MAIN CONCEPT™

POWERING THE DIGITAL VIDEO UNIVERSE

September 2022

Contents

Notable news

- VVC beta launch
- Advanced cloud-ready 8K broadcast
- VVC and MPEG-H demos in partnership with Fraunhofer IIS
- Avid and MainConcept sign extended product agreement
- Broadcast Delivery SDK for GStreamer – coming soon

MainConcept @ IBC

Next-Generation Codecs
VVC REAL-TIME ENCODING

MainConcept VVC Encoder

- Introducing as a beta
  - VOD – 4:2:0 10-bit up to 8K
  - Real-time – up to 4K
- Embedded in SBTVD and DVB
- To be released as an SDK and FFmpeg plugin
- Will Include multi-layer encoding and GPU acceleration

Want to join the beta group?
Let us know.

8K EVERYWHERE
LIVE IN THE CLOUD

HEVC, Live Encoder, GPU Hybrid, WebASM

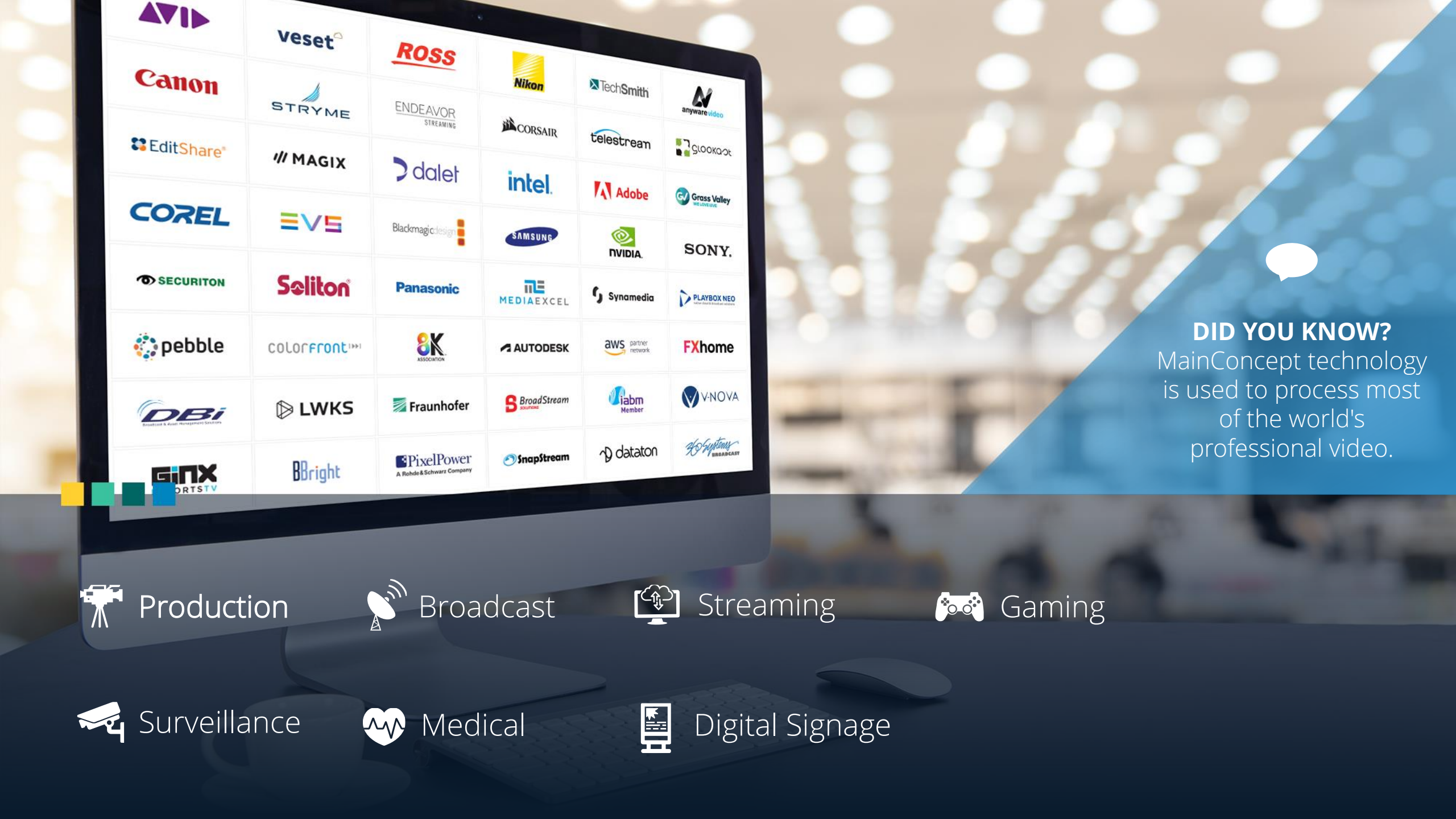
- Most cost-efficient solution for 8K live with hardware costs as little as 20% of other options
- Unique 8K + 4K + HD in a single instance
- HEVC Hybrid leveraging 3 GPUs
- WebASM decoding optimized for browsers
- Works on-premise, in-the-cloud and with hybrid workflows

