



ADVANCED INSTITUTE  
OF TECHNOLOGY

# *MPEG-4 BSAC Technology*

2000. 2. 19

Samsung AIT

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*108th AES Convention*

# *Introduction to BSAC*

- What is *BSAC*

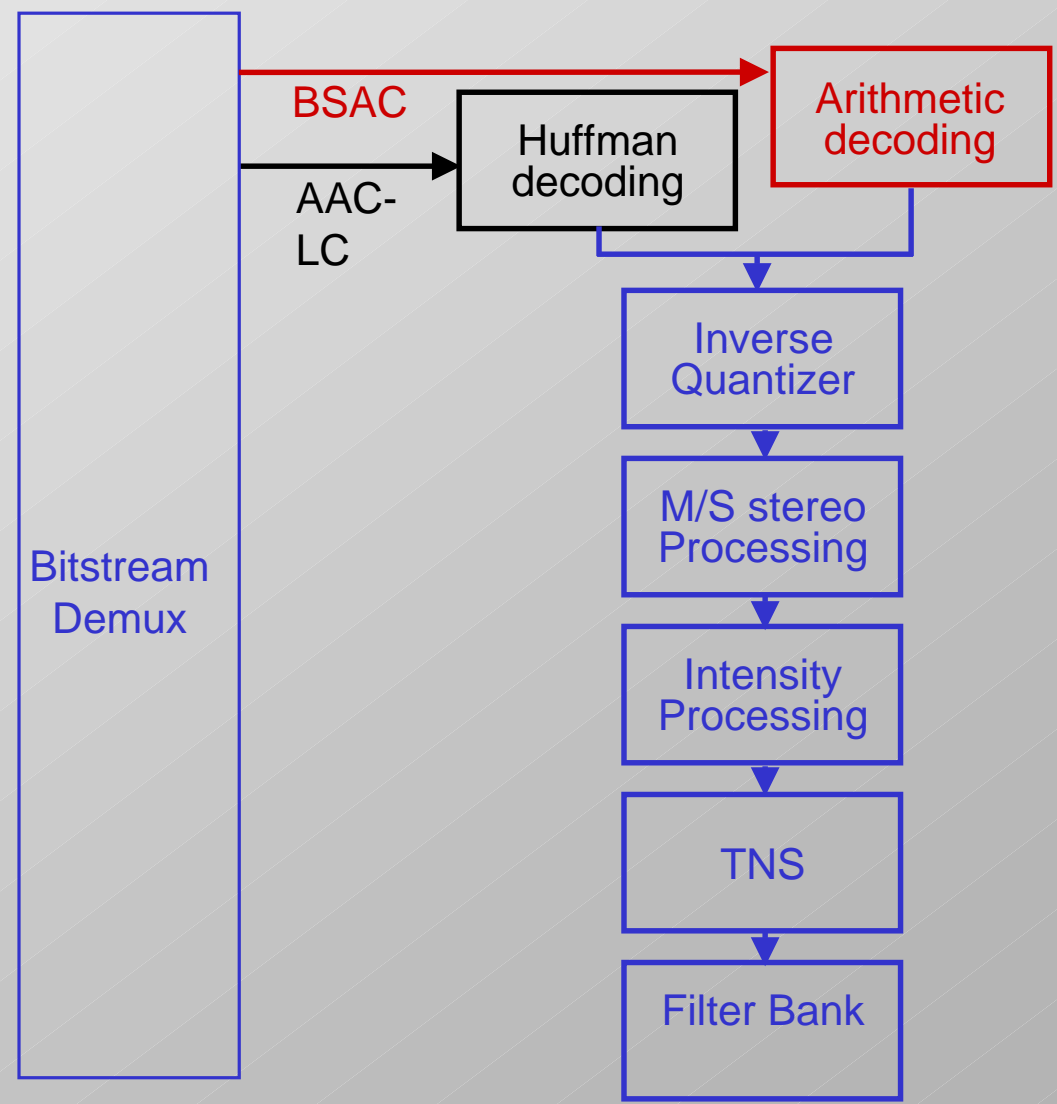
- ◆ Bit Sliced Arithmetic Coding
- ◆ *alternative noiseless coding tool for MPEG-4 AAC to provide fine grain scalability functionality*

- Characteristics of BSAC

- ◆ High coding efficiency: transcoding of AAC
- ◆ Small step scalability with 1kbps/ch  
(scalable range : 16kbps/ch ~ 64kbps/ch)
- ◆ Error resilient capability (SBA mode)

