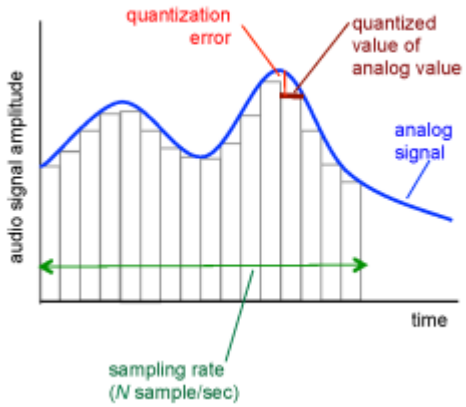
멀티미디어네트워크

Multimedia networking

Multimedia: audio

아날로그 신호를 디지털로 바꾸는 과정이 무조건 필요함



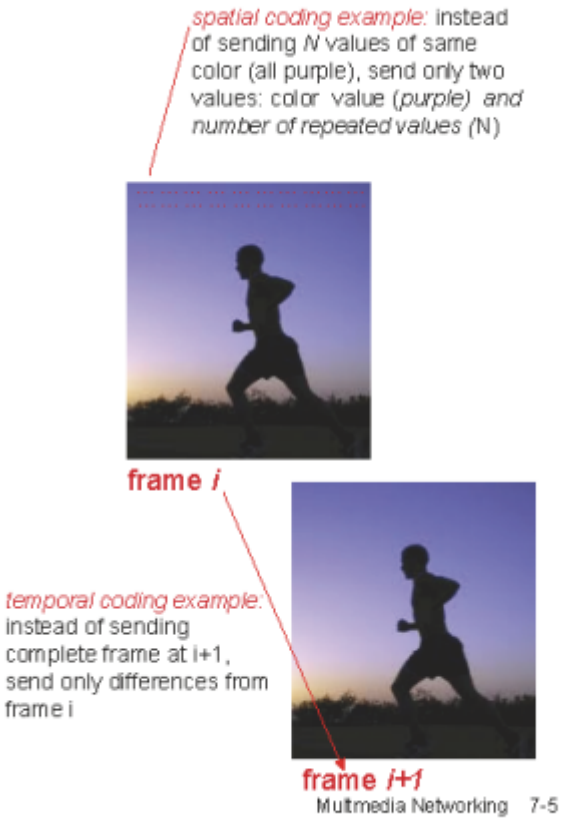
신호를 sampling

ex) 8000 samples/sec, 256 quantized values : 64000 bps

Multimedia: video

pixel 단위로 encoding

coding rate가 높을 수록 화질이 좋음



CBR (constant bit rate) : video encoding rate fixed

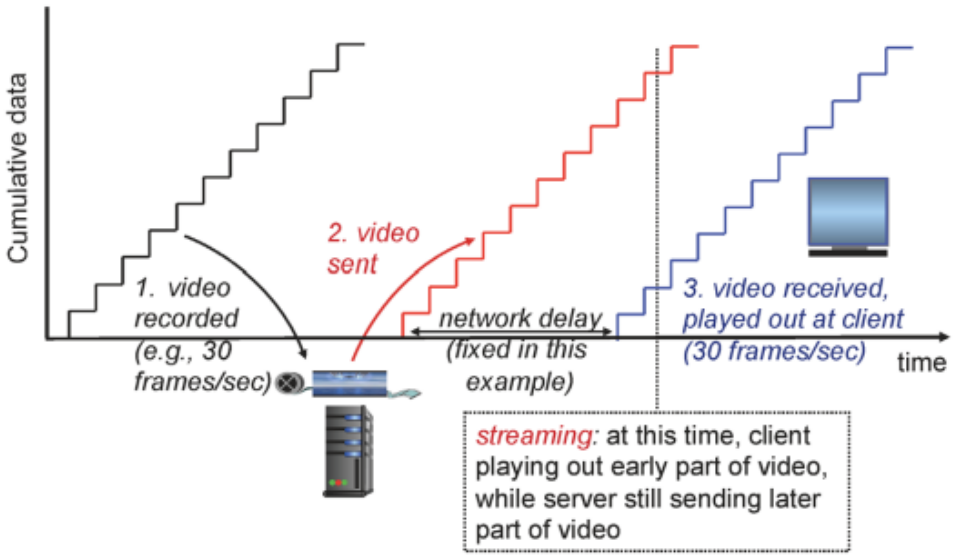
VBR (variable bit rate) : video encoding rate changes as amount of spatial, temporal coding changes

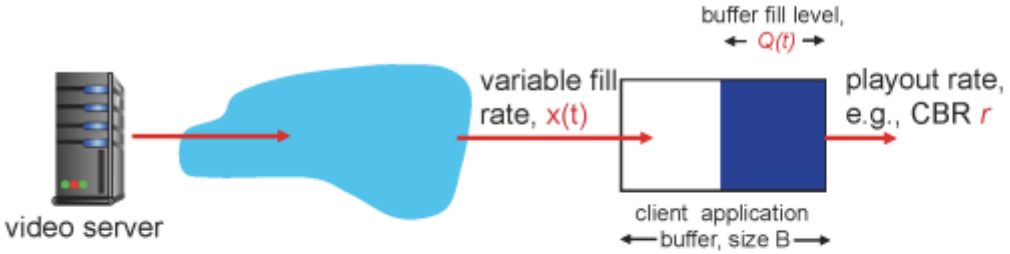
Multimedia networking : 3 application types

- **Streaming, stored** audio, video
  - straming : cna being playout before downloading entire file
  - stored (at server) : can transmit faster than audio/video will be rendered (implies storing/buffering at client)
- **conversational** vocie/video over IP
- **straming live** audio, video

  실시간 라이브

Streaming stored video





playout buffering: average fill rate ($\bar{x}$), playout rate (r):

- $\bar{x} < r$: buffer eventually empties (causing freezing of video playout until buffer again fills)
- $\bar{x} > r$: buffer will not empty, provided initial playout delay is large enough to absorb variability in x(t)
  - *initial playout delay tradeoff:* buffer starvation less likely with larger delay, but larger delay until user begins watching

서버에서 버퍼를 채우고, cilent가 거기서 꺼내서 재생시킴.

Streaming multimedia : DASH

DASH : Dynamic Adaptive Streaming over HTTP

네트워크 상황에 따라 최적의 화질로 전송함

manifest file : provides URLs for different chunks

CDN 방식 - 요청을 보내고, chunk에 해당하는 파일은 근처 distroage에서 받음

근처에 있는 CDN server에서 가져옴.