ESSENTIAL INGREDIENTS
PRODUCTION, BROADCAST & STREAMING

Content Creation Lab: try the most trusted SDKs for professional production in an easy-to-use test portal

- VVC
- Hybrid HEVC
- TV Broadcast
- Sony XAVC
- Panasonic AVC-Ultra
- xHE-AAC
- MPEG-H

MainConcept has the broadest range of workflow formats, also available in FFmpeg, GStreamer, Docker, and more


veset
ROSS
Canon
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TechSmith
anywarevideo
STRYME
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CORSAIR
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Adobe
Grass Valley
COREL
EVS
Blackmagicdesign
SAMSUNG
NVIDIA
SONY.
SECURITON
Soliton
Panasonic
MEDIAEXCEL
Synamedia
PLAYBOX NEO
pebble
colorfront
8K ASSOCIATION
AUTODESK
aws partner network
FXhome
DBi
LWKS
Fraunhofer
BroadStream
iabm Member
V-NOVA
BBright
PixelPower
A Rohde & Schwarz Company
SnapStream
dataton
Production
Broadcast
Streaming
Gaming
Surveillance
Medical
Digital Signage
DID YOU KNOW?
MainConcept technology is used to process most of the world's professional video.

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
- Decoders

Applications

- Live
- Cloud
- Transcoding

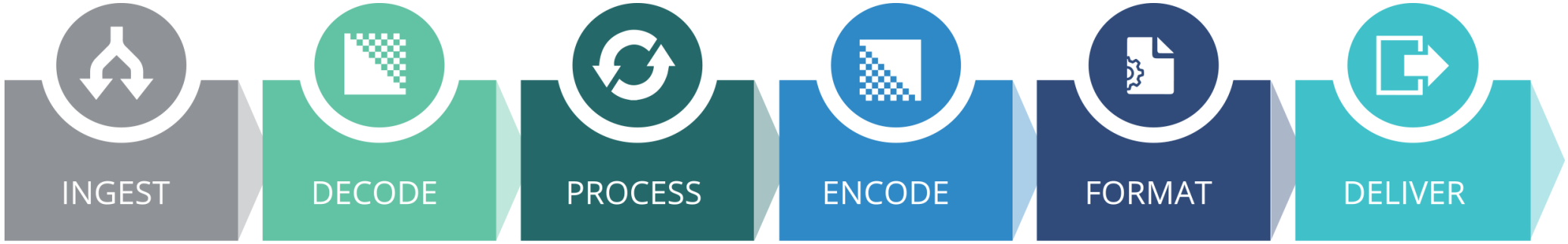
OPERATING SYSTEMS

FRAMEWORKS

SILICON

x86

arm



- 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

- AVC/H.264
- HEVC/H.265
- VVC*
- 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

