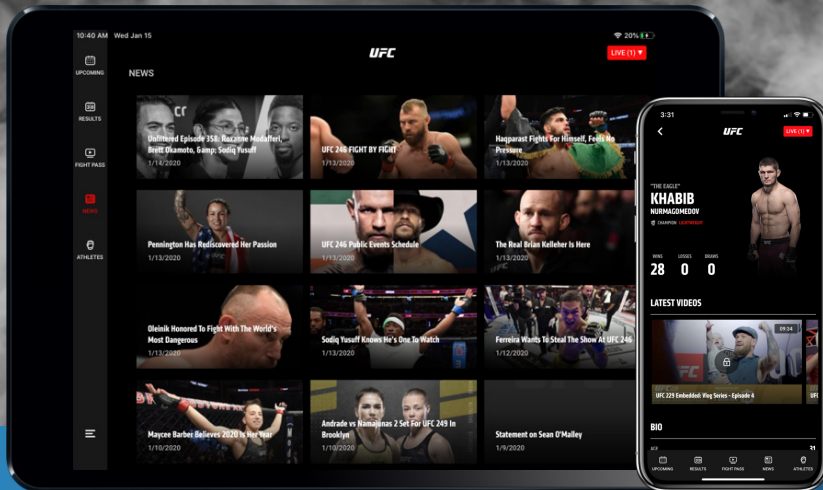# MainConcept® knocks out
OPEN SOURCE WITH
2 X BETTER PERFORMANCE

CHALLENGES

- Needed faster encoding than was possible with x264 (open source)
- Sought greater efficiency to save on server costs, without compromising quality
- Preferred a solution enabling use of their familiar FFmpeg framework

SOLUTIONS

- MainConcept AVC/H.264 Encoder
- MainConcept Pro Services

RESULTS

2X faster encoding with no change to quality

50% savings on encoding-related server costs

Seamless integration with **FFmpeg**

In the Competitive World of Video Streaming, Nothing Beats Quality, Performance, and Reliability

Video streaming is up, way up. Streaming consumption among people ages 25-54 has risen by nearly 100% in the last year according to Nielsen. Along with this surge in growth, viewership has become increasingly segmented and specialized. Brands are increasingly looking to launch their own subscription-based streaming services, leveraging over-the-top platforms like Endeavor Streaming to do so.

Chances are high that you've seen Endeavor Streaming's technology at work. Endeavor Streaming powers the streaming experiences for some of the world's leading sports and entertainment brands, including the NBA, NFL, UFC, and Univision. Their platform provides unmatched flexibility and scale in content delivery, management and monetization, enabling their partners to deliver personalized, engaging end-user experiences to their subscribers.

Powering subscription services with global audiences like UFC FIGHT PASS® and WWE Network®, Endeavor Streaming is highly focused on encoding technology. Video needs to be encoded efficiently, in high quality, and compatible on any device.

Encoding Time was Costly with Open Source

The ability to ingest and encode content efficiently is critical for Endeavor Streaming. Their customers don't want to worry about encoding presets and compression standards – they simply want to upload content to their video library and focus on enriching the viewing experience. To ensure compatibility for viewers with different screen sizes and network speeds, the platform encodes for variable bitrate (VBR), using 7 encoding presets aligned for MPEG-DASH and Apple HLS.

ENCODING PRESETS							
Level	1	2	3	4	5	6	7
Bitrate Audio	64	128	128	128	128	128	128
Width	512	640	896	1280	1280	1920	1920
Height	288	360	504	720	720	1080	1080
Profile	baseline	baseline	main	high	high	high	high
Bit Depth	8	8	8	8	8	8	8
Kbps	348	600	972	1512	3372	4872	7808

The platform is based on the FFmpeg framework and previously used the open source codec x264. Like many in the industry, Endeavor Streaming believed codecs to be a commodity with the no-cost open source option as good as anything else available. Being a sister company to MainConcept, they were urged to take a closer look at their encoding technology. The disadvantage of using an inflexible codec quickly became clear.

MainConcept has an easy integration with FFmpeg

*"We realized that **lengthy encoding times were costing us money**," said David Salmon, CTO at Endeavor Streaming. "**X264 required two-pass encoding** to meet our quality and bitrate targets, and the additional pass was expensive."*

Utilizing AWS servers to power their open source encoder, Endeavor Streaming had direct visibility into the dollars they spent on encoding and the amount of time taken up at each step in the video workflow. They had no problem using open source in principle, but it quickly became a matter of dollars and cents. They wanted to know if there was a better option.

Putting MainConcept AVC/H.264 to the Test: The Face-Off Against x264

MainConcept offers many distinct advantages compared to open source. As a highly configurable codec, it can be tuned and optimized to different specifications. This flexibility, along with the available expertise of MainConcept Pro Services, offered the perfect opportunity to run a face-off against x264.

"We were very interested to see what MainConcept AVC could do," says Salmon. "With their ability to integrate into the FFmpeg framework, there was no disadvantage to testing how they could help us–only potential upside."