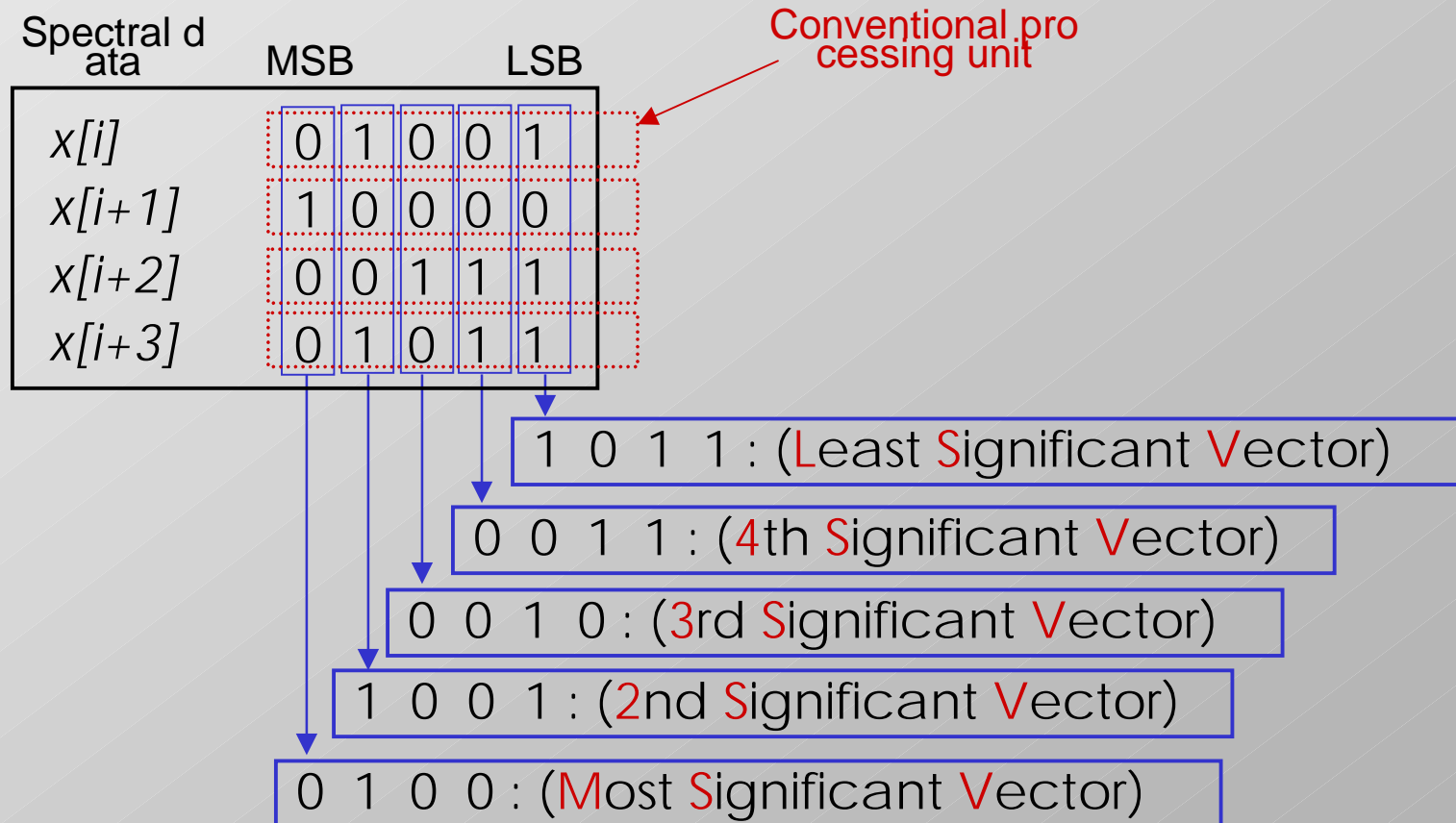
# Comparison with AAC

- **BSAC method**
  - ◆ top down scalability
  - ◆ small step scalability with 1kbps/ch enhancement layer
  - ◆ single decoding pass