- Color Space Converter
- Framerate Converter

- SCTE-35

- Smart Rendering AVC/H.264
- Smart Rendering MPEG-2

- Audio Converter

- 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

- MP4/ISO BMFF
- fMP4
- MPEG PS/TS/SS
- MXF

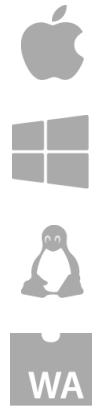
- ASF/WMV

- 3GP
- DV/DIF
- F4V
- MJ2
- DCI

- AVCHD
- Sony XAVC
- Sony XDCAM
- Panasonic DVCPRO
- Panasonic AVC Ultra

- MPEG DASH
- Apple HLS
- CMAF
- SRT*
- Zixi*
- OTT Live/VOD

- RTMP/RTMPS
- RTP/RTSP
- UDP



* Future products

Feature licensing: options to enhance the core SDK

AVC Decoder

Broadcast – 4:4:4 12-bit, unlimited resolution, more audio and demultiplexing options

HDR Conversion – PQ / HDR-10 to HLG, HLG to PQ / HDR-10 and PQ / HDR-10 to SDR

AVC Encoder

Broadcast – 4:2:2 10-bit, more audio & multiplexing options

Intel QSV – accelerated video encoding with reduced CPU usage

SVR360 – encode in virtually unlimited resolution, designed for 360/VR applications

HEVC Decoder

HDR Conversion – PQ / HDR-10 to HLG, HLG to PQ / HDR-10 and PQ / HDR-10 to SDR

HEVC Encoder

422 Chroma – 4:2:2 enabled

SABET – Smart Adaptive Bitrate Encoding Technology (multi-layer)

Hybrid GPU acceleration – GPU Accelerated Encoding on NVIDIA RTX boards

Broadcast Streaming

Network Client SDK – RTMP, HLS and Microsoft Smooth Streaming support

Network Server SDK – RTSP server sample source code with RTMP and RTMPS support

HDR Conversion

PQ/HDR-10 to HLG, HLG to PQ/HDR-10 and PQ/HDR-10 to SDR transformation available for:

AVC Video Decoder, HEVC Decoder, Apple ProRes Decoder, Color Space Converter

Audio Encoder

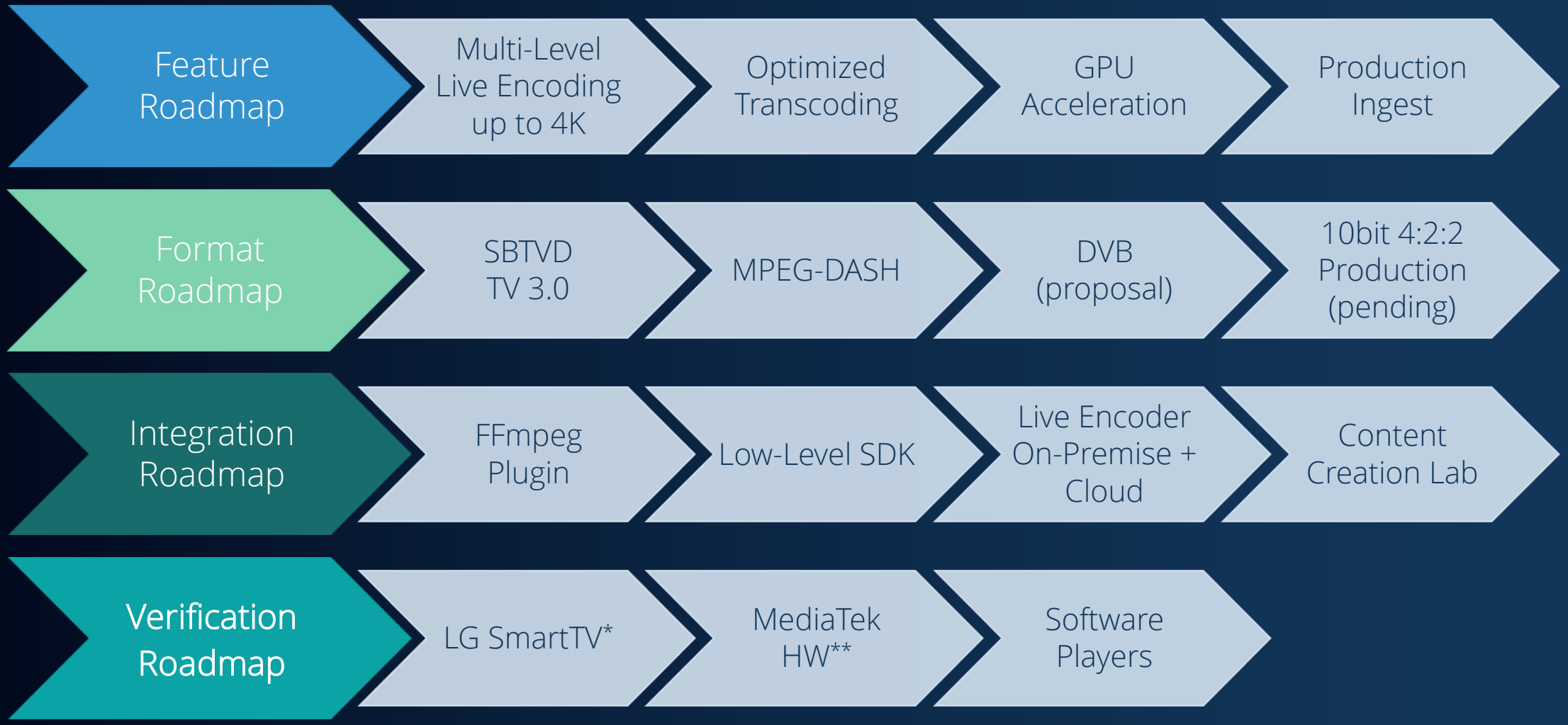
xHE-AAC – multi-pass encoding for DRC measurement and USAC (xHE-AAC) audio

