

Intelligent Signal Processing

Multimedia File System Paradigms

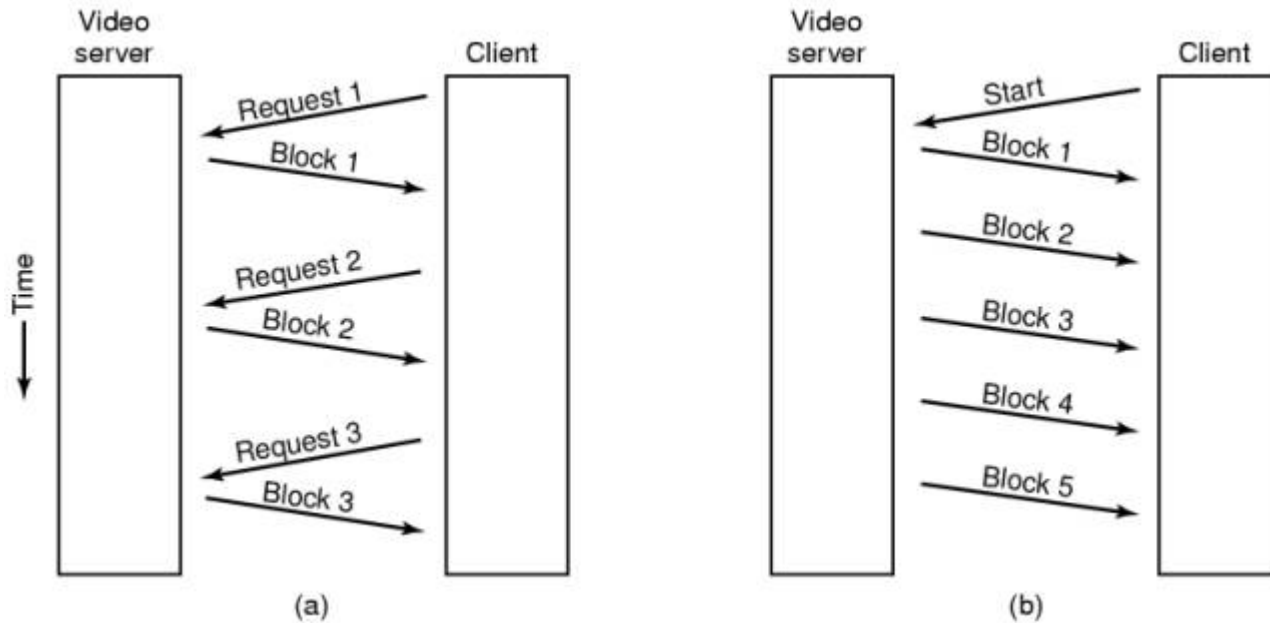
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Introduction

- **Multimedia file systems**
 - use a different paradigm than traditional file systems
- **Main steps**
 - open system call
 - file descriptor in UNIX or a handle in Windows
 - read system call
 - the operating system then returns the requested data in the buffer
 - close system call
 - close the file and return its resources



