

MEDIA EXCEL WHITE PAPER

HEVC: HIGH EFFICIENCY VIDEO CODEC BENEFITS - APPLICATIONS - CHALLENGES

4K | **HEVC**
ULTRAHD | H.265 - HIGH EFFICIENCY VIDEO CODING



How HEVC Shapes The Future Of End-To-End Video Delivery

INTRODUCTION

This brief white paper summarizes the benefits, applications and challenges introduced by HEVC and presents Media Excel's outlook for HEVC adoption across the value chain of the media & entertainment industry.

The introduction of the next-generation video compression technology, HEVC/H.265, has opened up a multitude of opportunities for existing and new video delivery applications. In a nutshell, HEVC offers two key advantages over its predecessor (H.264): quality equivalent to H.264 at half the data rate and the ability to deliver 4K/UltraHD video. At the same time however, encoding complexity, hence processing power requirement, is increased by an order of magnitude.

As was the case with MPEG-2 to AVC/H.264 migration, adoption and migration to HEVC will take several years and proceed at different rates across the diverse use cases and applications. Adoption rate is affected by the incremental benefit and/or cost-savings HEVC brings to the respective application/segment.

Technological advancements with HEVC, along with broader market directives, are expected to shape the future of end-to-end video delivery workflows for the next several years.

HEVC BENEFITS

- **Quality:** Enhance quality of experience without impacting CAPEX/OPEX, up to 50% video quality improvement.
- **Capacity:** Double the channel capacity for broadcaster, Cable, and Pay TV service providers.
- **4K/UltraHD:** Make 4K/UltraHD services more feasible and cost effective for both contribution and distribution.
- **OPEX:** Lower operating expenditures for OTT video services due to bandwidth/transport saving.
- **CAPEX/ROI:** Increase the value of existing spectrum investment (satellite, broadcast, cellular) by allowing more services through the same pipeline.
- **Storage Efficiency:** Increase storage capacity for VoD assets (head-end, CDN, DVR, CE device) and studio production (contribution, tapeless production).
- **Reach:** Enable service delivery at longer loop lengths (up to 30% farther).



APPLICATIONS

Even though practically all video delivery applications will be impacted by the introduction of HEVC, eventually, only a few of them are expected to make the switch sooner than later:

- **Broadcast Mobile TV (LTE/eMBMS):** The direct and pronounced spectrum utilization/capacity advantage of HEVC, as well as the presence of 1 Billion HEVC-capable CE devices (Frost & Sullivan, 2013) provide a clear motivation towards the adoption of HEVC in eMBMS/LTE-B services.
- **Point-to-Point/Contribution:** Even though satellite-based distribution workflows will take time to migrate to HEVC, satellite and IP-based teleport and point-to-point contribution workflows are taking advantage of HEVC in order to minimize transport costs and enhance service capacity.
- **Content Acquisition/Tapeless Production:** As more productions move towards 4K/UltraHD cameras and tapeless workflows, content acquisition and storage costs increase substantially. HEVC contributes in keeping storage figures low without compromising video quality.
- **OTT Multiscreen:** As content delivery (e.g. CDN) costs represent a major part of OTT OPEX, HEVC offer a substantial cost-saving opportunity. This is further encouraged by the faster replacement cycle of handheld devices, as well as, the option of over-the-air software update/push. Further, HEVC is already fully supported in MPEG-DASH.

Other applications and use-cases, such as Cable and IPTV services are less likely to adopt HEVC right away, due to the dependency on legacy Consumer Premise Equipment (e.g. set-top boxes).



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ECOSYSTEM PARTNERS

Media Excel has developed and cultivated an ecosystem of industry leaders across the entire video delivery value chain, in order to foster cooperation and safeguard end-to-end interoperability as HEVC adoption advances.



CUSTOMERS

Media Excel's client roster is made up of some of the most trusted names in media, serving millions of users daily across the globe.

They trust Media Excel to deliver Versatility, Scalability, and Flexibility to keep their media workflows operating efficiency, and to keep their viewers coming back for more.



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CHALLENGES

As with any new and promising technology, HEVC adoption presents a number of challenges. Operators need to be aware of those and identify mitigation strategies:

- **4K/UltraHD content availability:** HEVC makes 4K/UltraHD services more feasible and cost effective, however such content is still rare but growing as more cameras become available. Operators worldwide begin experimenting with 4K/UltraHD in 2014.
- **Processing Power:** The elevated complexity of HEVC imposes substantial computational, power consumption and cooling requirements. Without a scalable, disruptive and reliable hardware-software architecture, HEVC-based deployments can not deliver a viable ROI.
- **Quality of Service:** Early HEVC implementations present video quality, consistency and/or rate-control limitations. As with AVC, HEVC implementations are expected to evolve gradually within the next few years in order to match the theoretical/lab video-quality vs. bitrate expectations.
- **End-To-End Ecosystem:** Driven by market/industry demand, HEVC is gradually supported throughout the value chain across a multitude of video delivery use cases. Alliances and interoperability programs, such as Media Excel's, help align resources and efforts towards market directives.
- **Licensing/Royalties:** Early in 2014, MPEG-LA proposed a royalties scheme where content publishers are not charged. The licensing terms and the patent participants have not yet been finalized.

HEVC OUTLOOK WITH MEDIA EXCEL

Media Excel has been in the forefront of real-time and on-demand encoding/transcoding solutions for over a decade, and continues to lead in HEVC. Our hybrid approach of combining software and hardware best-of-breed architectures and our market-oriented mindset, drive our HEVC product development strategy. Specifically:

- **Broadcast Mobile TV (eMBMS/LTE-B):** Since early 2013, Media Excel has powered multiple worldwide trials with tier-1 Operators. Live 720p video in HEVC over MPEG-DASH for eMBMS is already fully integrated in our HERO product line. In 2014, HERO Live product line is involved in eMBMS trials with up to 1080p HEVC video.
- **Point-to-Point/Contribution:** As of 2014, HERO Contribution Encoder/Decoder product line includes support for Live and VoD 1080p video in HEVC. Today, HERO 4K Encoder delivers Live HEVC 4K/UHD video up to 60fps.
- **Content Acquisition/Tapeless Production:** Since early 2014, HERO VoD transcoder product line includes support for HEVC up to 4K/UltraHD resolutions.

Media Excel's HEVC solutions have already been selected by leading operators such as LGU+ and Korea Telecom based on:

- Video quality, motion fluency, color range
- End-to-end interoperability, 24x7 reliability
- Scalability, rack space and overall operating efficiency



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