Trend in Multimedia Compression Technology

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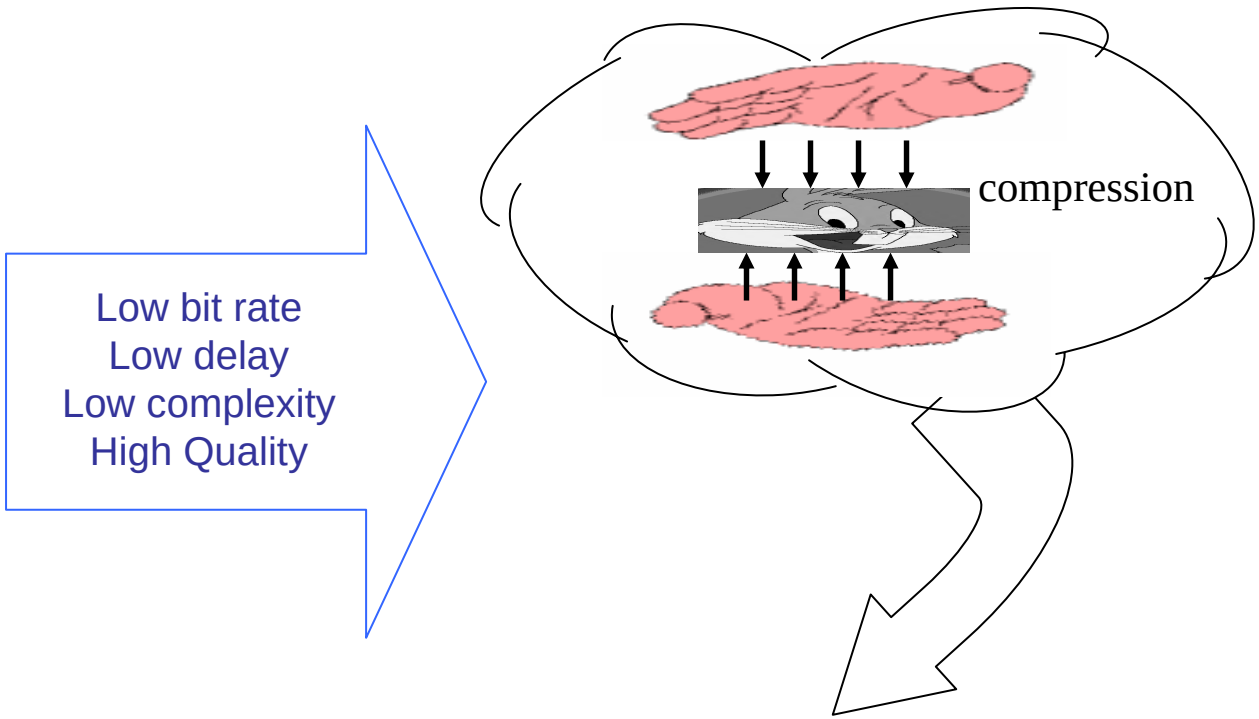
Content

- When Coding Efficiency is the top priority
- Convenience of Use is the next
- Compression for special applications
- Final Words

Coding Efficiency

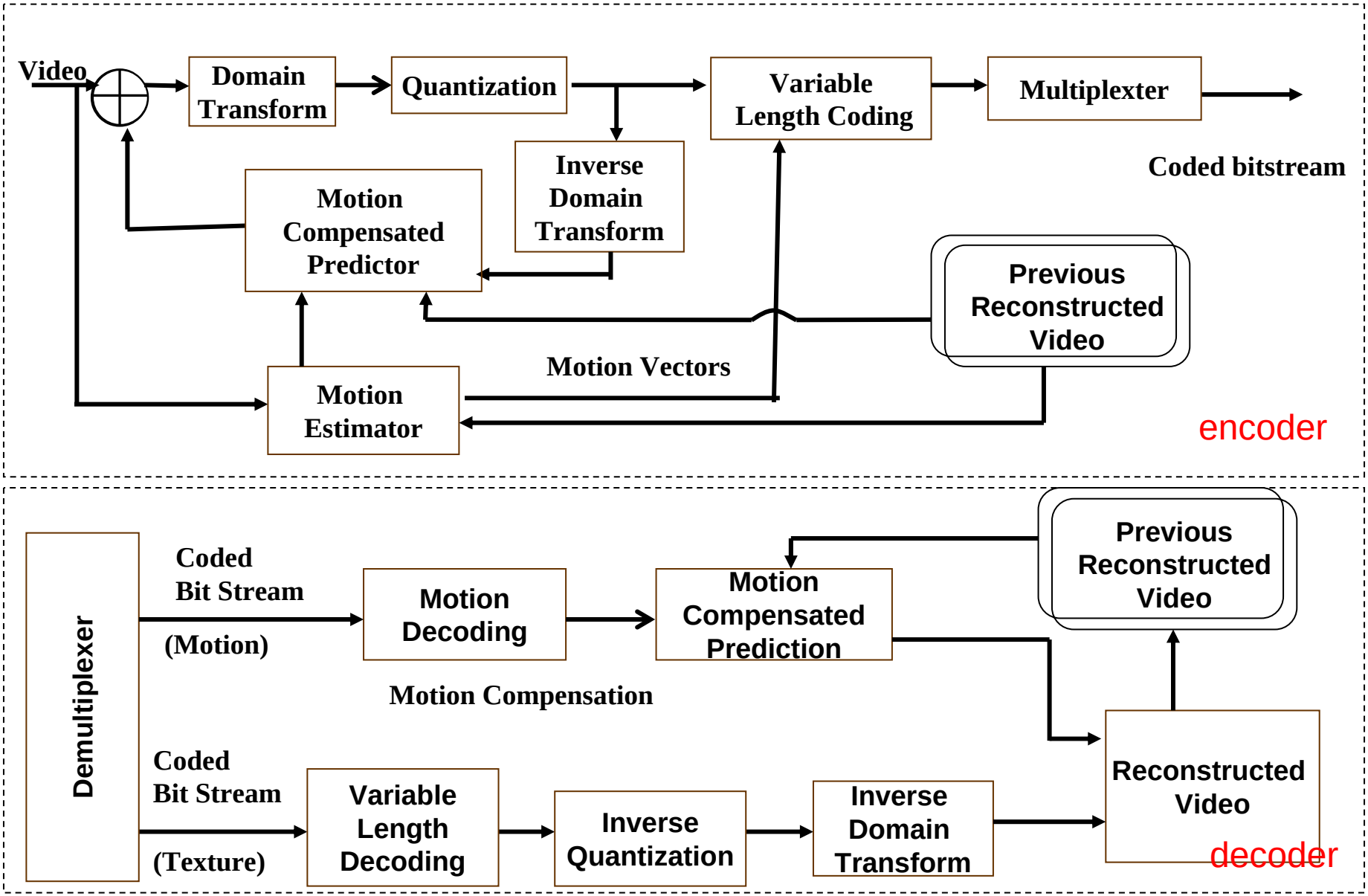
- Compression is to reduce the amount of data