SDKs and more

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

MainConcept VVC/H.266

Codec Evolution for the Next Level of Broadcast Experience



MAINCONCEPT™

* Requires firmware update to support VVC

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

VVC/H.266

Next-gen 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
- Embedded in SBTVD and DVB
- New coding tools for up to 8K resolution
- MPEG-2 TS & MP4 multiplexing,
- MPEG-DASH output & MPD generation

SOON

Decoder

- 4:2:0 10-bit real-time playback

Encoder

- GPU acceleration
- SABET (Multi-layer)
- Additional Rate control modes

BETA AVAILABILITY

VVC Encoder SDK
VVC Encoder Plugin for FFmpeg

HEVC/H.265

Unmatched quality and performance

EFFICIENT

30% more efficient than open source[1]

VERSATILE

Decode and Encode addons deliver even higher performance

FLEXIBLE

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

FEATURES

- 8K60 Hybrid GPU accelerated 10-bit live video encoding[2]
- 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 support[2]
+ Hybrid GPU acceleration[2]
+ SABET

HEVC Decoder SDK

+ Canon XF-HEVC Ingest
+ HDR Conversion
+ WebASM[2]

[1] Source: MSU 4K codec performance comparison
[2] Optional add-on

8K Live Hardware Cost

MAINCONCEPT HYBRID GPU		COMPETITOR
BEST	ENTRY	
$10,240	**$4,055**	**$21,500**
8K, 1080 & 720 streams	Single 8K stream	Single 8K stream

20% – 50% the cost with MainConcept

Core system configurations

MainConcept BEST (professional)

- 2x Intel Xeon Gold 6230 = $4000
- 1x Asus motherboard = $700
- 3x NVIDIA Quadro RTX 4000 = $4200
- 1x AJA KONA 5 Capture Card = $3700
- 4x 32 GB DDR4-2933 RAM (128 GB) = $1040

MainConcept ENTRY (consumer/prosumer)

- 1x AMD Ryzen Threadripper PRO = $800
- 1x Supermicro motherboard = $660
- 2x Micron RAM = $450
- 3x NVIDIA GeForce RTX 3070 = $1500
- 1x DeckLink 8K Pro = $645

Competitor

- 2x Intel Xeon Platinum 8176 = $17,500
- 1x Asus motherboard = $700
- 6 x 32GB DIMM DDR4-2933 (192 GB) = $1560
- 1x AJA KONA 5 Capture Card = $3700

Prices based on manufacturer suggested retail as of April 2022. Comparison based only on the components listed.

