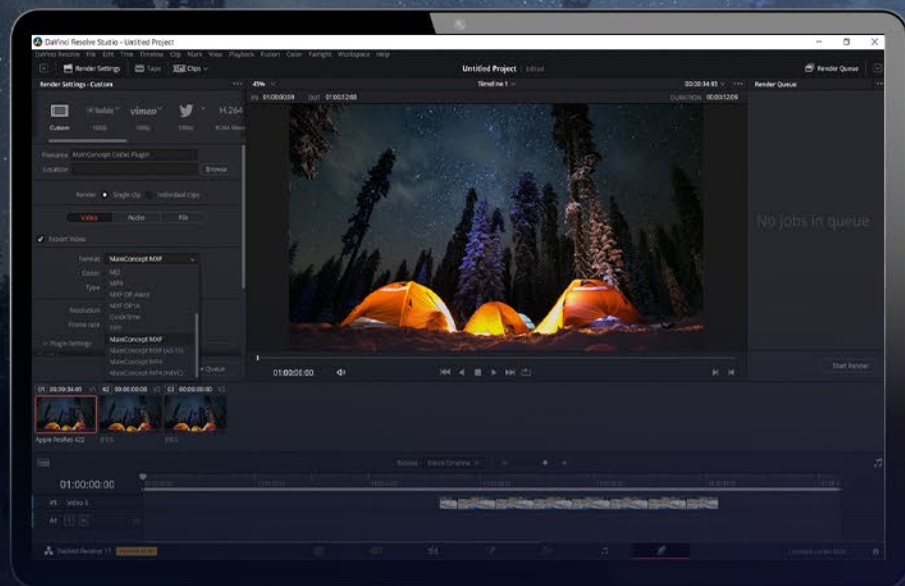
- Multiplexing support for broadcast delivery formats
- Ready-to-use multiplexer profiles for ATSC and DVB
- SPTS and MPTS format support
- Up to four video and four audio tracks
- Ready-to-use multiplexer profiles for ATSC and DVB
- AVC/H.264, HEVC/H.265 and MPEG-2 video

ART MEETS DIGITAL ALCHEMY:

Blackmagic DaVinci Resolve and the
MainConcept Codec Plugin

Blackmagicdesign

MAINCONCEPT



MainConcept Codec Plugin for DaVinci Resolve Studio



Fast

Encode in HEVC up to 20% faster than open source¹.

Efficient

Experience a seamless workflow in DaVinci Resolve Studio.

Reliable

First plugin for DaVinci Resolve Studio approved by Blackmagic Design.

⁽¹⁾Source: MSU 4K codec performance comparison



\$99 one-time purchase

includes updates within current major version and forum support

Learn more at mainconcept.com/bmd

MainConcept Codec Plugin for DaVinci Resolve Studio

Creators rejoice, now you can render project timelines into professional camera formats!



Native access to HEVC Main and Main 10 encoding plus accelerated Hybrid HEVC in up to 8K



Export compliant AS-11 UK DPP content directly from your timeline



Render project timelines into the same professional camera format the video was recorded in



The complete production chain from filming, capturing, editing and playout, without leaving the app



Supports

- Sony XAVC & XDCAM
- Panasonic P2 AVC-ULTRA & DVCPRO
- Blu-ray UHD, Blu-ray & DVD and more
- Windows
- macOS – Intel x86 & Apple M1/M2
- Linux

What technologies interest you?



8K Dolby Vision
EVC **LCEVC**
MPEG-H **VVC** AC-4 **ATSC 3.0**
Microservices
HEIF Docker
JPEG XS SRT
AV1

SMPTE 2110

Zixi



Thank You

More questions?
info@mainconcept.com

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