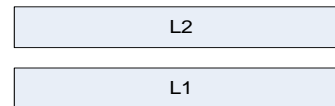
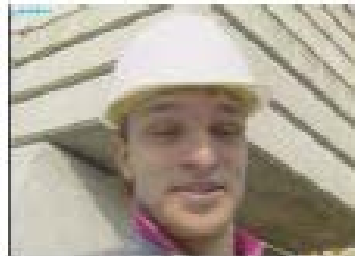
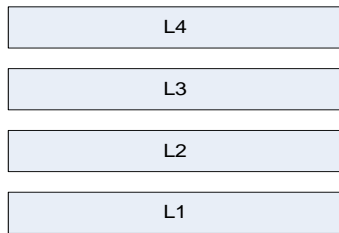


Layered Video

- Single layer Video
 - All peers receive the same video quality
 - PPStream, PPLive, CoolStreaming
- Layered video
 - A video is encoded into several layers
 - More layers introduce better video quality
 - Nested dependence between layers
 - A higher layer can be decoded only if all the lower layers are available



Digital Watermarking

- Allows users to embed some data into digital contents
- When data is embedded, it is not written at header part but embedded directly into digital media itself by changing media contents data

Digital Watermarking (Contd..)

Watermarking

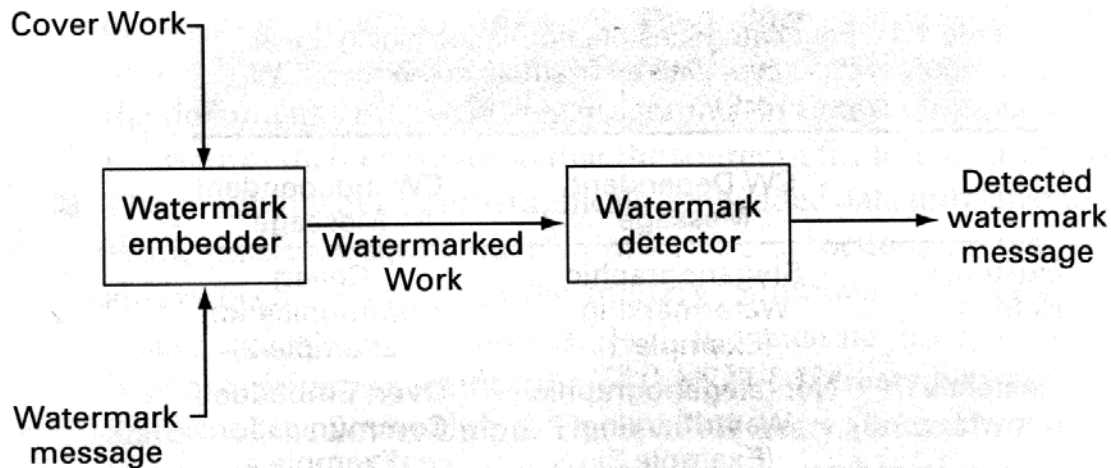
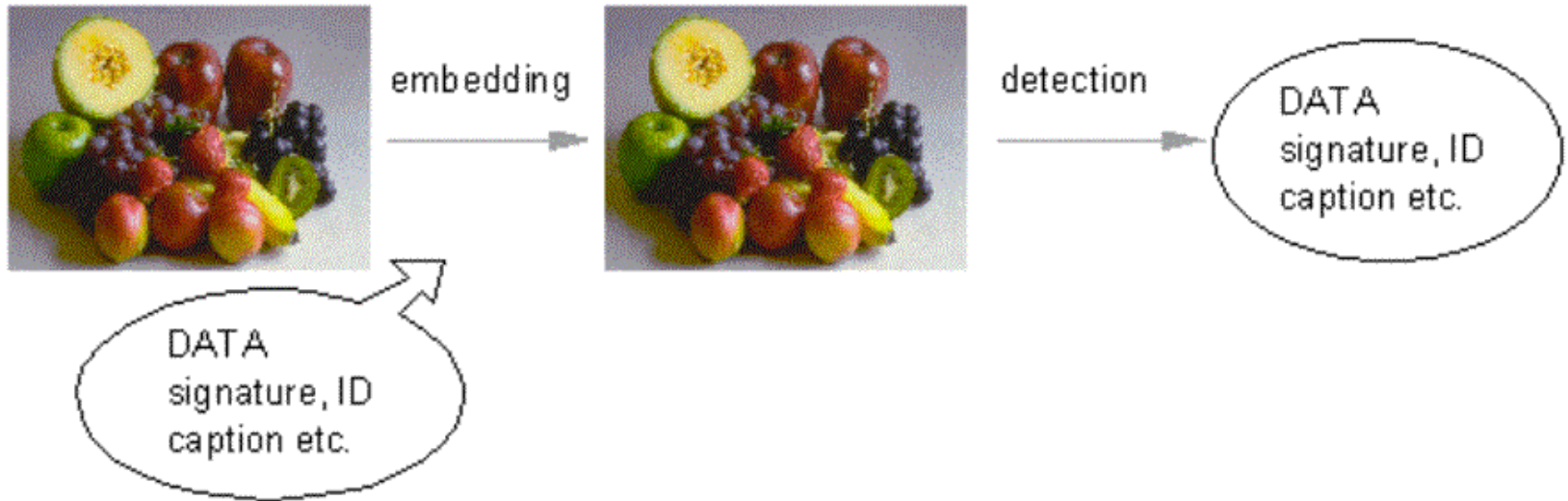
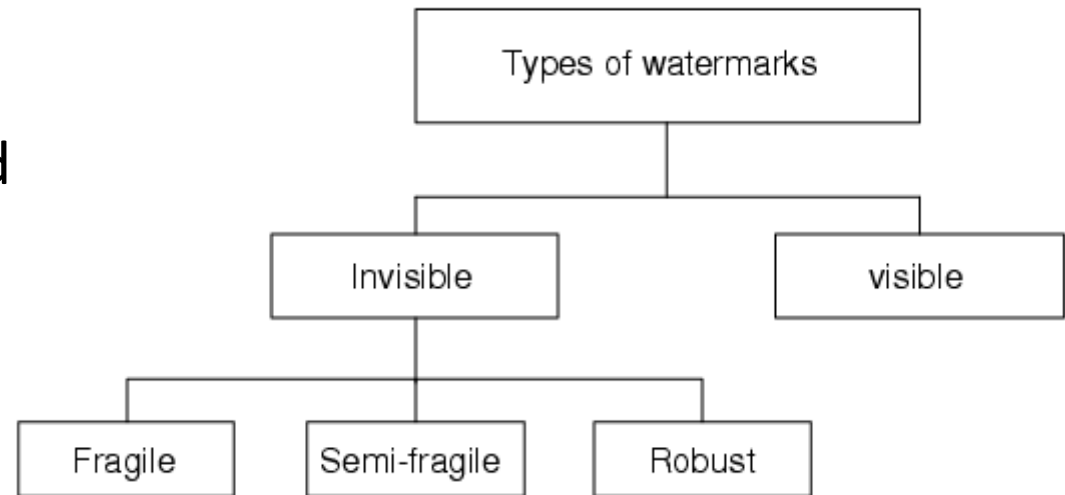