Client-server example



Streaming models



VCR

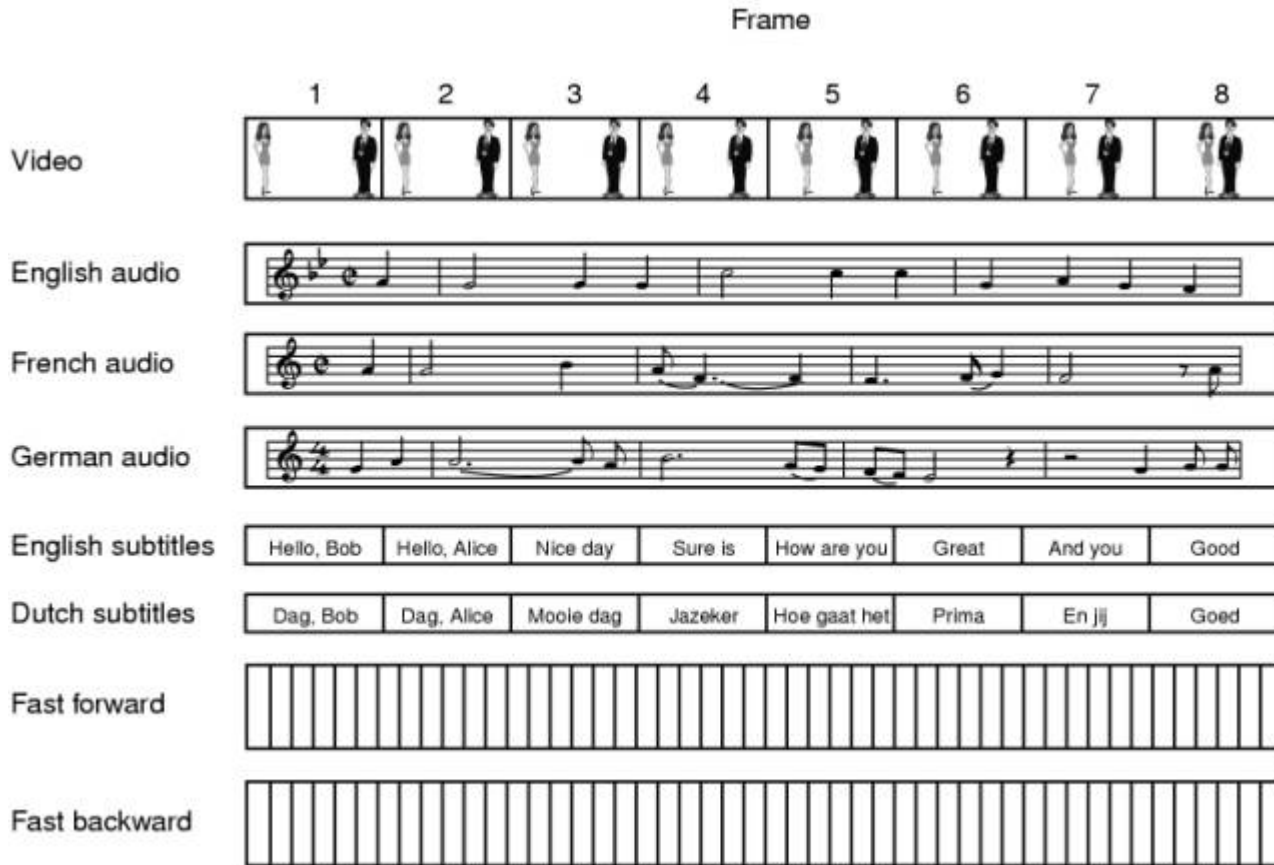
- different paradigm is used by **multimedia file servers**
 - they act like **VCRs (Video Cassette Recorders)**
- most video servers also implement standard VCR control functions
 - **start** and **stop**
 - **Pause**
 - the user sends a message back to the video server that tells it to stop
 - **rewind**
 - the next frame to be sent is 0



- forward and fast backward
 - no compression
 - e.g., 10x speed – display every 10th frame
 - compression
 - Best solution - special file containing
 - e.g., D-frame



VCR



Multimedia file with different tracks



- To switch to **fast forward** mode
 - **current frame** is **48.210** and the fast forward file runs at **10x**, the server has to locate frame **4821** in the fast forward file and start playing there at normal speed
 - that frame might be a P- or **B-frame**, skip frames until it sees an **I-frame**
 - if the **current frame** in the fast forward file is **5734**, the server just switches back to the regular file and **continues at frame 57.340**
 - if this frame is not an **I-frame** the decoding process on the client side has to ignore all frames until an **I-frame** is seen

