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# Highly Efficient Video Coding with ARM

BY SUKANYA CHANDRAMOULI / ON MAY 30, 2013 AT 2:48 PM /

H.265, more popularly known as HEVC (High Efficiency Video Coding), is the newest addition to the long list of video codecs that have evolved in the last two decades. HEVC promises improved video quality and double the compression ratio of its predecessor, H.264/AVC. This dramatic compression and quality improvement is achieved through significantly more complex tools in the coding scheme.
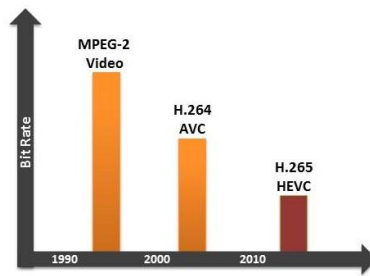


Figure 1: Graph comparing bit rate levels across MPEG-2, H.264 and H.265.

The HEVC standard is targeted at meeting the needs of higher resolution displays (Ultra HD) and advanced media services on multiple end points: TVs, set-top boxes, smartphones and tablets.

**Early Adopters**

HEVC deployment brings about a host of benefits – up to 50% reduction in streaming and storage bandwidth, Ultra HD television and multi-screen services not possible with today's video compression technology.

The initial adoption of HEVC will be primarily driven by the explosive growth in the Over-The-Top (OTT) services segment. The growing demand for video – fueled by smarter phones, more powerful tablets and OTT services like Netflix and Hulu – places a huge strain on bandwidth, choking the global networks. With HEVC, service providers will be able to deliver the same high quality video at about half the bandwidth or alternatively service twice the number of customers.

The first wave of HEVC adoption will be enabled by software decoders on mobile platforms.

**Software Decoder**

Ittiam®'s HEVC decoder has been designed to take advantage of the full capabilities of mobile SoCs, notably the media capabilities of the ARM® NEON™ SIMD engine and multi-threading, to exploit the data and functional parallelism on ARM Cortex® microprocessor cores. The decoder implementation is load balanced and scalable across single and multi-core devices.

The software decoder enables HEVC playback on a wide range of end-points, targeting consumer devices such as set-top boxes, TVs, smartphones and tablets powered by ARM cores.

**. . . And Power Efficiency**

Handling the decoder complexity  within the thermal  constraints of mobile form factors is a major challenge for the software decoder. With an aim to maintain the overall battery life, our software decoder takes advantage of the advanced computational power and energy efficiency of GPUs.

ARM Mali™-T600 GPUs are designed for GPU Compute and support APIs such as OpenCL™ and Android™ Renderscript. Systems featuring Mali-T600 GPUs provide a powerful and efficient platform for the development of GPU Compute accelerated, energy efficient HEVC decoding.

By identifying operations that are highly parallel and offloading these to GPUs, a significant improvement in performance is achieved i.e. a higher frames per second (fps) throughput for the same CPU usage or, for the same fps throughput, the more effective use of both GPU and CPU resources results in better energy efficiency.

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*Figure 2: Snapshot of an Ittiam Systems demo which shows the 1080p HEVC decoder on the ARM Mali -T604 GPU*

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The HEVC standard offers exciting benefits throughout the media delivery chain.  Ittiam Software Decoder with GPU acceleration enables optimal, power efficient decoding of various resolutions to suit the application needs.

**TAGS:** ARM | AVC | H.264 | H.265 | HEVC | HIGH EFFICIENCY VIDEO CODING | ITTIAM SYSTEMS | NEON | SIMD | SOFTWARE DECODER | ULTRA HD

**Bio:** Sukanya Chandramouli, General Manager , Ittiam Systems is responsible for Mobile Multimedia solutions in Ittiam. She has over 20 years' experience in Embedded Platforms, Multimedia, Systems Software and Application development for the Consumer and Mobile segments.

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