Fig. 1.2 A generic watermarking system.

Digital Watermarking (Contd..)

Types of Watermark

- **Visible**
 - A visible translucent image which is overlaid on the primary image
- **Invisible**
 - An overlaid image which cannot be seen, but which can be detected algorithmically



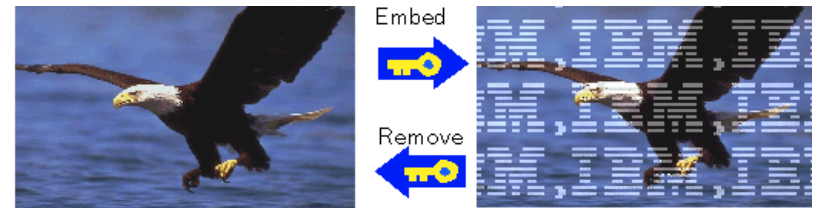
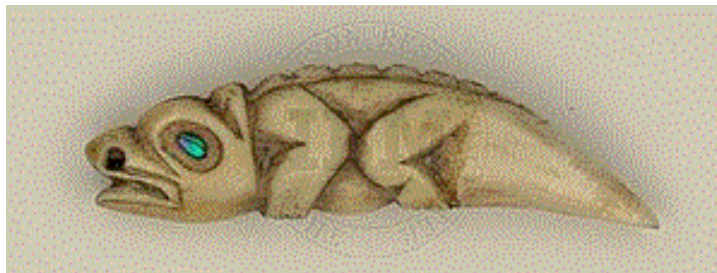
Digital Watermarking (Contd..)

Visible Watermark

- Logo or seal of the organization which holds the rights to the primary image, it allows the primary image to be viewed, but still marks it clearly as the property of the owning organization.
- Overlay the watermark in a way which makes it difficult to remove, if the goal of indicating property rights is to be achieved.

Digital Watermarking (Contd..)