ATSC Encoding

Ultimate quality using MainConcept Software Encoding

6 Live Channels ATSC (HD)*	3 Live Channels ATSC 3.0 (UHD) *
MainConcept AVC/H.264 Video Encoder 4:2:0 Video 1920 x 1080 8-bit @ 60 fps ATSC Preset	MainConcept HEVC/H.265 Video Encoder 4:2:0 Video 3840 x 2160 10-bit @ 60 fps ATSC 3.0 Preset

* Server System running Dual Intel® Xeon 6330 w/ 128 GB RAM

AVC/H.264

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

FAST

2x faster than open source[1] and 20% faster than previous generation[2]

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
+ SVR360[2]
+ Smart Rendering[2]
+ Intel Quick Sync Video[2]

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 comp. efficiency

COMPATIBLE

Playback even on legacy devices

ENCODING

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

DECODING

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

AVAILABILITY SOON

- FFmpeg Plugin
- MC Live Encoder
- Content Test Lab*
- SDK*

* Planned for 1H/2023

V-NOVA | MPEG-5 LCEVC | FÓRUM SBTVD

MAINCONCEPT™

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

PACKAGES

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

STREAM TYPES & FORMATS

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

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

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%

MAINCONCEPT™

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 & IQSV 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 encoder
- AVC/H.264 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 encoder
- AVC/H.264 encoder
- Fraunhofer AAC audio encoder
- CMAF/DASH/HLS presets
- Multiplexers and file generators

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

Apple Mac

Microsoft Surface

AWS

Cloud friendly

RPi

NVIDIA

Cost-efficient

Apple M1 partner

Embedded markets

MAINCONCEPT™

Applications

- Live Encoder
- MainConcept 2GO

Live Encoder

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

EFFICIENT

Cost-effective HEVC 8K60 10-bit live encoding

FLEXIBLE

Deployment via intuitive web UI or powerful REST API

SCALABLE

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

FEATURES

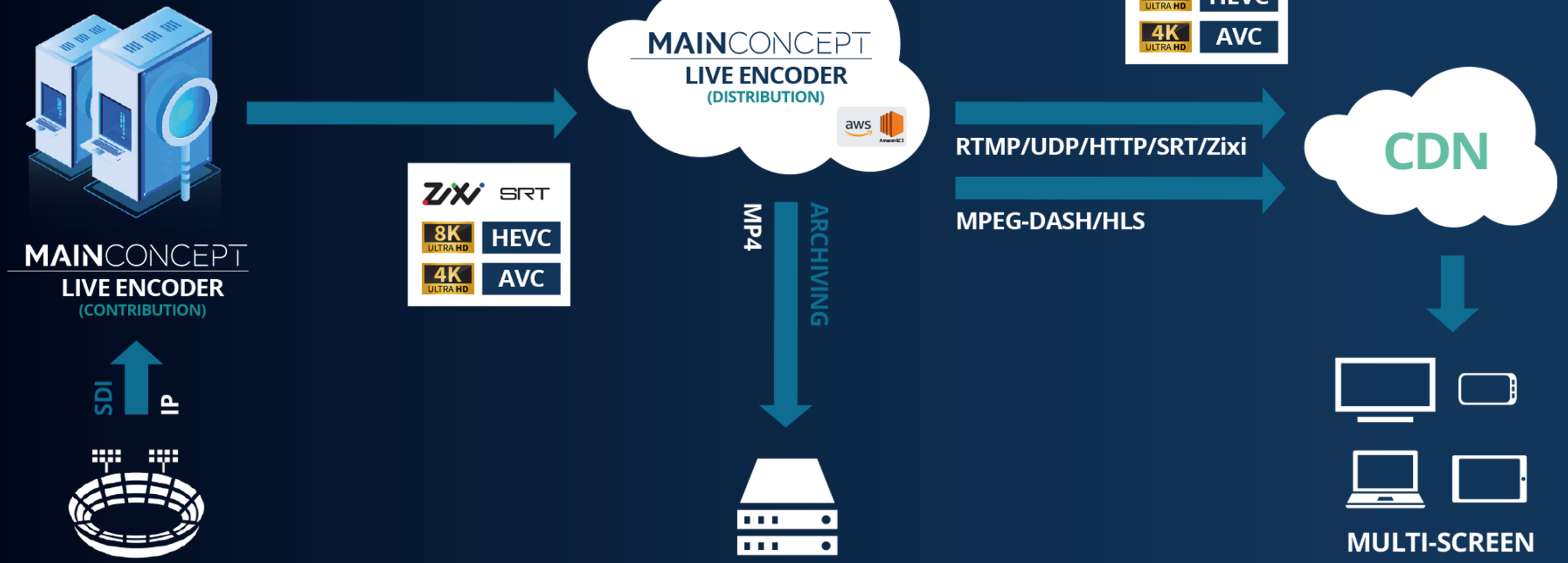
- Common SDI and IP input sources
- Intel & NVIDIA powered hardware and MainConcept software decoding for ingest
- AVC & HEVC hardware and software encoding modes
- GPU accelerated HEVC 8K60p live encoding in superior quality on NVIDIA RTX boards
- MPEG-DASH, Apple HLS, RTMP, RTSP, HTTP, etc. output (incl. MP4 archiving files)
- 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