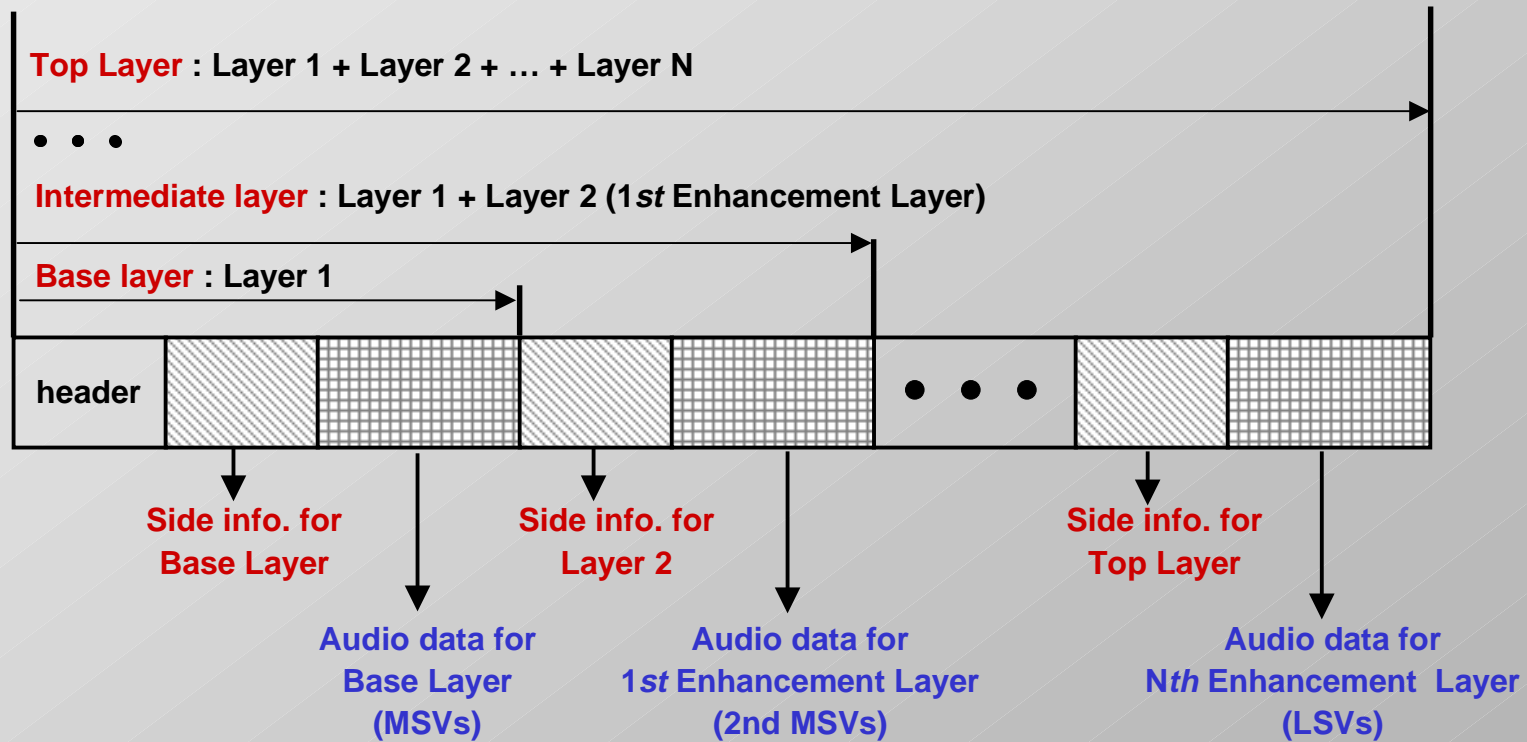


## Basic idea of BSAC

- Bit sliced approach: Slice those quantized data in bit order

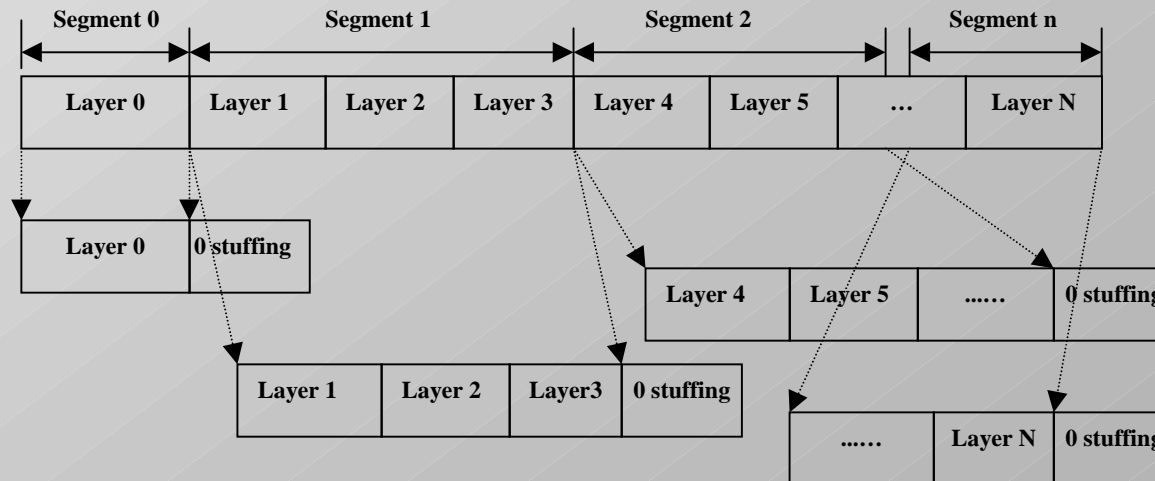


# Concept of BSAC bitstream

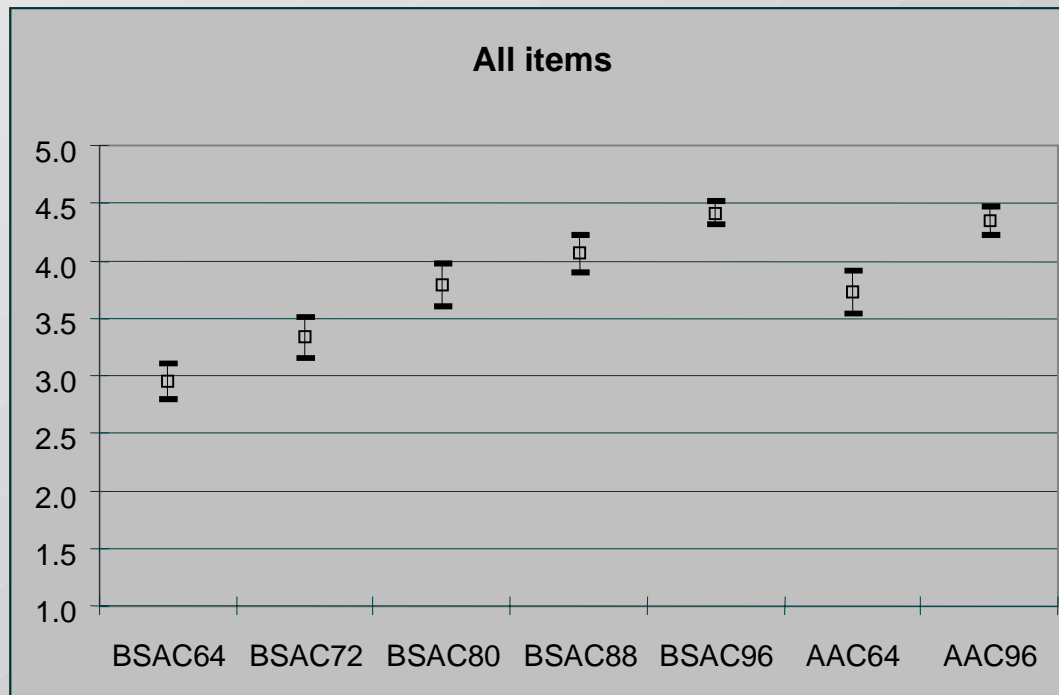


## SBA mode

- Segmented Binary Arithmetic Coding
  - provides error resiliency
  - partitions the arithmetic codeword into some sections
  - provides very little overhead (less than 1 %)
- ◆ Decoding concept of SBA mode