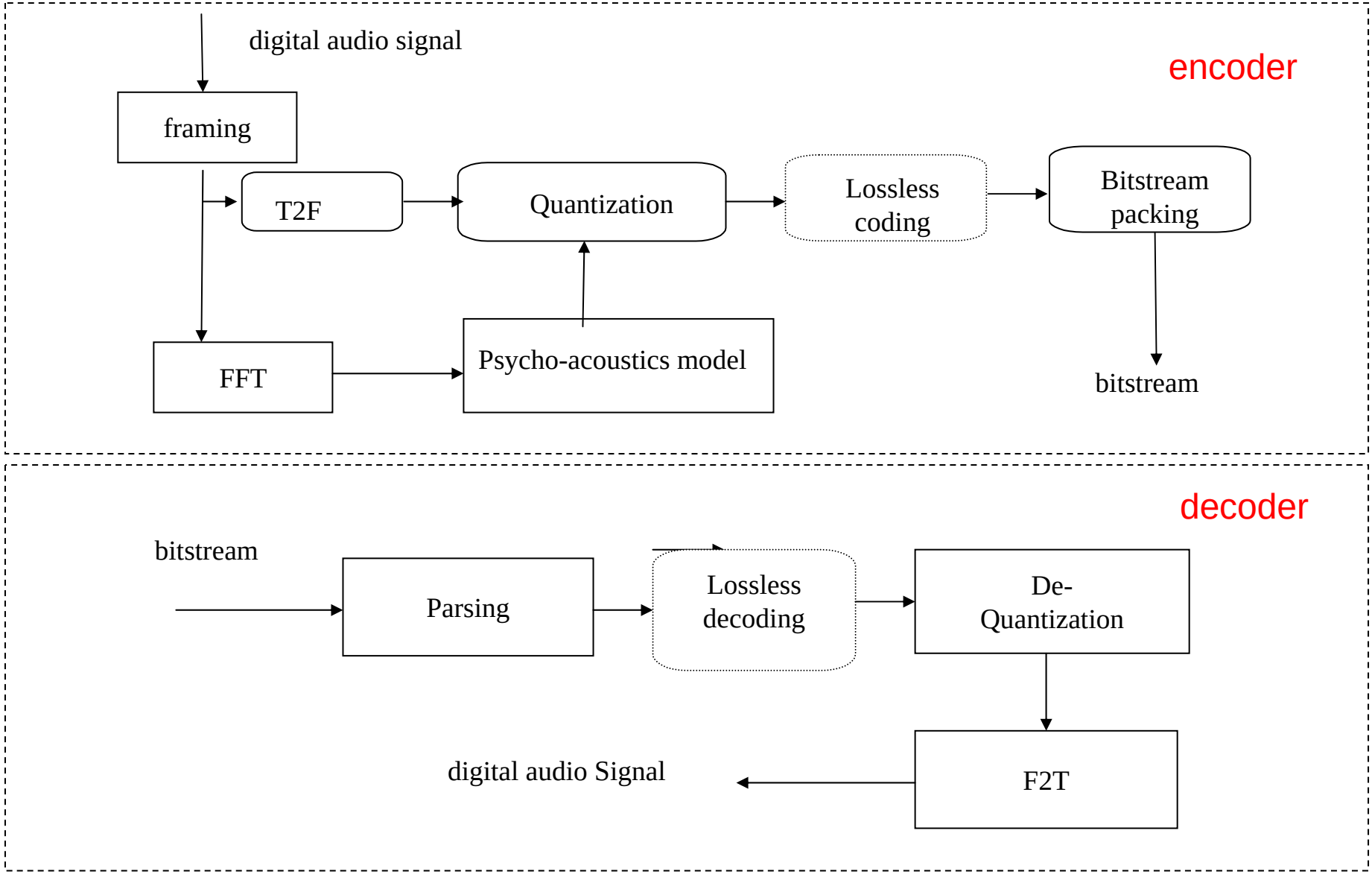
Technical considerations
for coding efficiency

