



AOMedia Video 1

30% More Efficient Than
HEVC and VP9

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BITMOVIN
Software to Solve Complex Video Problems

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What is the AV1 Codec?

AV1 is an open, royalty-free, next-generation video coding format from the Alliance for Open Media. It is designed to succeed Google's VP9 and compete with H.265/HEVC.

How the AV1 Development Works

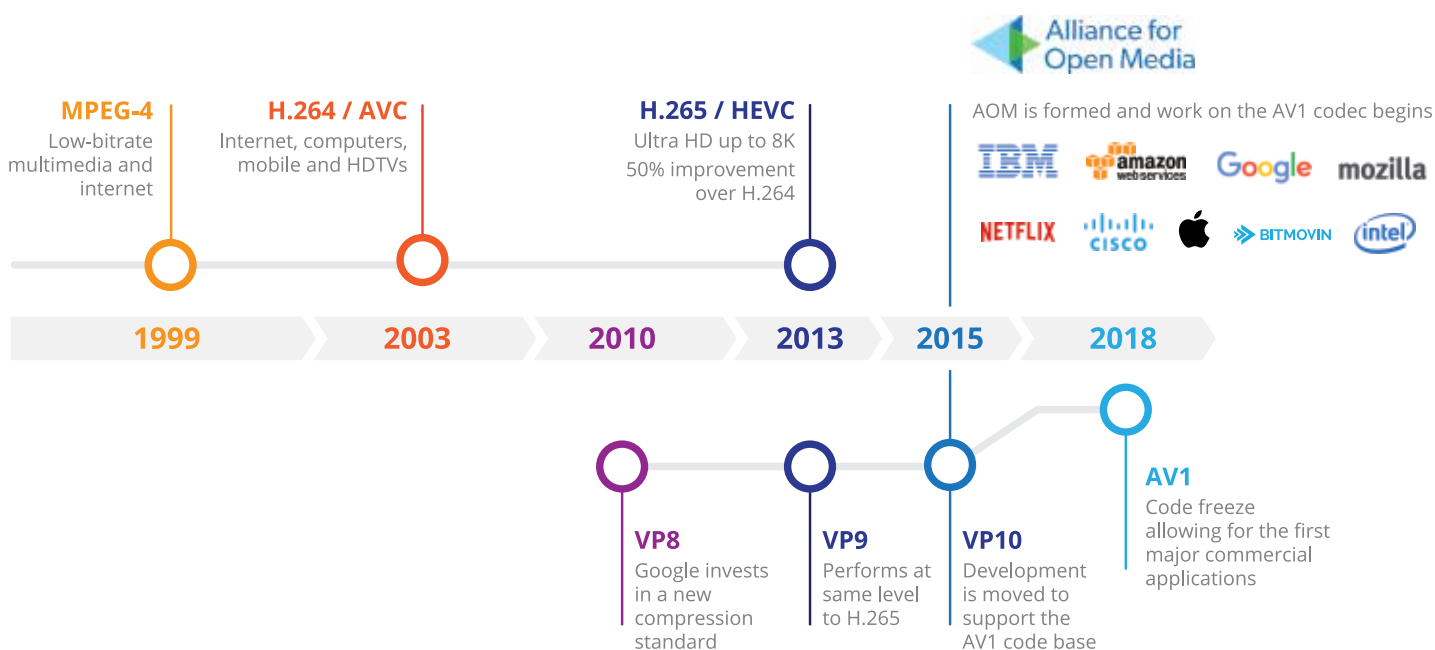
In September 2015 the Alliance for Open Media (AOMedia) was founded by leading companies from various industries with an association to media technology. Among them are browser vendors like Google, Mozilla, Apple and Microsoft, hardware vendors like AMD, ARM, Intel, and NVIDIA, and content providers like Amazon and Netflix.