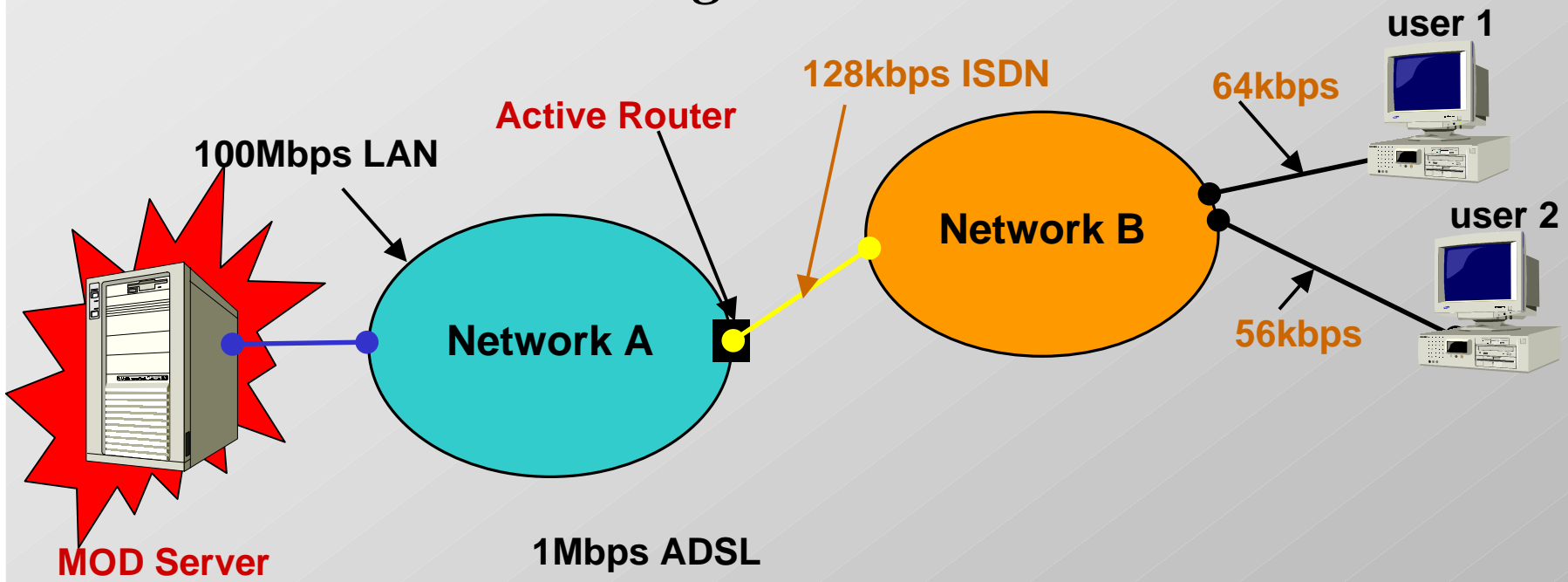
# Performances of BSAC



Source : ISO/IEC JTC1/SC29/WG11/w3075

(Report on the MPEG-4 Version 2 Audio Verification Test)