- Ignoring the irrelevancy
  - Motion compensation in Video
  - Psycho-acoustics model in Audio
- Ignoring the redundancy
  - Lossless coding
    - Huffman coding
    - Arithmetic coding
- Parameterization
  - CELP coding in speech
  - SBR in audio

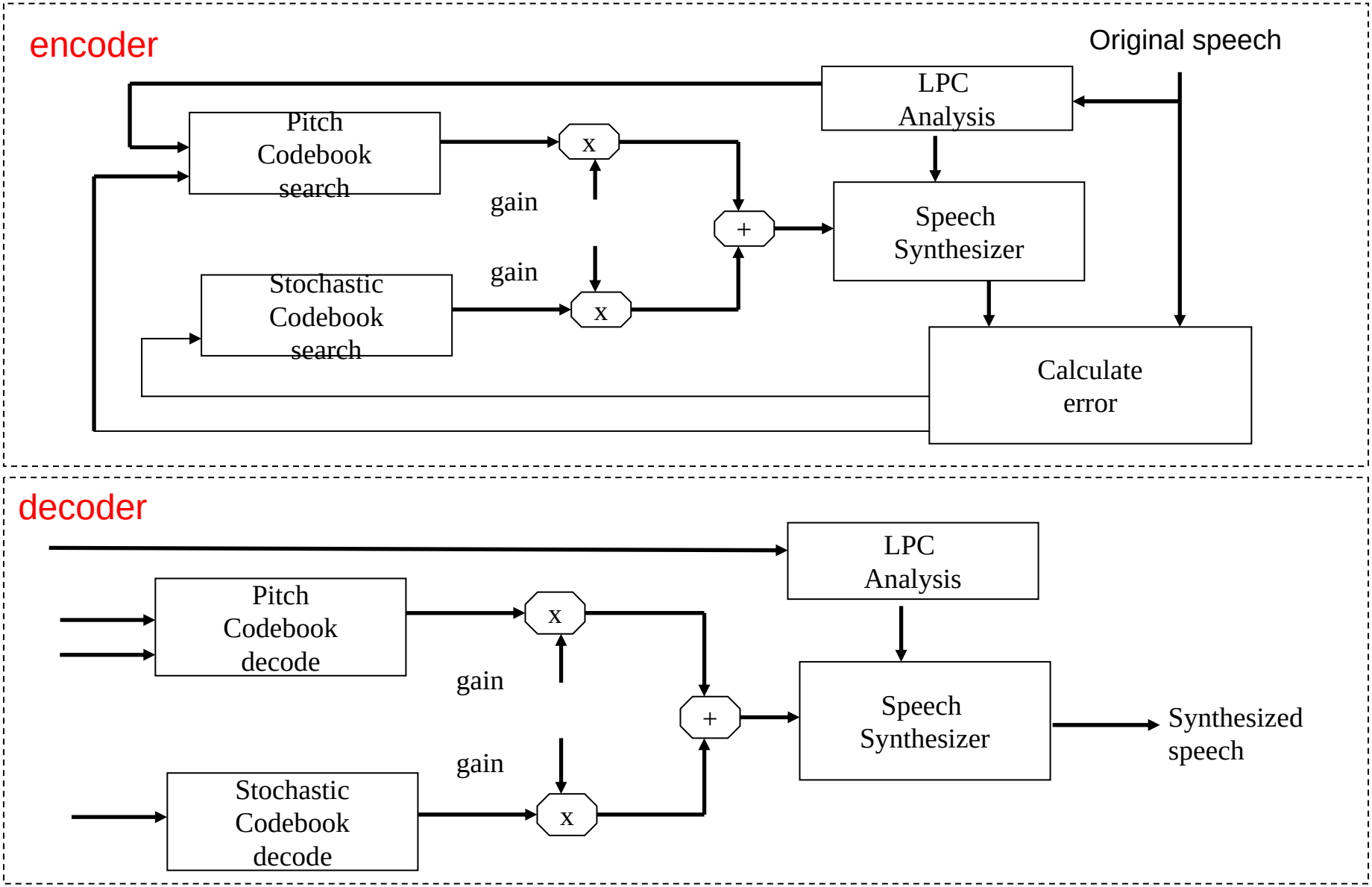
