

# MPEG VIDEO & FILE FORMATS

WORKSHOP: VIDEO MEETS MOBILE – THE 5G OPPORTUNITY

AUG 21, 2015

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# OVERVIEW



## › Current focus on

- Future Video Coding Standardization
  - › Next Generation Video
  - › High Dynamic Range
- New and recent work on File Formats
  - › HEVC, scalable, multiview
  - › Content Protection
  - › Image file format

## › Other Video activities

- HEVC Extensions, Internet Video, Freeview Television

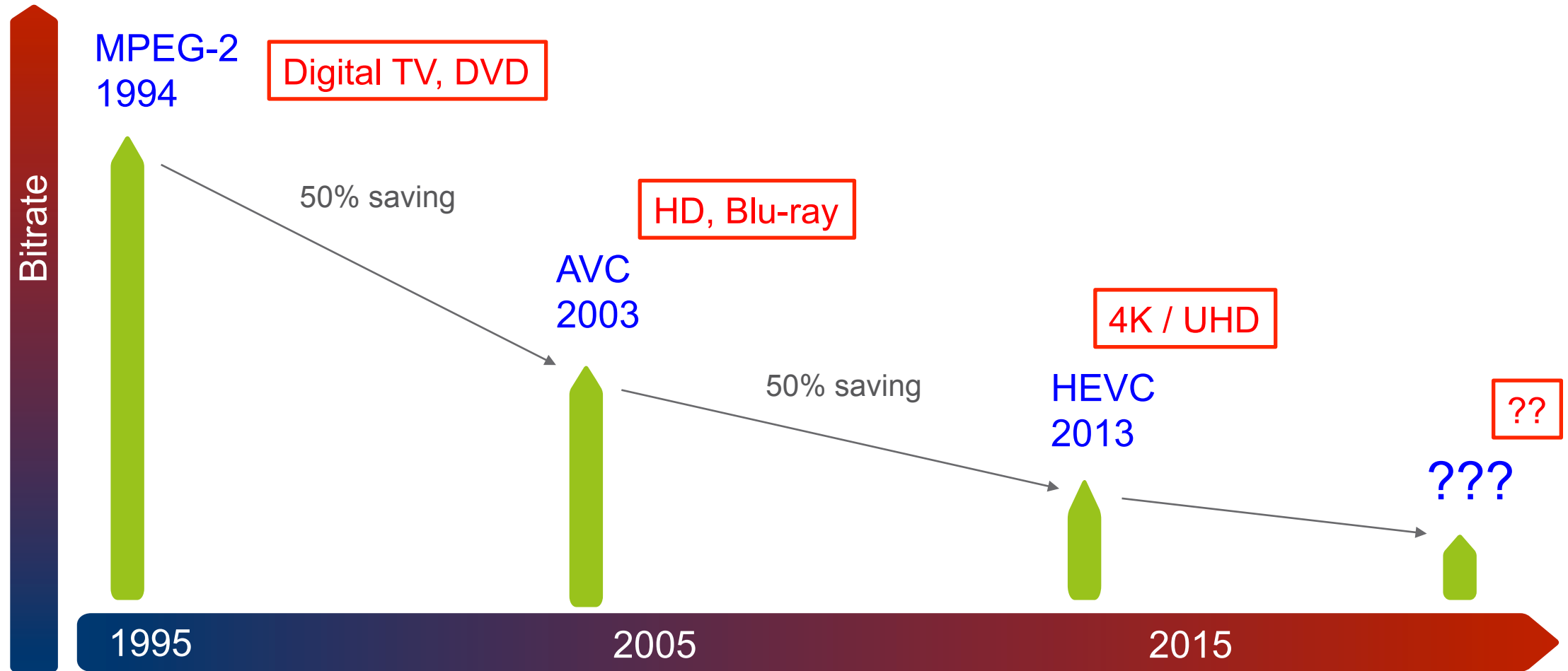