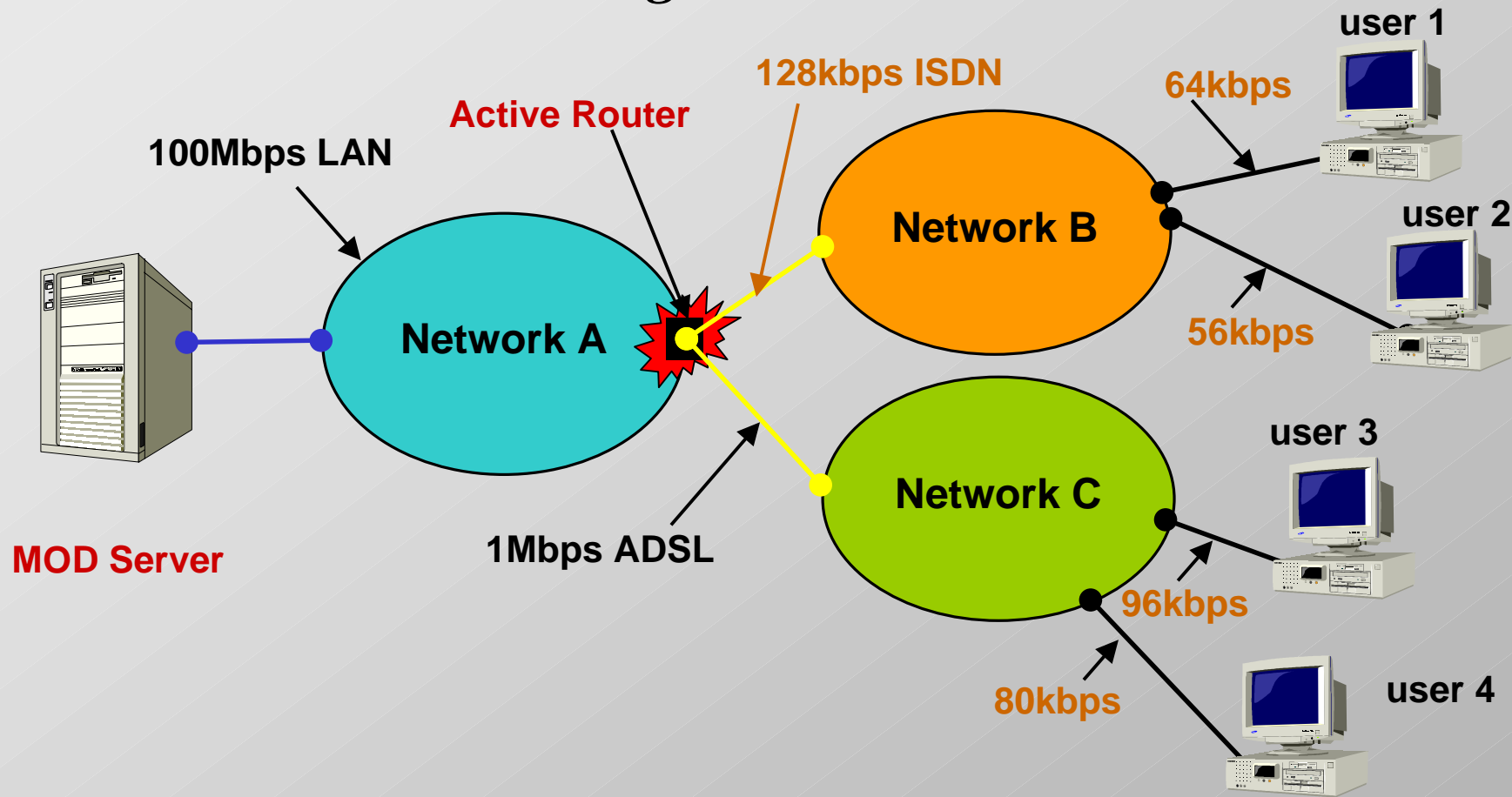
# Streaming service with BSAC



- reduces a burden of the Server
  - have only one bitstream

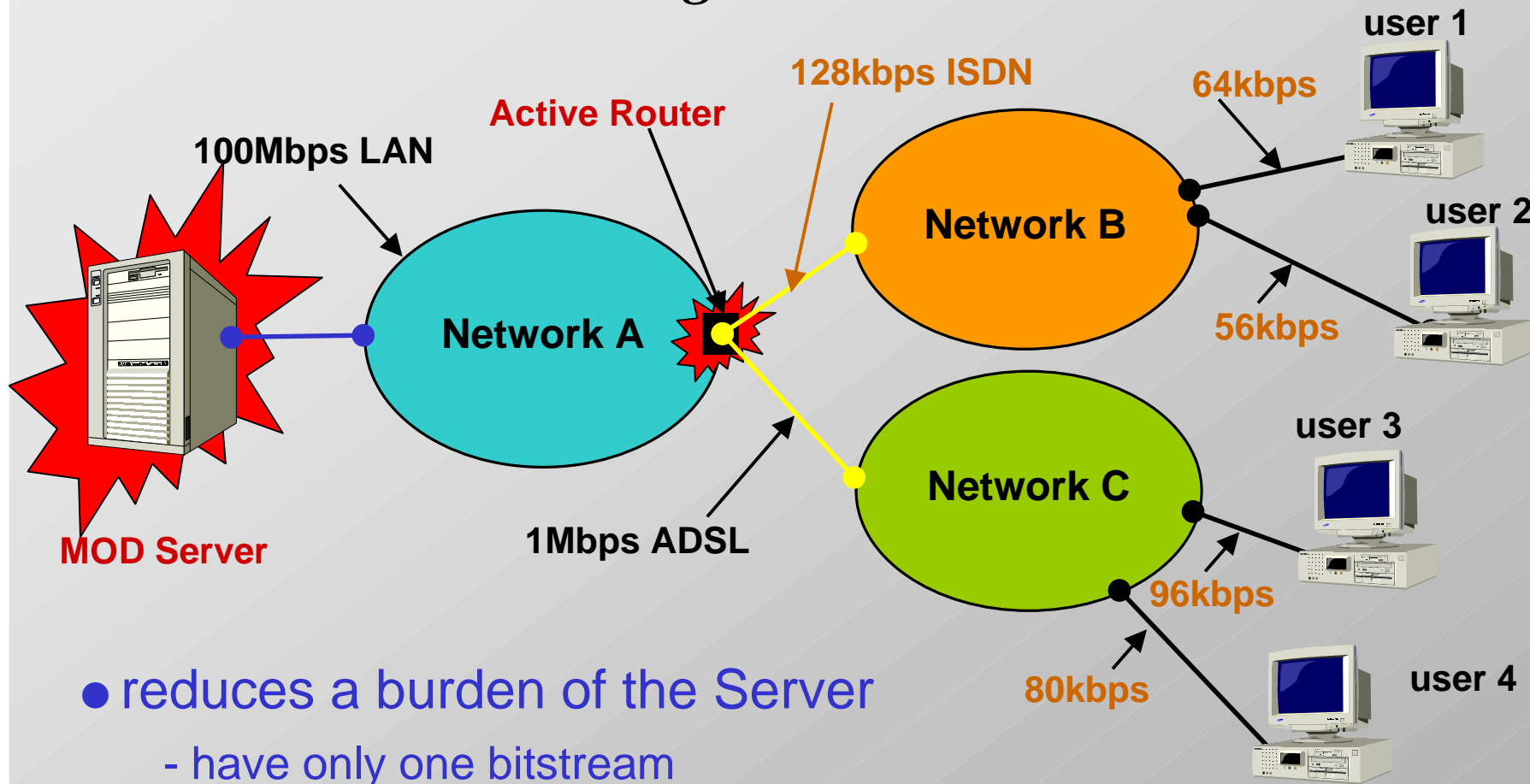


# Streaming service with BSAC



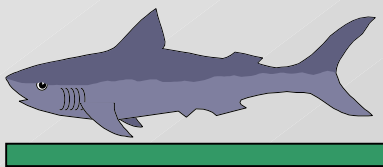
- reduces a burden of the Router
  - do not need a transcoding