- SRT & Zixi ingest and output
- NVENC AVC encoding
- VVC video and MPEG-H audio encoding
- Full AWS, Google Cloud and Microsoft Azure deployment
- CMAF-DASH low latency encoding and packaging

Live Encoder

Diagram



MainConcept 2GO

Video and Audio transcoding pre-configured in Docker containers

Easy to use through REST API and command line

Optimized for scalable workflows in server farms and cloud

awsmarketplace

Broadcast:

- Individual container products for HEVC 4K, P2 AVC Ultra, Sony XAVC, Sony XDCAM and Canon XF-HEVC

Audio:

- Certified containers for Dolby Digital, AAC-LC and HE-AAC audio transcoding

OTT:

- Live and VOD products for MPEG-DASH and HLS outputs

Gaming:

- Transcoding for Sony PS4 game console video production

Plugins

- FFmpeg
- Blackmagic Design

FFmpeg plugin family

The world's best codecs available in FFmpeg

Hybrid HEVC

- ✓ 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 and NVIDIA NVENC

AVC

- ✓ Optimized for low bitrate encoding with superior quality & speed
- ✓ MPEG-DASH & Apple HLS
- ✓ Options for Intel Quick Sync Video and NVIDIA NVENC
- ✓ 2-pass encoding for best VOD quality

AVC Broadcast

- ✓ All features from AVC plugin
- ✓ 4:2:2 10-bit and level 6.2 (8K)
- ✓ Verified presets for Sony XAVC and Panasonic AVC Ultra