General Video Coding Blocks



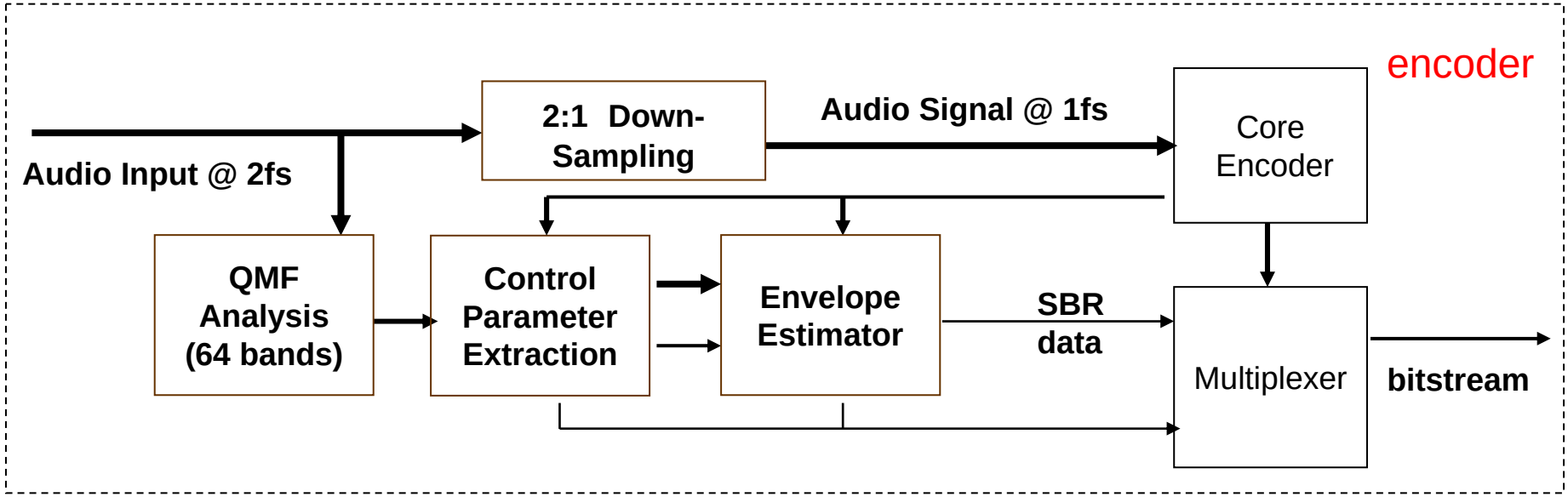
General Audio Coding Blocks

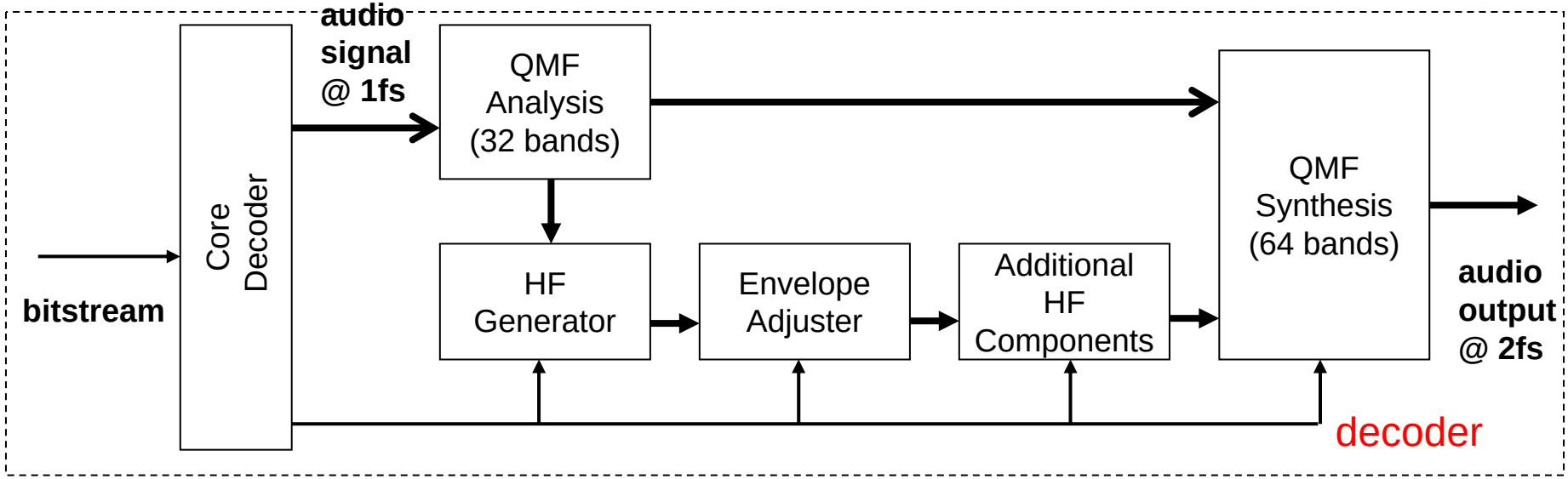


Parametric Coding - CELP speech



Parametric Coding - SBR





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