MainConcept has another advantage compared to open source–very precise bitrate adherence. In a single encoding pass, MainConcept can achieve the target quality and bitrate with only a +/- 2% variation. Open source codecs are often unable to meet target bitrate and quality with one pass, requiring additional time and cost.

The test was set up using Endeavor Streaming's existing encoding presets for variable bitrate streaming. They provided MainConcept with seven video on-demand (VOD) presets and profiles, aligned for MPEG-DASH and Apple HLS standards, from low resolution up to full HD. The MainConcept Pro Services team immediately got to work optimizing the MainConcept AVC codec, tuning the feature set and algorithms to maximize performance. With fixed quality targets, MainConcept was able to focus on speed.

MainConcept AVC Proves Over 2X Faster Than Open Source

The results surpassed expectations–MainConcept AVC achieved more than a 100% speed increase for every encoding preset tested, with no change in quality.

"Frankly, we were shocked by the results, we didn't expect to see such a dramatic improvement in performance," says Salmon. "Not only does this make our platform faster, but the cost savings are significant–over 50%."

Endeavor Streaming not only improved performance using MainConcept, but they limited the impact to their existing environment. As FFmpeg users, the seamless integration with MainConcept means their developers can remain in their preferred framework and avoid major product iterations.

ENCODING PRESETS								
Level	1	2	3	4	5	6	7	Average
Bitrate Audio	64	128	128	128	128	128	128	
Width	512	640	896	1280	1280	1920	1920	
Height	288	360	504	720	720	1080	1080	
Profile	baseline	baseline	main	high	high	high	high	
Bit Depth	8	8	8	8	8	8	8	
Kbps	348	600	972	1512	3372	4872	7808	
RESULTS (IN SECONDS)								
x264	2064.2	2119.6	2236.6	2626.9	2751.4	3977.5	4333.3	
MainConcept AVC	1004.6	1032.9	1117.7	1293.3	1336.9	2134.6	2197.0	
Speed Increase	**105%**	**105%**	**100%**	**103%**	**106%**	**86%**	**97%**	**100%**

For Endeavor Streaming, their ultimate goal is to provide the most value for their users. Switching to MainConcept makes the Endeavor Streaming platform even more powerful, and the budget saved on server costs can be invested back into the business to fuel continued innovation.

Endeavor Streaming Discovers the Power of Optimization

Perhaps most powerful is the impression this has left on the technical team at Endeavor Streaming. Before working with MainConcept, they hadn't considered that an upside like this was possible. There was a true "aha" moment – realizing that open source is a one-size fits-all proposition, and that the ability to tune and optimize can overcome significant limitations.

Adopting more flexible technology led to 50% cost savings

It's common for organizations using open source codecs to believe that the up-front cost savings will continue to save them money in the long run. Endeavor Streaming has realized that the ability to optimize can greatly outweigh the initial investment in a more flexible technology like MainConcept.

"If MainConcept Pro Services can do this for us," says Salmon, "I'll bet other organizations don't realize the efficiency and cost savings they're leaving on the table. They should all be taking a closer look at how MainConcept can optimize their own unique environment."

The Partnership Continues with MainConcept Pro Services

With the performance gains proven for on-demand video encoding, Endeavor Streaming is continuing to work with MainConcept Pro Services to identify other platform optimizations.

"We're exploring how we can partner to improve the performance of live encoding, as well as looking at other codecs such as HEVC and AV1," says Salmon. "We're very excited about our future with MainConcept."

Interested in boosting your own encoding efficiency?

START A FREE TRIAL

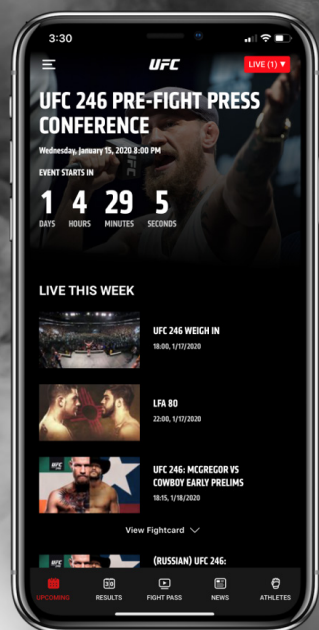### ABOUT MAINCONCEPT

MainConcept is the global leader in professional-grade video technology, servicing the industry since 1993. As the technology of choice for some of the most valued brands, MainConcept supports robust video workflows for Adobe, Sony, Autodesk, Microsoft, Harmonic, Wowza and many others. Our technology delivers the highest quality, best performing audio and video, backed by a team of experienced engineers. Through a single interface, we support the largest codec library with simple and agile integration capabilities with premier technical support. Mainconcept.com

ABOUT ENDEAVOR STREAMING

Endeavor Streaming is a global leader in premium video streaming across the entertainment and sports industries. Endeavor Streaming combines stunning live and on-demand video with the most extensive feature set to create personalized, over-the-top experiences on every screen imaginable. Through the global footprint of the Endeavor network and our position at the forefront of technology, Endeavor Streaming provides solutions with unmatched flexibility and scale in content delivery, management, analytics and monetization. EndeavorStreaming.com

2X *Greater* EFFICIENCY ENCODING THAN WITH X.264