# Streaming service with BSAC



- reduces a burden of the Server
  - have only one bitstream
- reduces a burden of the Router
  - do not need a transcoding

# QoS with BSAC



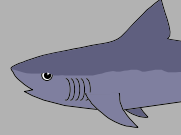
## Menu order

## Food

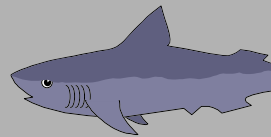
If you pay 10¢



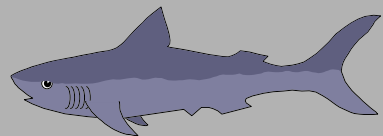
If you pay 20¢



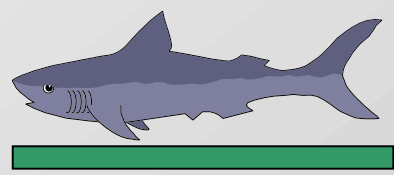
If you pay 30¢



If you pay 40¢



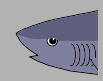
# QoS with BSAC



Menu order

Food

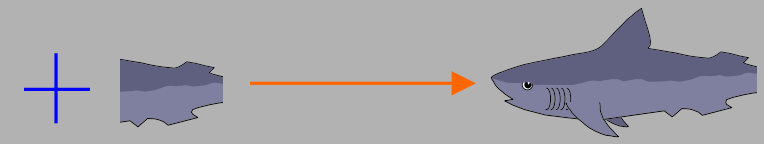
If you pay 10¢



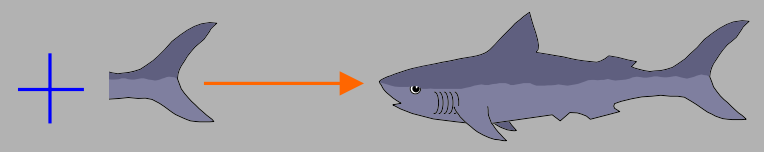
If you pay additional 10¢



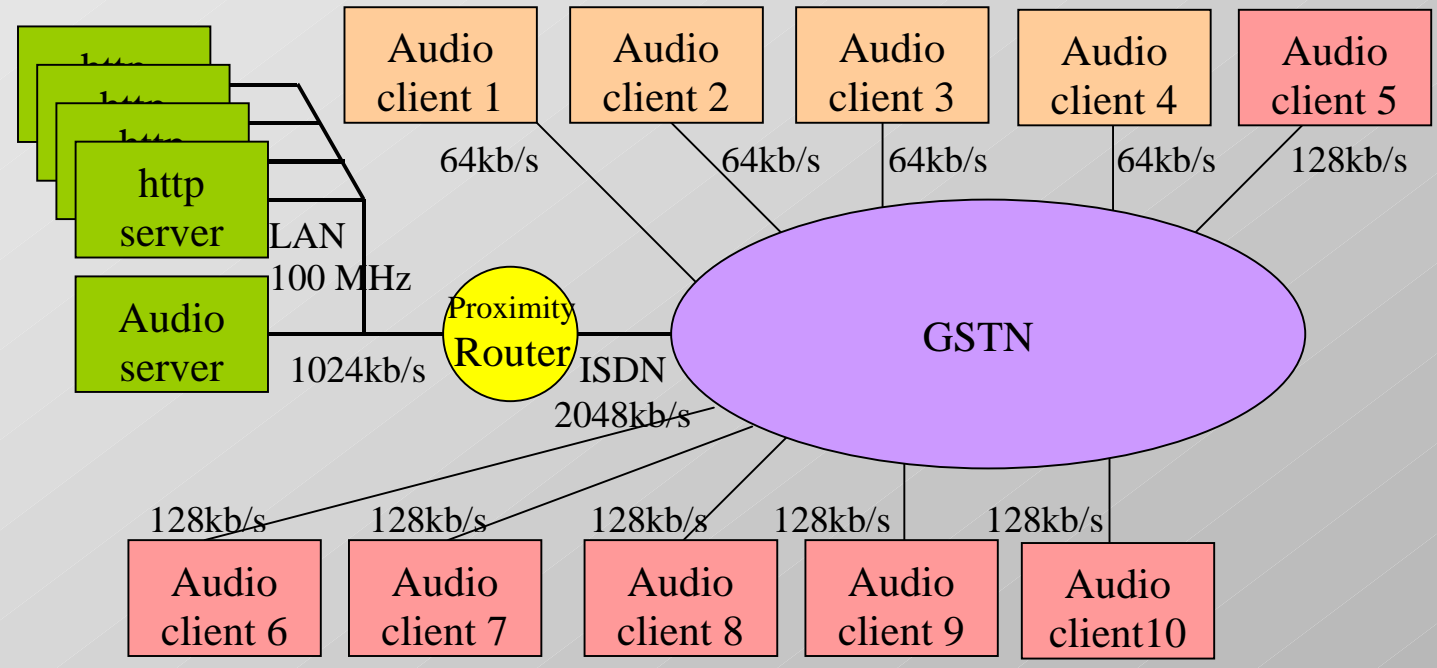
If you pay additional 10¢



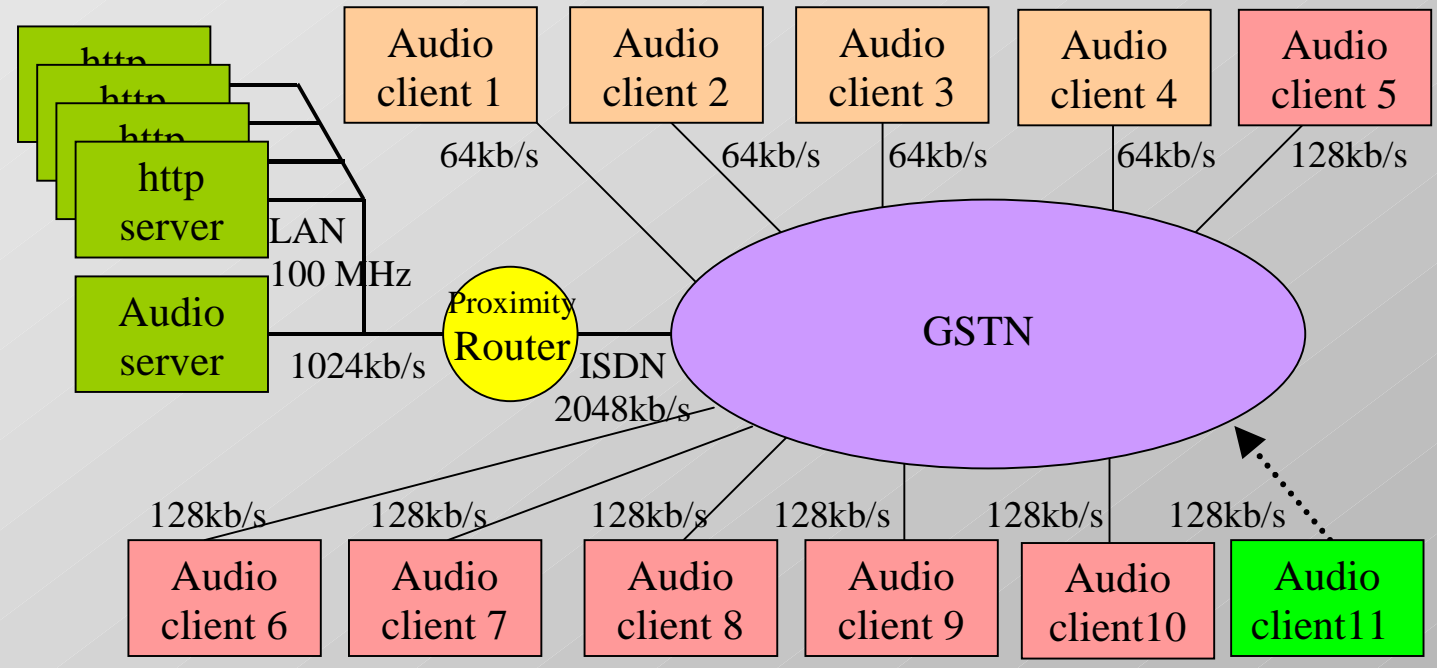
If you pay additional 10¢



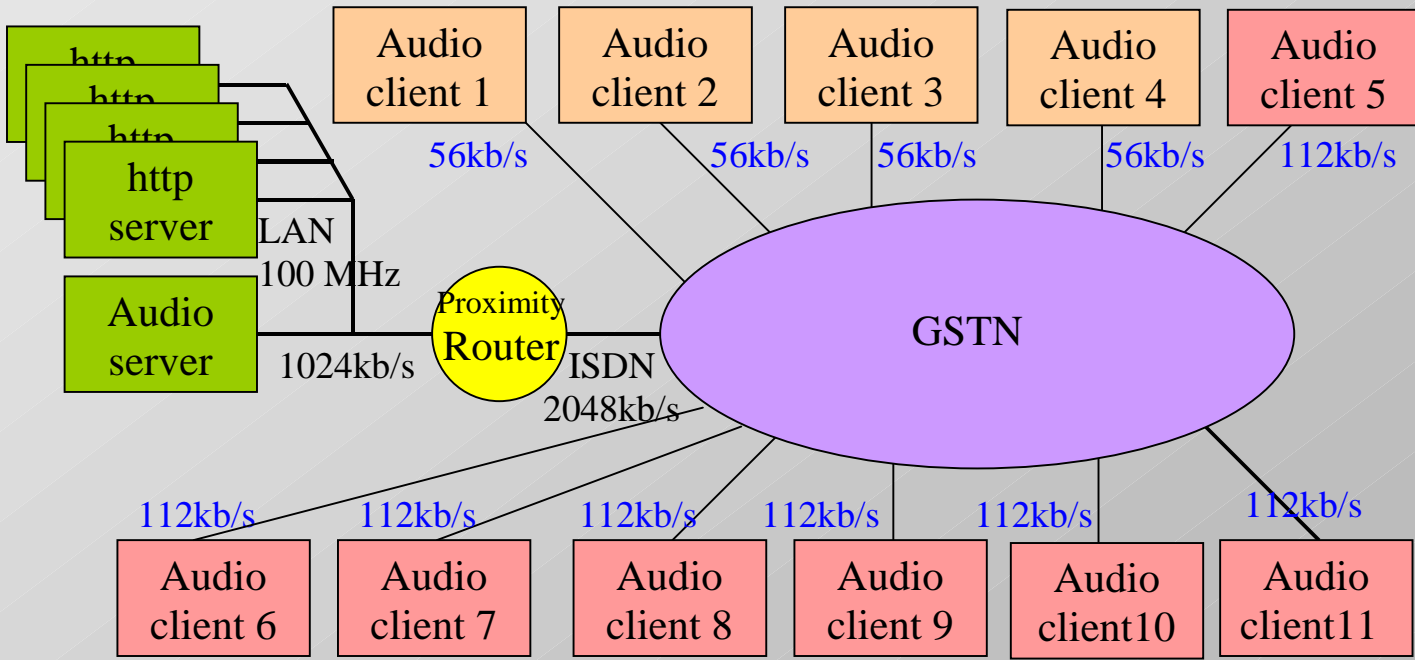