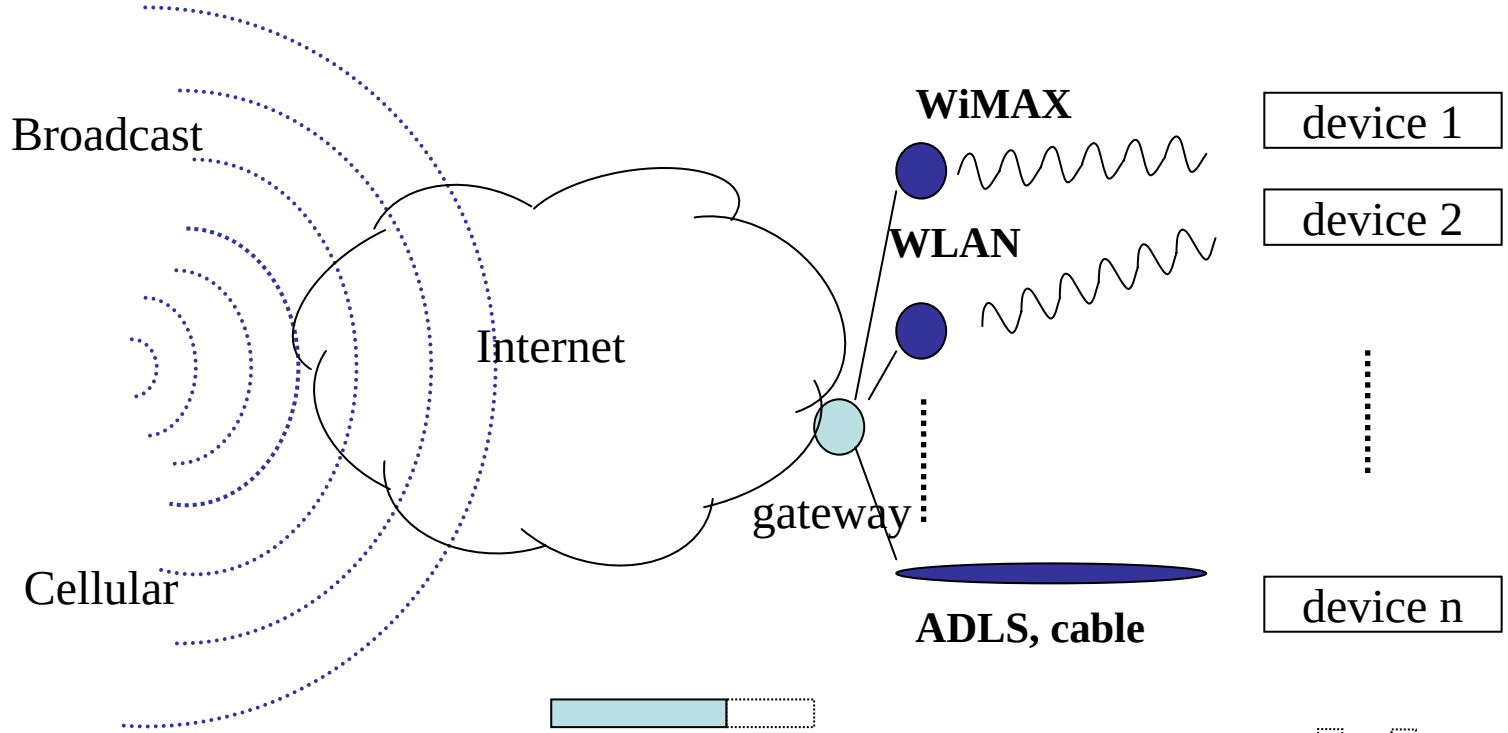
Convenience of Use Issue

- Coding efficiency is not all
- Convenience of Use
  - Network adaptability
    - Heterogeneous networks
  - Device adaptability
    - Difference in capability
    - Power issue
  - Convergence service