AV1 will deliver an improvement over VP9 and HEVC of around 30%. When comparing AV1 specifically with HEVC, it is fair to say that the biggest competitive advantage of AV1 will be that it is royalty-free, especially when considering the still very uncertain royalty situation with HEVC. Currently there are two patent pools with MPEG LA and MPEG Advance, plus some unknown HEVC IP

owners who are yet to join a pool. In the end, nobody will know how much you will need to pay in royalties for HEVC. This situation is obviously not satisfactory for the industry and especially, encoding, distribution, content and hardware companies.

The AV1 codec has its roots in the codebase of Google's VP9/VP10 codec with an additional 77 experimental coding tools that have been added and are under consideration. Out of that 77 experimental coding tools, only 8 are currently enabled by default (adapt_scan, ref_mv, filter_7bit, reference_buffer, delte_q, tile_groups, rect_tx, cdef), but the performance of the codec is already appealing.

- » Interoperable and open
- » Designed with a low computational footprint and optimized for hardware
- » Capable of consistent, highest-quality, real-time video delivery
- » Optimized for the Internet
- » Scalable to any modern device at any bandwidth
- » Flexible for both commercial and non-commercial content, including user-generated content.



Bitmovin AV1 VoD and Live Encoding

Bitmovin's containerized and scalable chunk based encoding service can deliver fast, reliable, high quality AV1 encoding for Live and VoD, both in the cloud and on-premise on Kubernetes and Docker.

