

The logo for Ateame, featuring a stylized 'a' with three horizontal bars to its left, followed by the word 'ateme' in a lowercase, sans-serif font.

*Keep content looking great wherever it's played*



# Compression Technology Recent Trends

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# Agenda

- MPEG-4/H.264 State of the Art
- How High do you WANT to go
- How Low CAN you go
- AVC-I
- 1080p50/60
- Contribution for Web & Mobile
- What is Next?

**We are just beginning to see what H.264 can do for us....**

# MPEG-4/H.264 Today



- **Utilizing still more of H.264 powerful Toolset**
  - . 2 Level Hierarchical B Frames
  - . up to 7 B-Frames and more
  - . Adaptive MBAFF & PAFF
  - . Rate Distortion Optimization
- **Now using H.264 Contribution Profiles in Contribution**
  - . Hi10 and Hi422 Profiles
    - Increased coding efficiency and better picture with 10-bit
- **We have plenty of headroom with the standard, and the processing capacity in modern platforms**
  - . Many years of growth ahead. Competitive market drives innovation. The industry is far from reaching a plateau.

# TRENDS: How High you WANT to GO?



- **Achieving Transparency**

- . In H.264 LONG GOP with current implementations we observe Visually Lossless encoding at rates of 130Mbps with extreme content
  - Such as looking at a human face within a confetti shower
- . Visually Lossless with the majority of contents below 100Mbps
- . In H.264 Hi422 intra the equivalent is around 150Mbps with extreme content

- **High quality contribution over satellite usually less than 30Mbps in 1080, 20Mbps in 720p60**
  - . Next Gen firmware will make possible 3 HD services in one transponder

# TRENDS: How Low CAN you go?



- Progressive formats increasingly chosen
- Distribution Rates of 4.5 or 5Mbps are becoming reality
- Internet rates at 1, 2, 3Mbps for “HD”
- Coding Efficiency is only part of the story
  - Rate Control and Motion Estimation
  - Advanced Psycho Visual enhancements
  - Pattern detection – for example text and graphic overlay, grass
  - Motion adaptive Pre-Processing
  - Maintaining Compatibility with legacy STB

## TRENDS: AVC-I



- **ITU/ISO MPEG-4 is the reference standard including :**
  - Hi10 Intra profile is identical to Hi10 without P and B frames
  - Hi422 Intra profile is identical to Hi422 without P and B frames
  - No new tools
- **Natural support of compressed audio in TS**
  - Which may not be necessarily the case with some JP2K implementations. With 10 or more audio channels bandwidth savings are important
- **Readily interoperable and Software Decoding tools exist**
- **DVB is drafting a major revision of contribution std**
  - Will include Hi422, Hi422 intra along with JPEG2000

## TRENDS: 1080p60



- **New Infrastructure often support 3G**
- **Increased interest from Sports broadcasters**
- **Why?**
  - Increased clarity permitted by increased spatial and temporal resolution
  - Replays are clearer, allows better referee decision support
  - Perfect transform from 1080i to 720p
  - Cleaner format conversion from Europe – Americas
  - Save setup costs in Mobile Production and Uplink trucks
- **Slight Bitrate increase of ~30% easily compensated by codec advances (Gen 4)**

# Contribution for Web & Mobile



- **Emerging Medias have Emerged**

- . Consumers requesting more video content, everywhere
- . A portion of the advertizing dollars are following
- . Nielsen C3 Extended Screen

- **Contribution for Web and Mobile**

- . The same Long Tail effect
- . College Sports, Religious groups, Concerts, Enterprise
- . Lower cost, usually 4:2:0
- . High Density and easy to deploy
- . Single or multiple profiles
- . Connectivity to CDN at the venue or at NOC



# What about Tomorrow?

## ● Change is the only Predictable direction

- . The level of technology we all use everyday ever goes up
- . Users become increasingly aware of Technology Choices
- . Become conversant in compression lingo
  - Users request programmable solutions to better protect their investments and face the evolving requirements

## ● HEVC High Efficiency Video Coding

- . In development phase, planned release early 2013
- . Expected gains in the order of 30-40% (difficult to predict)
- . No support of interlace formats...

## ● After that

- . 4K and 8K formats will require advanced codecs
- . 3D optimizations



**Thank You!**