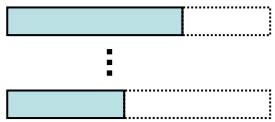
One Solution for Convenience of Use

- Scalable Compression



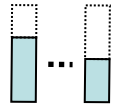
one process

one set of bitstream



Heterogamous network

various bandwidth



various processing and display capability

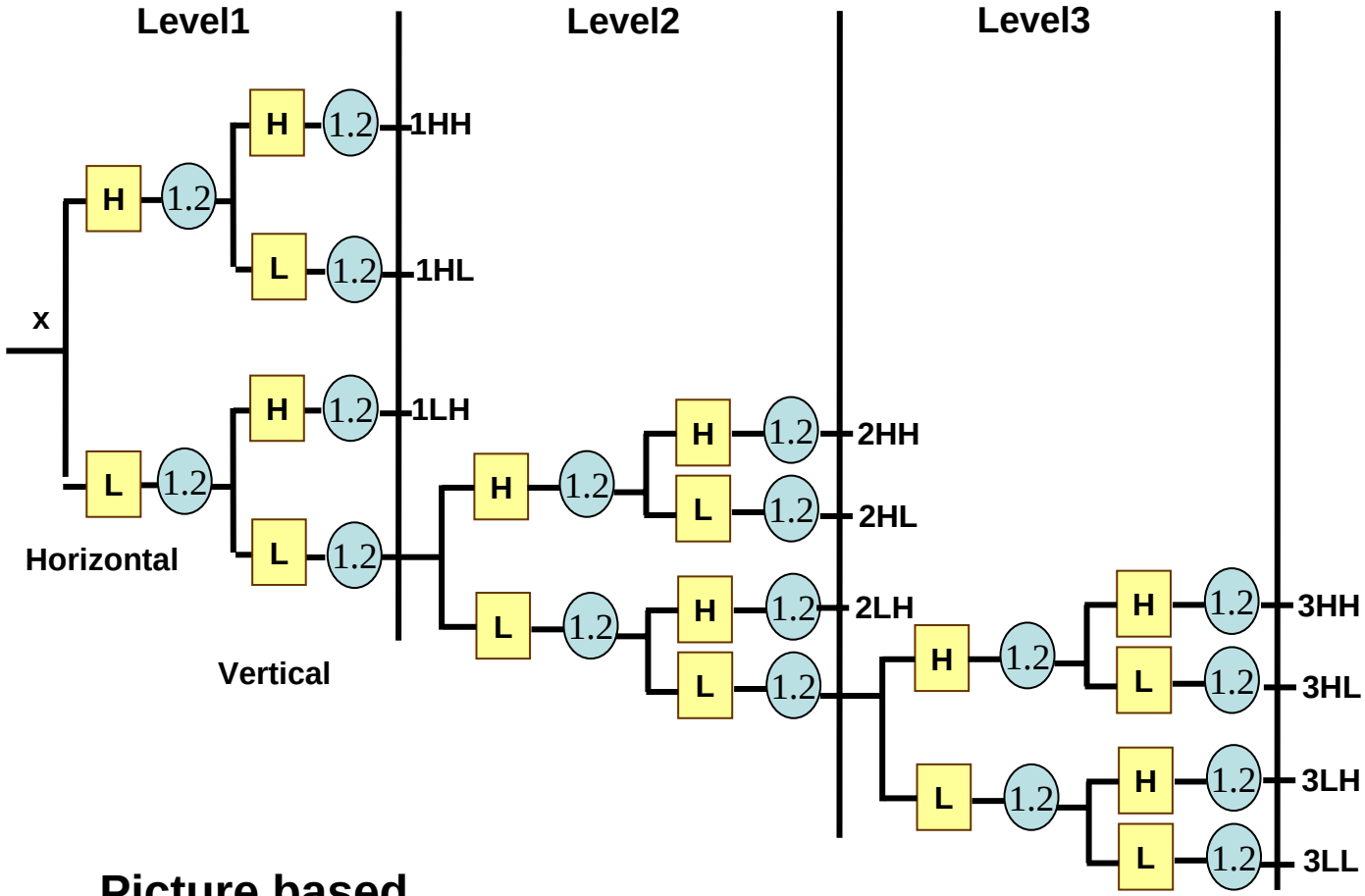
Types of Scalability

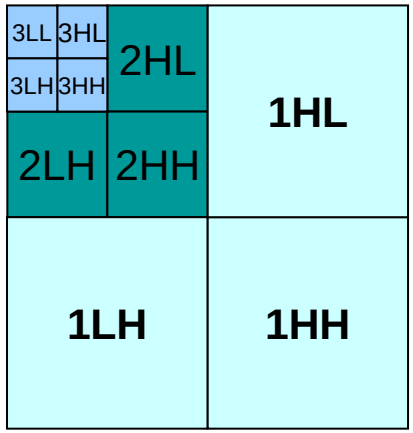
- SNR scalability
  - Multilayer scalability