# QoS with BSAC



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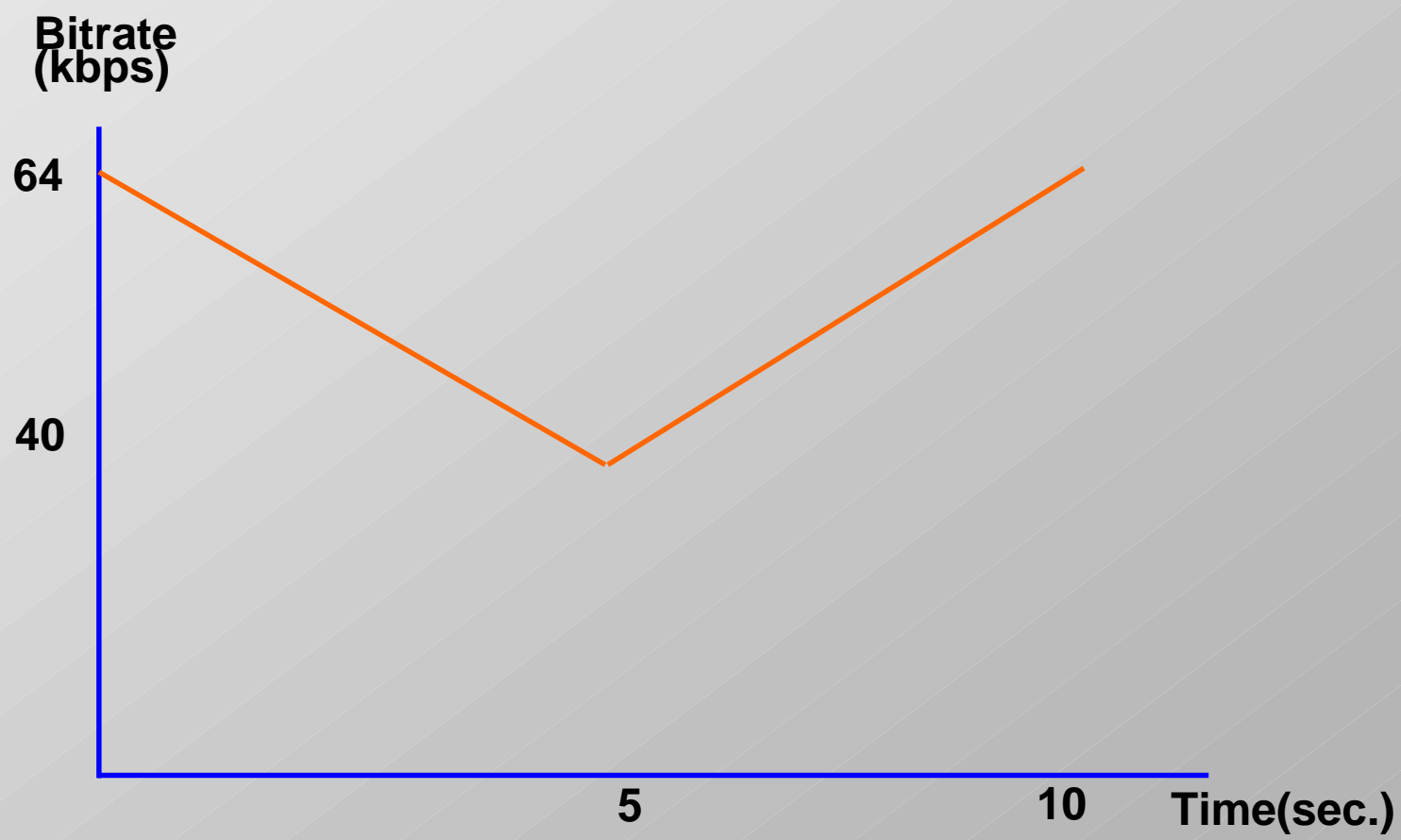
## Conclusions

- *Alternative noiseless coding tool* of MPEG-4 AAC
- *Fine grain scalability* with 1kbps/ch
  - ◆ with graceful quality degradation
  - ◆ with top down scalability
- *High coding efficiency* at top bitrate
- *Error resilient capability*



# Demonstration-1

- Item : 48kHz, mono, 64kbps ~ 40kbps



# Demonstration-2

- Item : 32kHz, stereo, 96kbps ~ 64kbps