Moving Picture Experts Group



# FUTURE VIDEO STANDARDIZATION - COMPRESSION EFFICENCY

# VIDEO CODING STANDARDIZATION



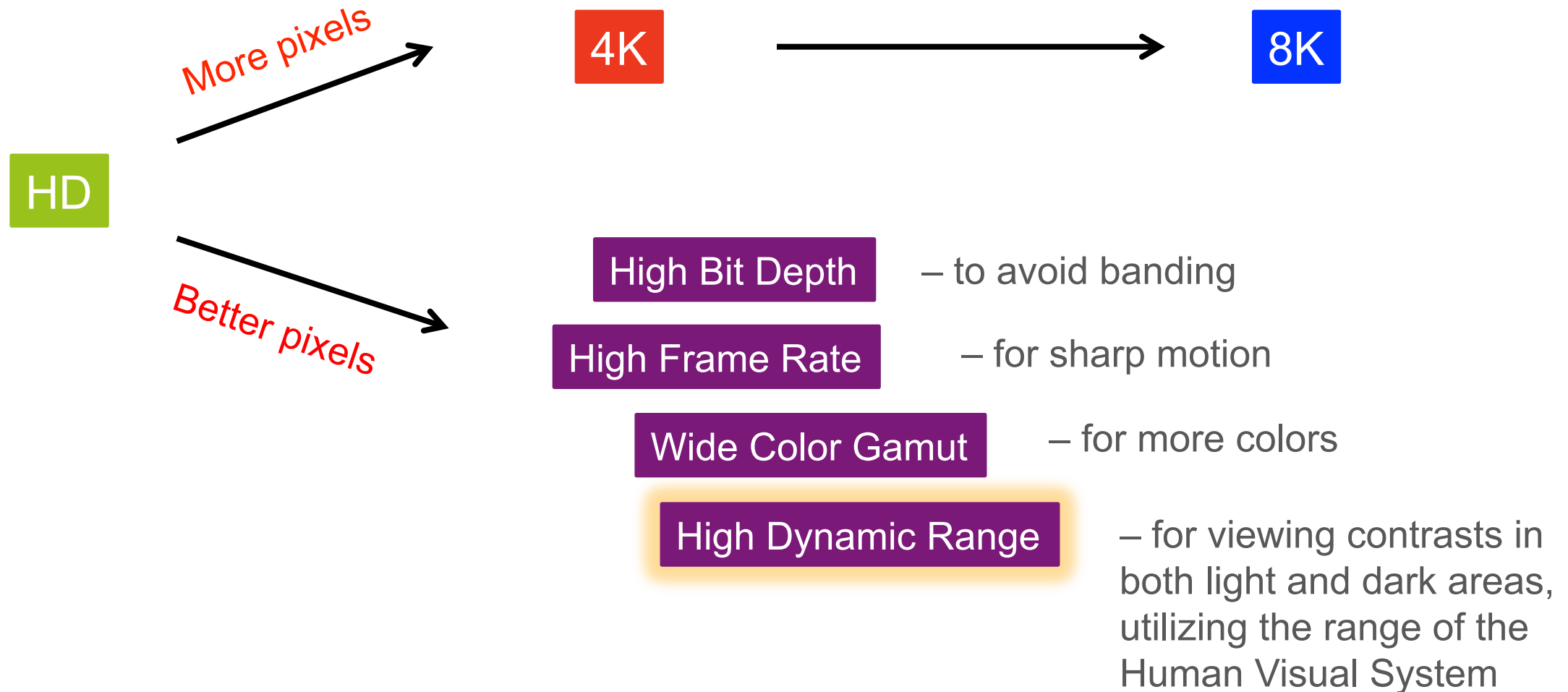
# FUTURE VIDEO STANDARDIZATION





# FUTURE VIDEO STANDARDIZATION- MORE VERSUS BETTER

# BEYOND HD



# HDR AND WCG



HD

More pixels

Better pixels

## Feb 2015 **Call for evidence** on **HDR and WCG** video coding

- Coding **efficiency** and **functionality** for HDR/CWG content
- Compared to **HEVC Main10** in several categories
  - > Re-use HEVC?
  - > Backward-compatible?