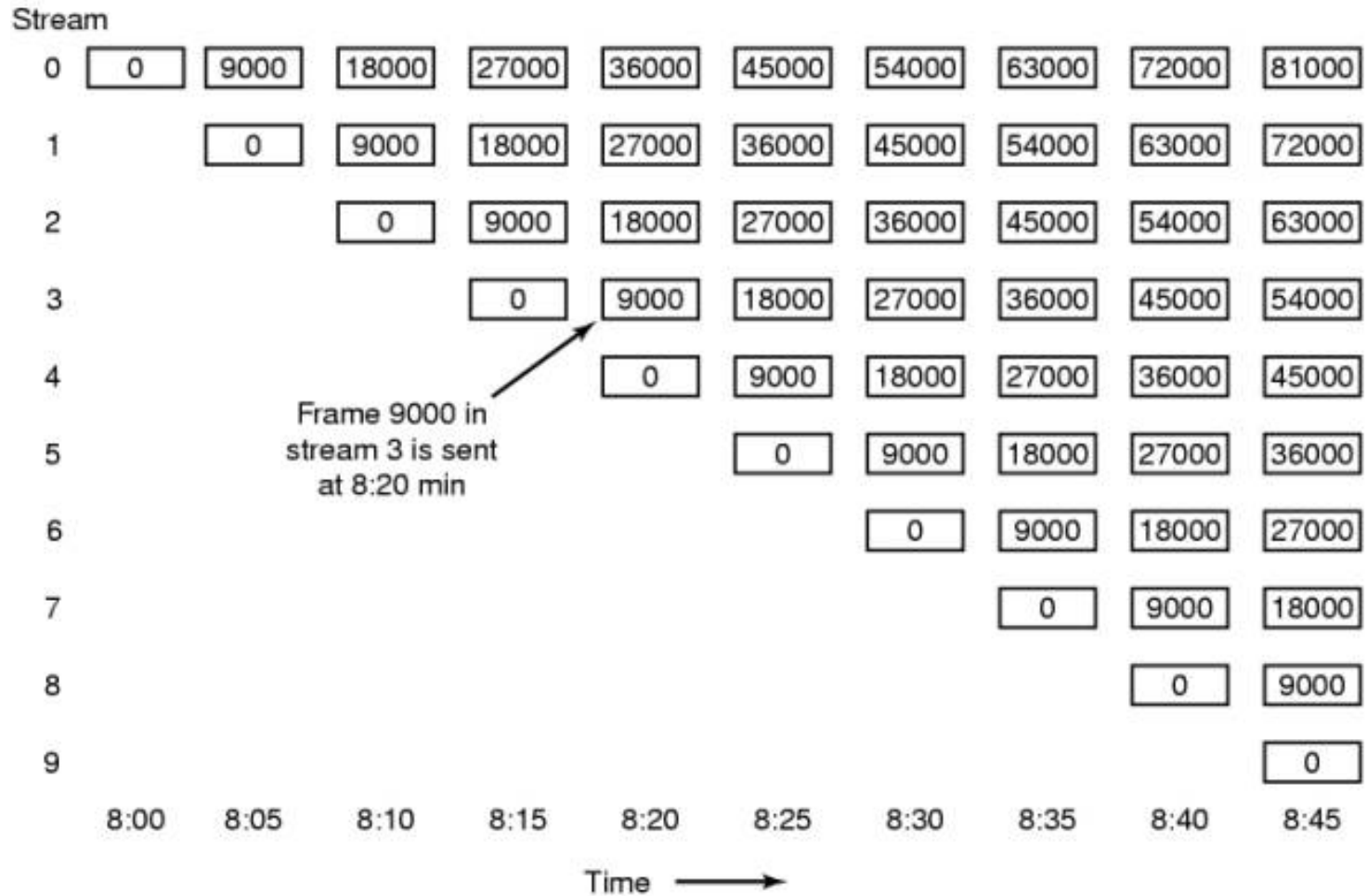


Video on Demand and Near on Demand

- video on demand is like using a taxi
 - you call it and it comes
- near video on demand is like using a bus
 - it has a fixed schedule and you have to wait for the next one
 - users do not have VCR controls
 - the best that can be done - to drop back to a stream that started later



Video on Demand and Near on Demand



Near video on demand has a new stream starting at regular intervals, in this example every 5 minutes (9000 frames)