xHE-AAC

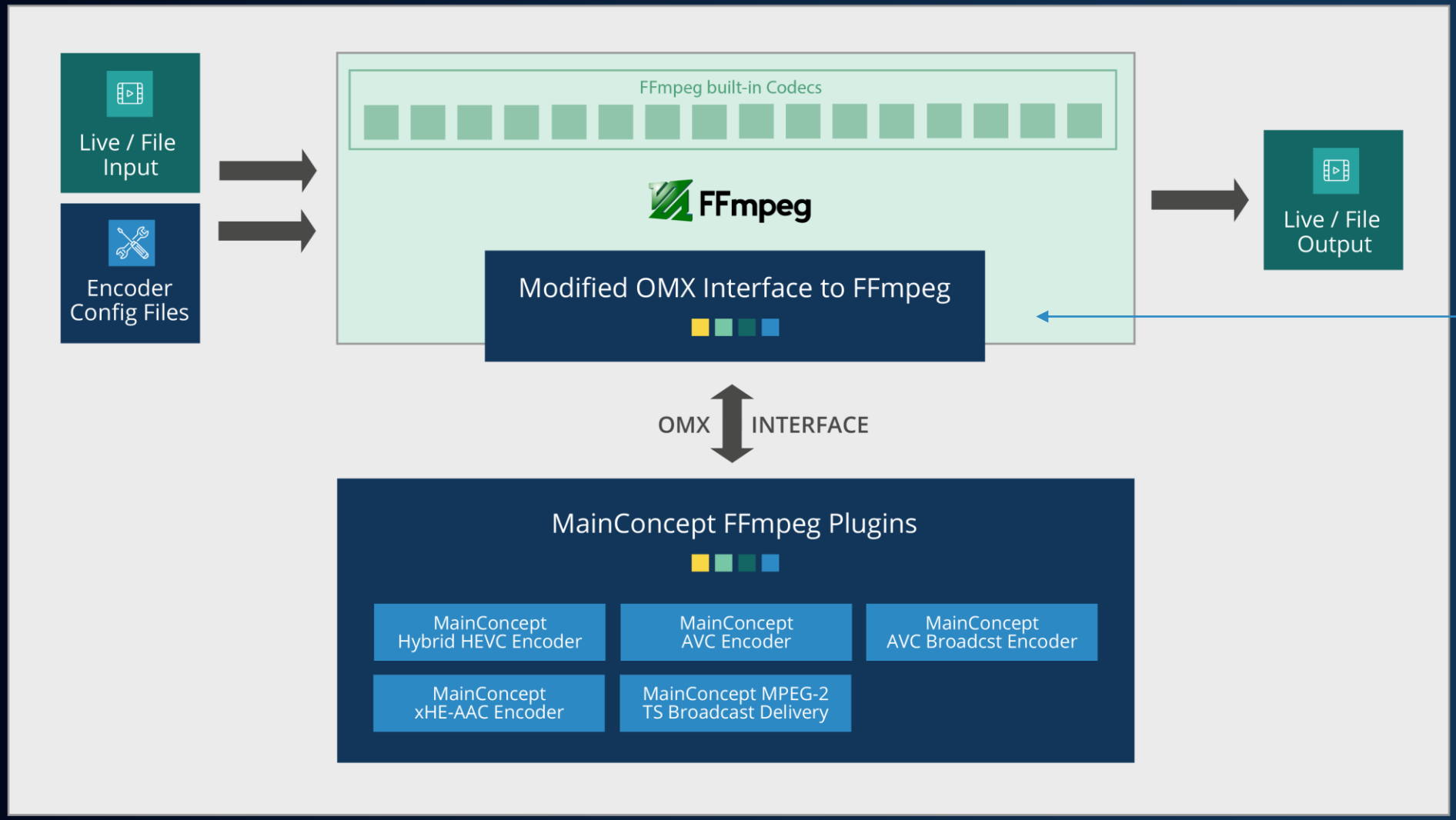
- ✓ Enables Fraunhofer's xHE-AAC encoder natively in FFmpeg
- ✓ Supports xHE-AAC and legacy AAC-LC, HE-AAC v1& v2
- ✓ Suitable for on-demand and live encoding workflows*
- ✓ Bitrates of 12-500 kb/s for stereo
- ✓ Mandatory loudness and dynamic range control

MPEG-2 TS Broadcast Delivery

- ✓ MainConcept MPEG-2 TS multiplexing support for broadcast delivery formats
- ✓ Ready-to-use multiplexer profiles for ATSC and DVB
- ✓ Support for AVC/H.264, HEVC/H.265 and MPEG-2 video and AAC and AC-3 audio
- ✓ SPTS and MPTS format support

* Live encoding support for AAC-LC, HE-AAC v1 & v2

MainConcept FFmpeg Plugins — Architecture



We provide source code for this interface on public GitHub to allow customers to build their own version of FFmpeg with our modifications.


Blackmagicdesign
MAINCONCEPT

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 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 & AVC-Intra
- Panasonic P2 DVCPRO and more

- Windows
- macOS – Intel x86 & Apple M1
- Linux

MainConcept Codec Plugin for DaVinci Resolve Studio

Fast

Encode in HEVC up to 20% faster than open source[1].

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

1st CODEC PLUGIN AUTHORIZED BY BLACKMAGIC DESIGN

Two ways to buy

$79 annual subscription
includes upgrades and personalized email support

$99 one-time purchase
includes only critical updates and forum support

Learn more at **mainconcept.com/bmd**

What technologies interest you?

8K
Dolby Vision
EVC
LCEVC
MPEG-H
VVC
AC-4
ATSC 3.0
Microservices
SMPTE 2110
Zixi
HEIF
Docker
JPEG XS
SRT
AV1
MAINCONCEPT

Thank You