## June 2015 **Evaluation** of Submissions

- Significant gains identified →
  - > **Fast Track**: Improvement using HEVC Main 10 profile
  - > **Long Term**: Part of the planned effort on
    - **Future Video Coding Standardization**





# ISO BASE MEDIA FILE FORMAT - MOTHER OF MP4 & 3GP

# ISO BASE MEDIA FILE FORMAT



› Base specification for several file formats

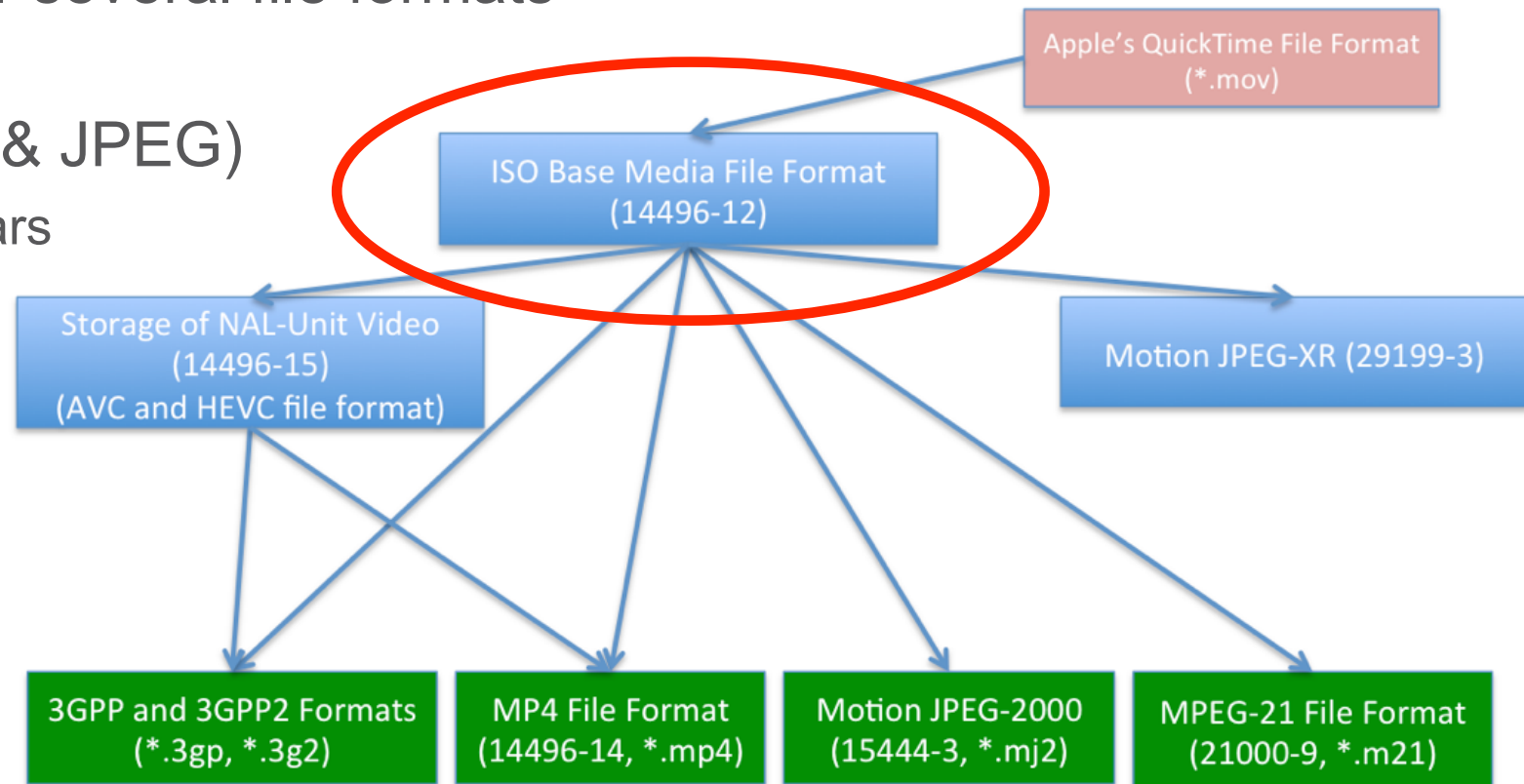
– **MP4**, **3GP**, MJ2, ...