  - Fine granular scalability

- Multi-dimensional scalability
  - SNR
  - Spatial
  - Temporal

Scalable Picture Coding - Wavelet



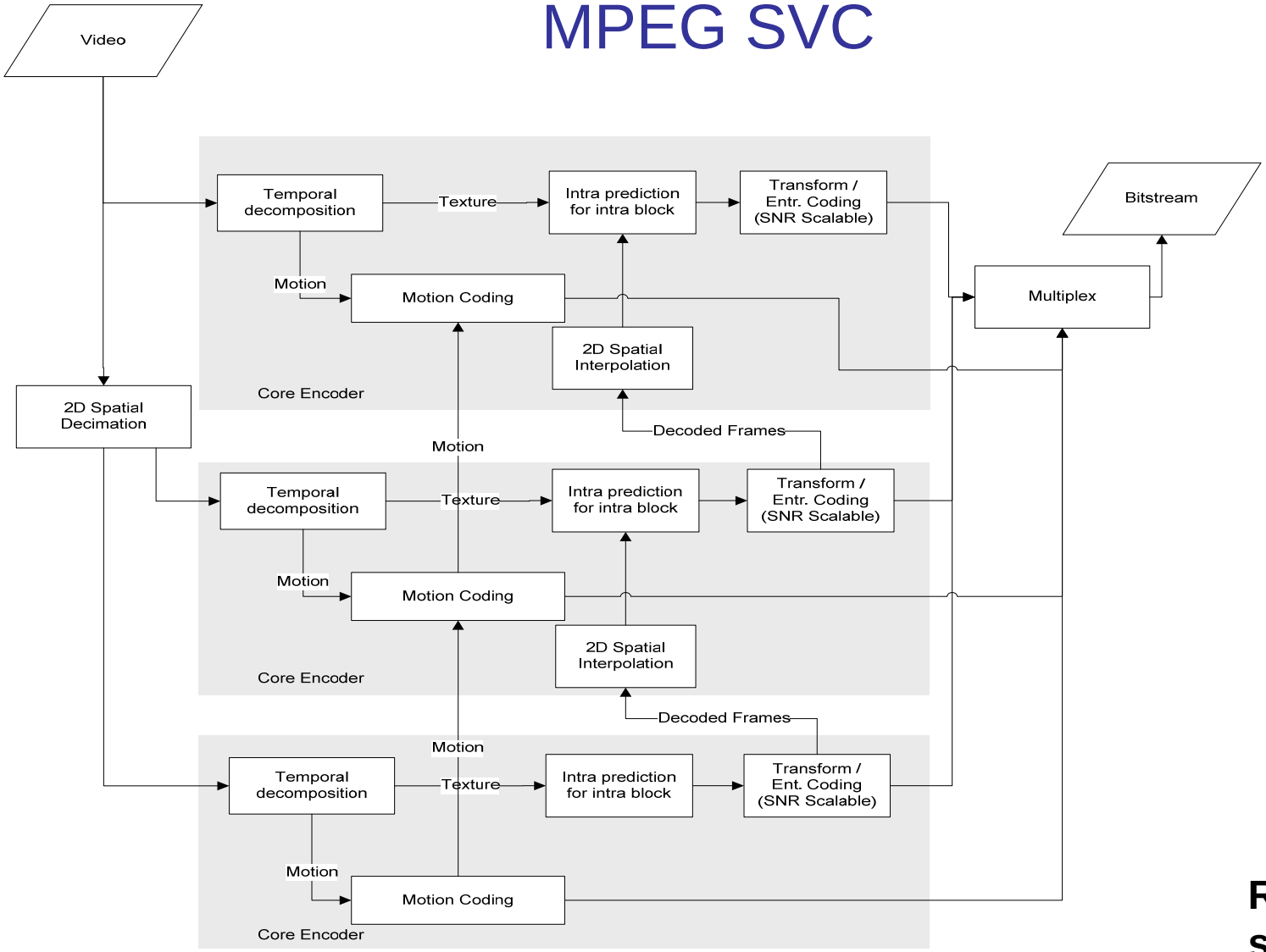


Picture based

Spatial Domain Scalability

Multi-Dimensional Scalability

MPEG SVC



Ref: MPEG standard

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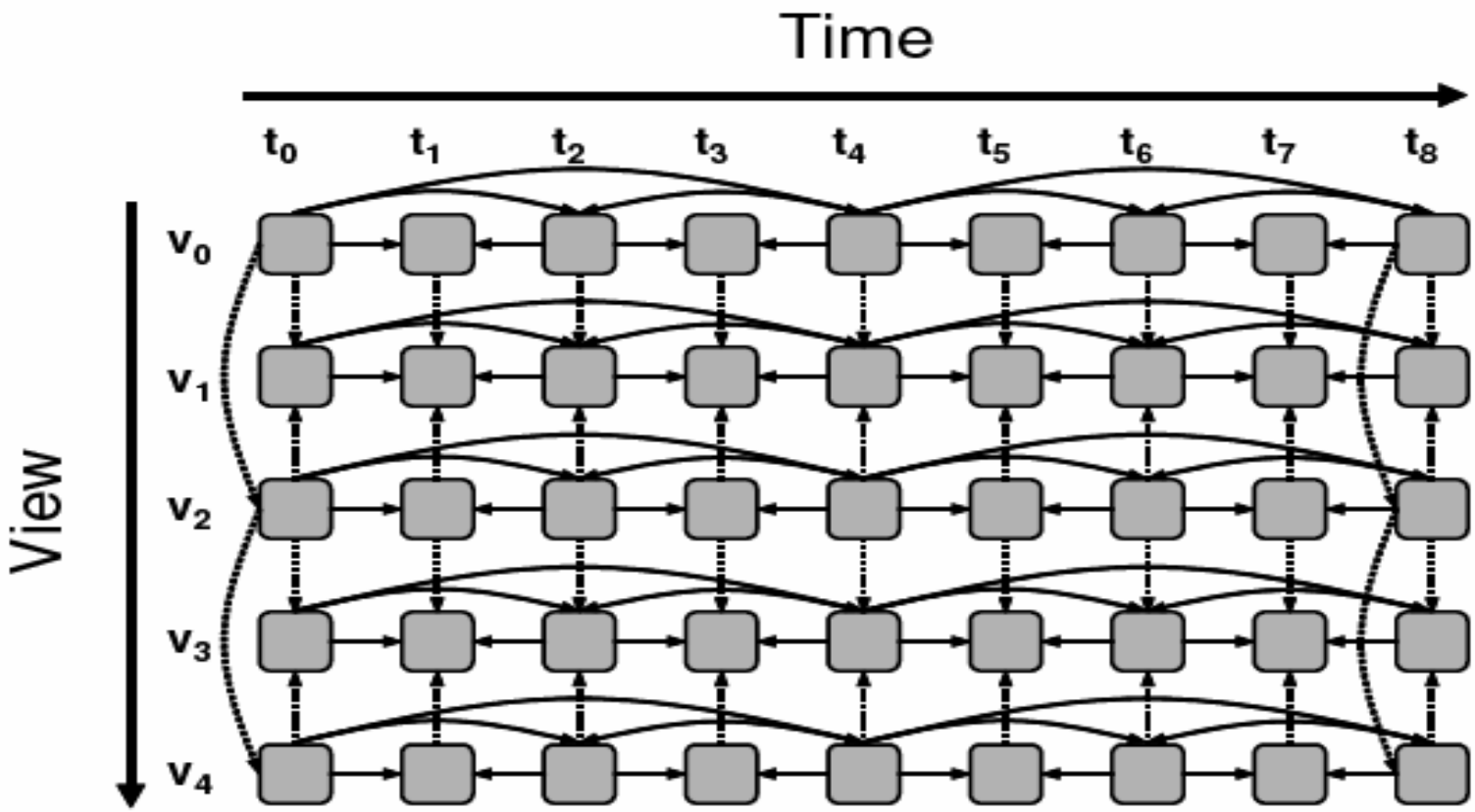
Advanced Compression for Special Applications