Visible Watermark Examples



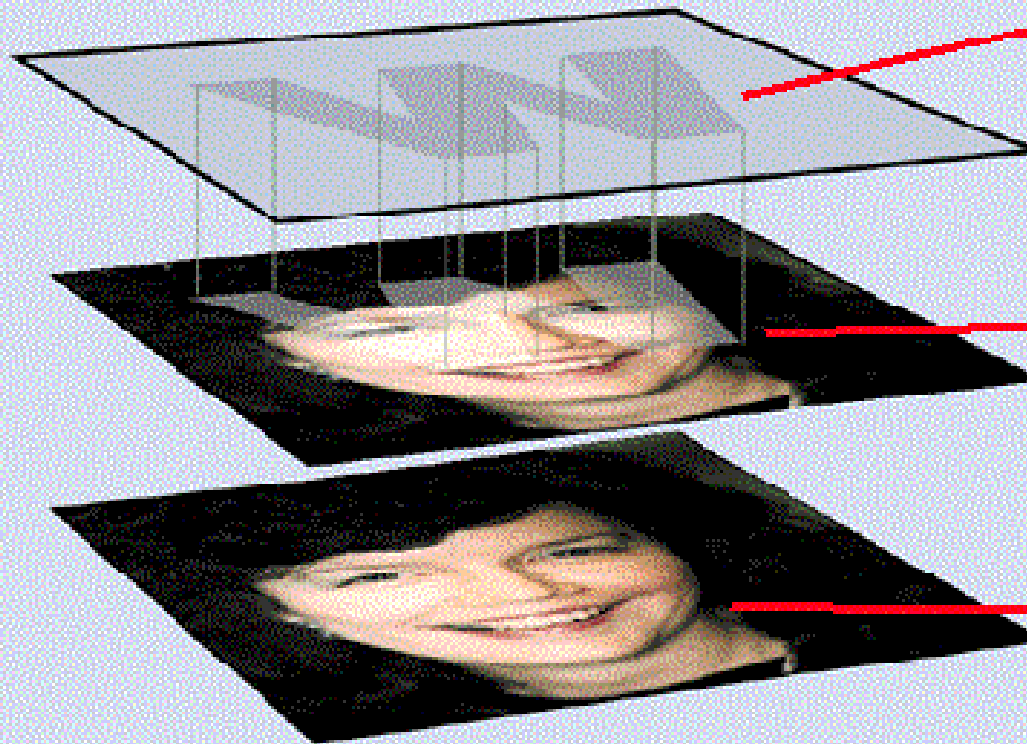
Digital Watermarking (Contd..)

Invisible Watermark

- Embedding level is too small to notice
- Can be retrieved by extraction software
- Applications:
 - Authentication
 - Copyrighting
 - Etc...

Digital Watermarking (Contd..)

Watermarks: Secret Code for Protection



1 Depending on the chosen technique, noise is added to every data element or just to a pseudo-random subset.

2 Hidden information (watermark) is embedded in the noise signal of the original.

3 Watermark is invisible and can be retrieved only by extraction software.

Digital Watermarking (Contd..)

Applications of Watermarking

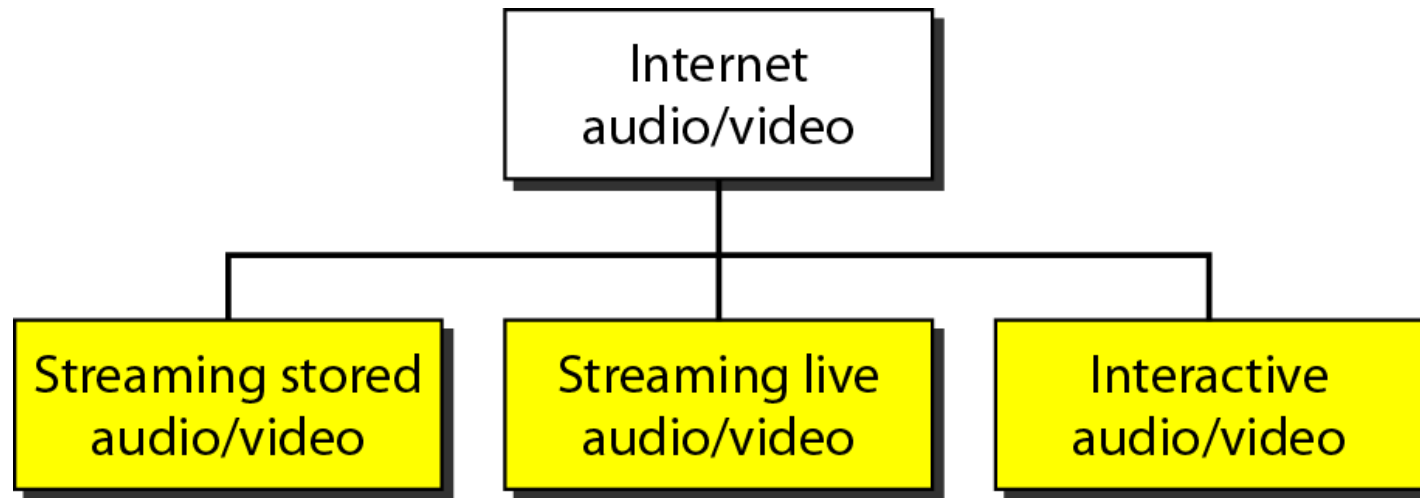
- Rights management
- Contents management
- Access/copy control
- Authentication

Digital Watermarking (Contd..)