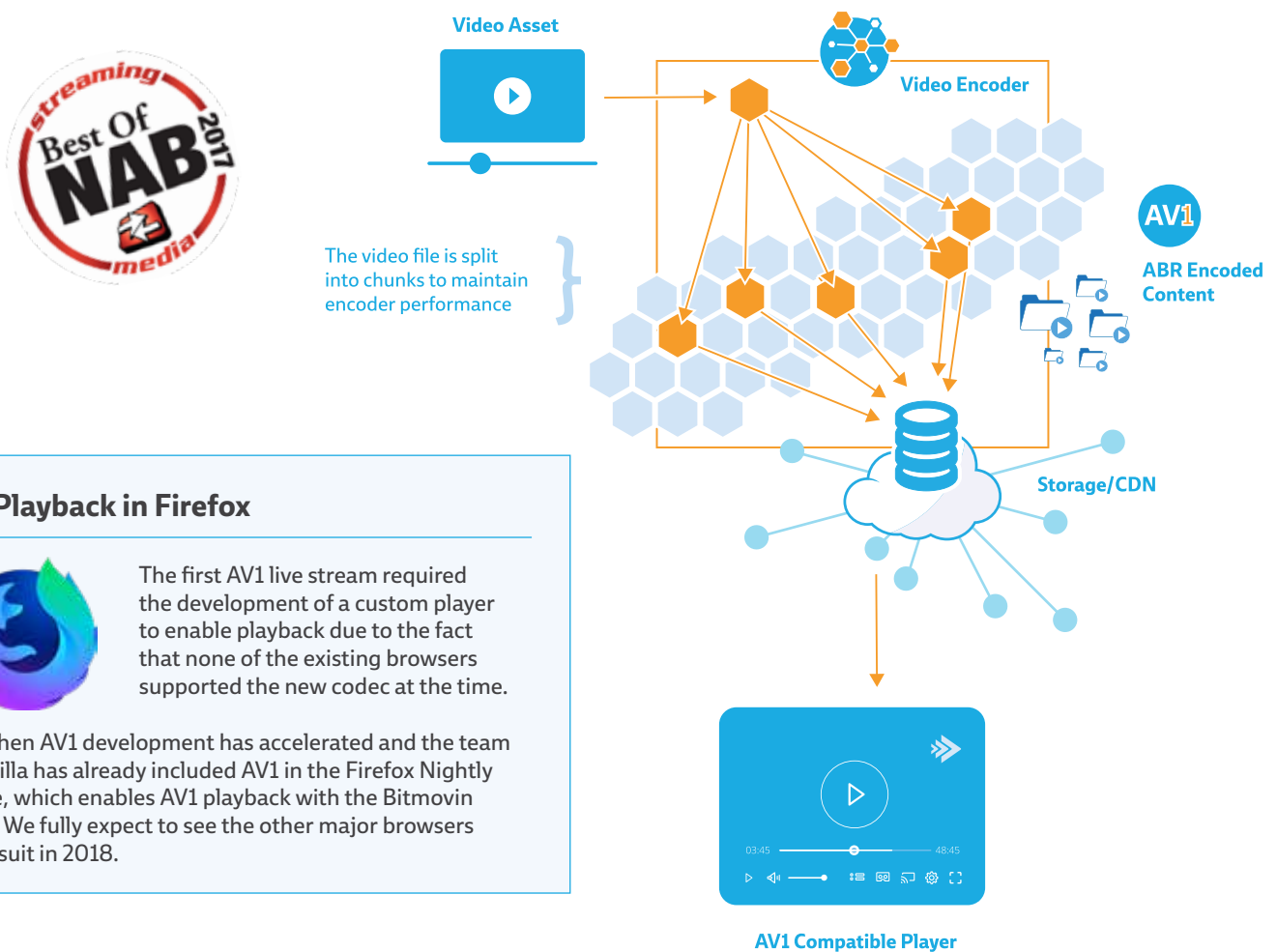
Optimized AV1 Encoding

In April 2017, we were proud to deliver the world's first AV1 live stream, winning the Best of NAB Award from Streaming Media magazing. At the time it required over 200 processor cores to stream. Just five months later at the IBC show in Amsterdam we delivered the same demonstration using just 32 cores. Since then we have continued to improve our AV1 technology, and as more companies begin to use and support the codec, this development will only accelerate.

Chunk based encoding, which is at the core of the Bitmovin Encoding Service is perfect for managing the additional

processing power required to encode AV1. Our chunked encoding allows us to speed up encoding almost linearly with the number of instances that are added to the encoding cluster. This approach works with our cloud encoding in the same way that it works with our on-premise setups that are based on Kubernetes and Docker.

As a result, we can reach the same encoding speeds for AV1 that our customers have come to expect for H264, VP9 and HEVC encoding, which now makes the codec effectively usable for media companies and content providers throughout the industry.



AV1 Playback in Firefox



The first AV1 live stream required the development of a custom player to enable playback due to the fact that none of the existing browsers supported the new codec at the time.

Since then AV1 development has accelerated and the team at Mozilla has already included AV1 in the Firefox Nightly release, which enables AV1 playback with the Bitmovin Player. We fully expect to see the other major browsers follow suit in 2018.

Over 50% of today's online video relies on technology that we developed

As the video industry evolves, so does the technology that drives it.

Bitmovin has been a first mover in almost every significant development in online video, from building and deploying the world's first (and fastest) commercial adaptive streaming (MPEG-DASH/HLS) HTML5 Player, to being the first to achieve 100x realtime encoding speeds in the cloud. Bitmovin provides HEVC as well as VP9 live streaming with 60FPS and 4K resolution, and built the first containerized video encoding solution with Docker and Kubernetes.

Bitmovin products are completely in-house developed, easy and fast to integrate and highly customizable. In combination with our great support, documentation and SLAs, this is a true enterprise offering.

To find out more about Bitmovin's video infrastructure solutions, or about any individual products, contact sales@bitmovin.com, or visit our website: bitmovin.com

Pioneers of adaptive streaming technology

There is no company in the world better qualified to help you *stream video!*

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The New York Times



For more information, visit our website at bitmovin.com or email: sales@bitmovin.com



Bitmovin, Inc. Headquarters

301 Howard Street, Suite 1800 | San Francisco | CA 94105 | USA | +1 650 4585453

Bitmovin also has offices in New York, Chicago, Seattle, Hong Kong, Austria, Sao Paulo, and the Netherlands, as well as sales operations in countries all around the world.