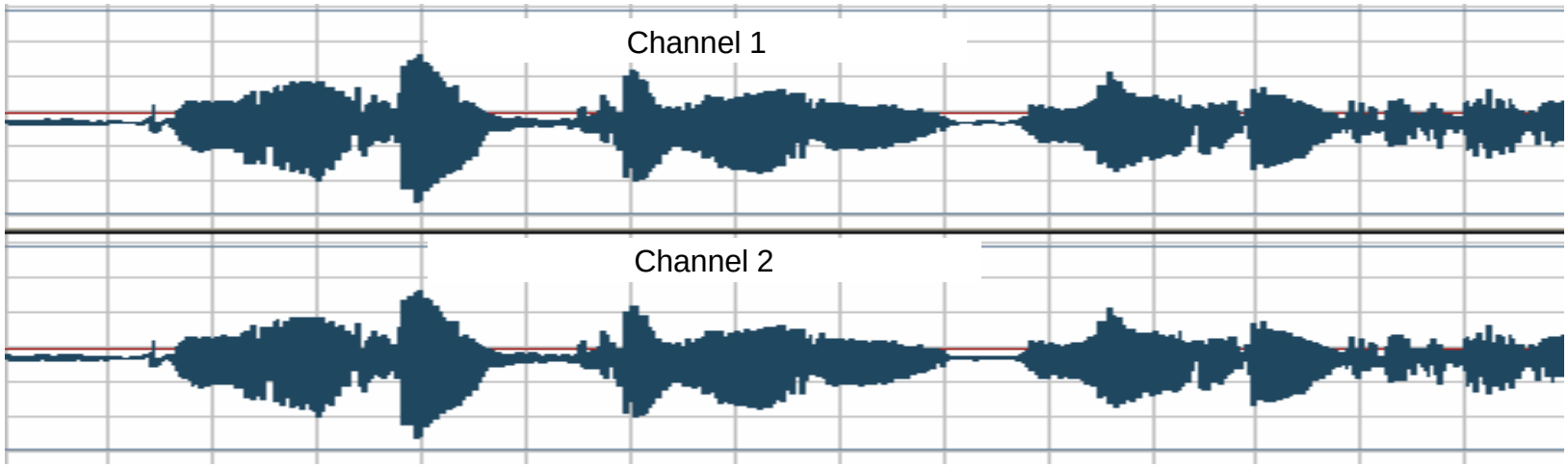
- Multi-View / Multi-Channel compression
  - 5.1 channel audio (old technology)
  - 3D TV
  - Free Viewpoint TV
- Surveillance Video

Multi-View Video Compression



Prediction between frames and views

Multi-Channel Audio Compression (old technology)



- MS

  M = (channel 1+ channel 2)/2

  S = (channel 1-channel 2)/2
- Intensity coding
  - Only process on high frequency bands
    - Regular coding for one channel
    - Keep intensity information only for the other channel

Surveillance Video Compression

- Just a thought

- Coding efficiency is still key
  - It could be 24-hour occupation of the bandwidth
- Information is more important than video quality
  - Region of Interests
  - Object coding
  - Parameter coding
    - Surveillance modeling
      - Event to parameters

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Final Words

-Video Compression Industry

- Technology is not the only Driven force
  - Who is deployed first
    - MPEG 2 video is still dominant
  - Who has better content support
    - Dolby audio has larger market share than AAC
    - H.264 starts with Blue Ray Disc
  - Niche market
    - MP3 finds its way in internet and USB player
  - IP royalty issue
    - AVS may be a threat to H.264