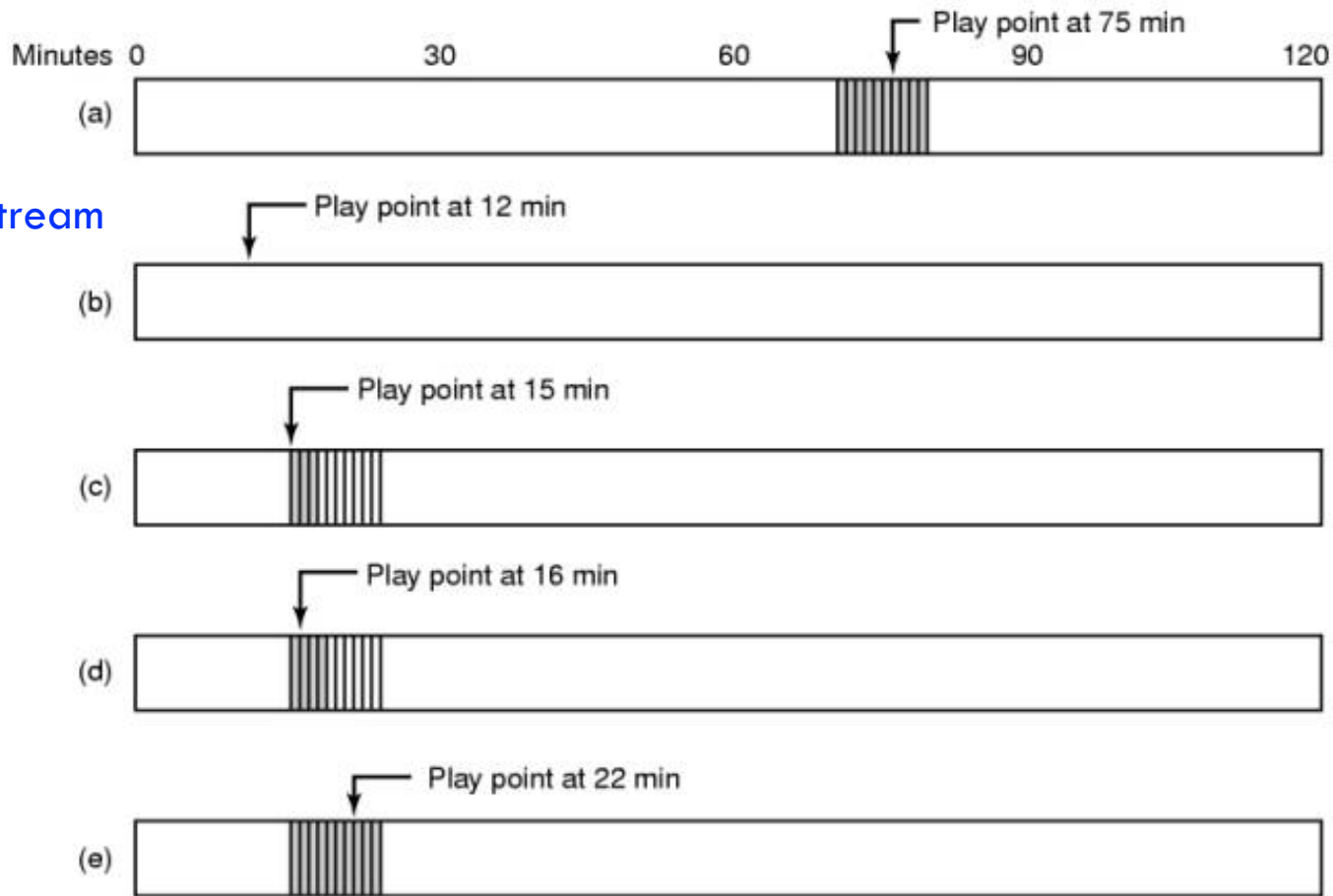


Near on Demand with VCR functions

- VCR and Near on Demand (AbramProfeta and Shin, 1998)
 - each client machine buffer the previous ΔT min
 - The current frame being displayed, called **the play point**, is always in the **middle of the buffer**
 - the **buffer** can certainly be kept on **disk** and possibly in **RAM**



Near on Demand with VCR functions



private stream

(a) Initial situation. (b) After a rewind to 12 min. (c) After waiting 3 min. (d) After starting to refill the buffer. (e) Buffer full.