› Specified by MPEG (& JPEG)

– Evolved during 15 years

– **5<sup>th</sup> Edition (2015)**

› Freely available



# OVERALL FILE STRUCTURE



## Logical structure

- Files
  - > Tracks
    - Samples (timed)
  - > Resources
    - Items (non-timed)

## Physical structure

- Boxes
  - > Hierarchical
  - > Easy to parse
- Separation of data
  - > Meta vs. media data

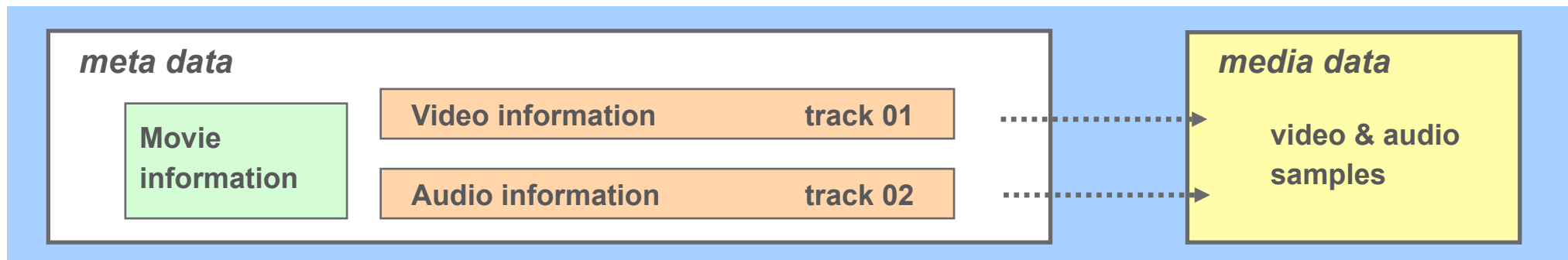


Fig. Example of self-contained file for audio & video

# FILE FORMAT EXTENSIONS



- › Carriage of MPEG-4 Systems (14496-14)
  - **MP4 file format** (2003)
  
- › **Carriage of NAL-unit structured video** (14496-15)
  - **AVC**, SVC, MVC
  - 3<sup>rd</sup> Edition (2014)
    - › including **HEVC**
  - Amendments (2015)
    - › including **layered HEVC** (scalable, multiview)
  
- › Carriage of **Timed text** and other visual overlays (14496-30)
  - TTML and WebVT (2014)

# CONTENT PROTECTION



- › Support for **Common Encryption** (23001-7)
  - 2<sup>nd</sup> Edition (2015)
    - › Support for partial encryption (power savings to play the content)
- › **Sample Variants** (23001-12)
  - Finalized 2015
  - Enables the insertion of watermarks as part of the decryption and playback of protected content

# IMAGE FILE FORMAT



- › High Efficiency **Image File format** (HEIF) (23008-12)
  - Technically complete (2015)
  - Storage of **HEVC Images or Image Sequences**
  - Documentation of relationship, indication of necessary transformation and composition, etc



# OTHER VIDEO ACTIVITIES

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- › Screen content coding
  - Extensions to HEVC (ongoing)
  
- › **Internet Video** (targeting royalty free licensing)
  - Web Video Coding (14496-29, published 2015) “sub-profiling AVC”
  - Video Coding for Browsers (14496-31, ongoing) “standardizing VP8”
  - Internet Video Coding (14496-33, ongoing) “technology re-use”
  
- › Free-Viewpoint Television
  - Call for Evidence (June 2015)
  - Super-Multiview and Free Navigation





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