Features of Watermarking

- Invisible/Inaudible
 - Information is embedded without digital content degradation, because of the level of embedding operation is too small for human to notice the change.
- Inseparable
 - The embedded information can survive after some processing, compression and format transformation.
- Unchanging data file size
 - Data size of the media is not changed before and after embedding operation because information is embedded directly into the media.

Video Streaming



Internet audio/video

Video Streaming (Contd..)

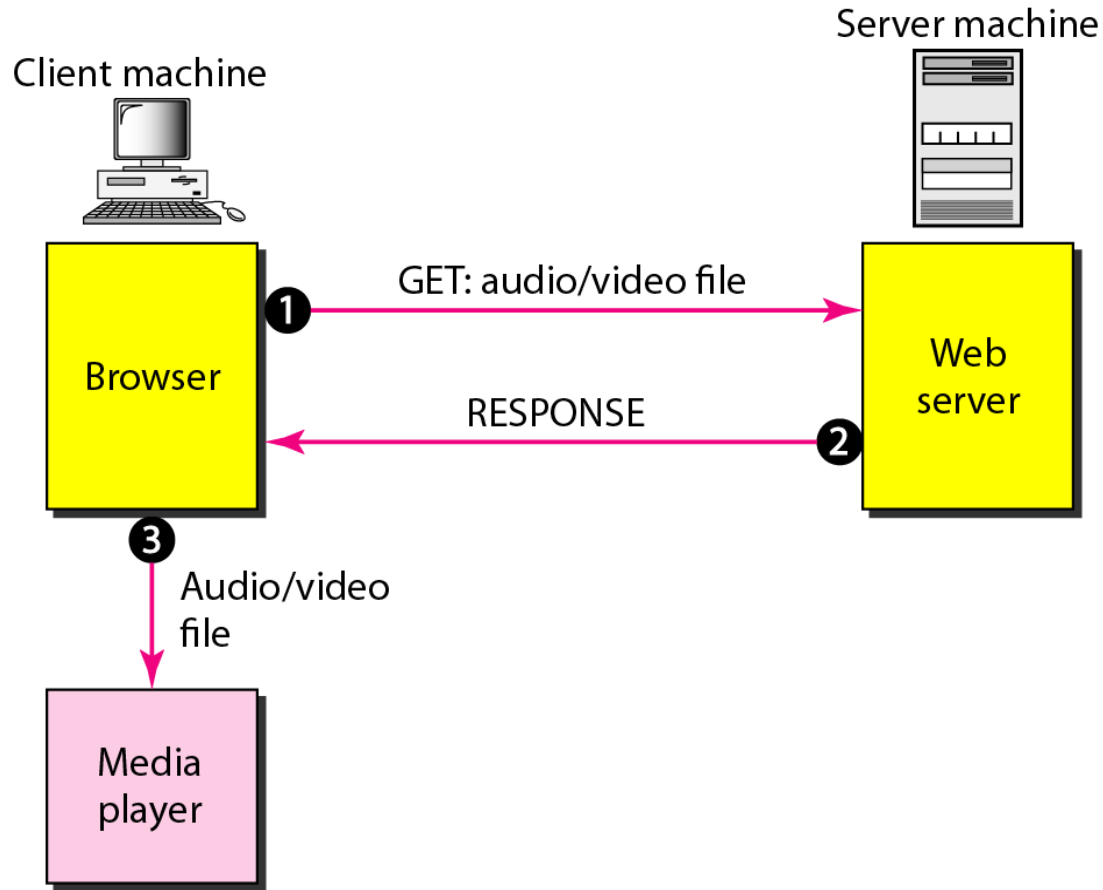
- Streaming stored audio/video refers to on-demand requests for compressed audio/video files.
- Streaming live audio/video refers to the broadcasting of radio and TV programs through the Internet.
- Interactive audio/video refers to the use of the Internet for interactive audio/video applications.
- Compression is needed to send video over the Internet.

Video Streaming (Contd..)

STREAMING STORED AUDIO/VIDEO

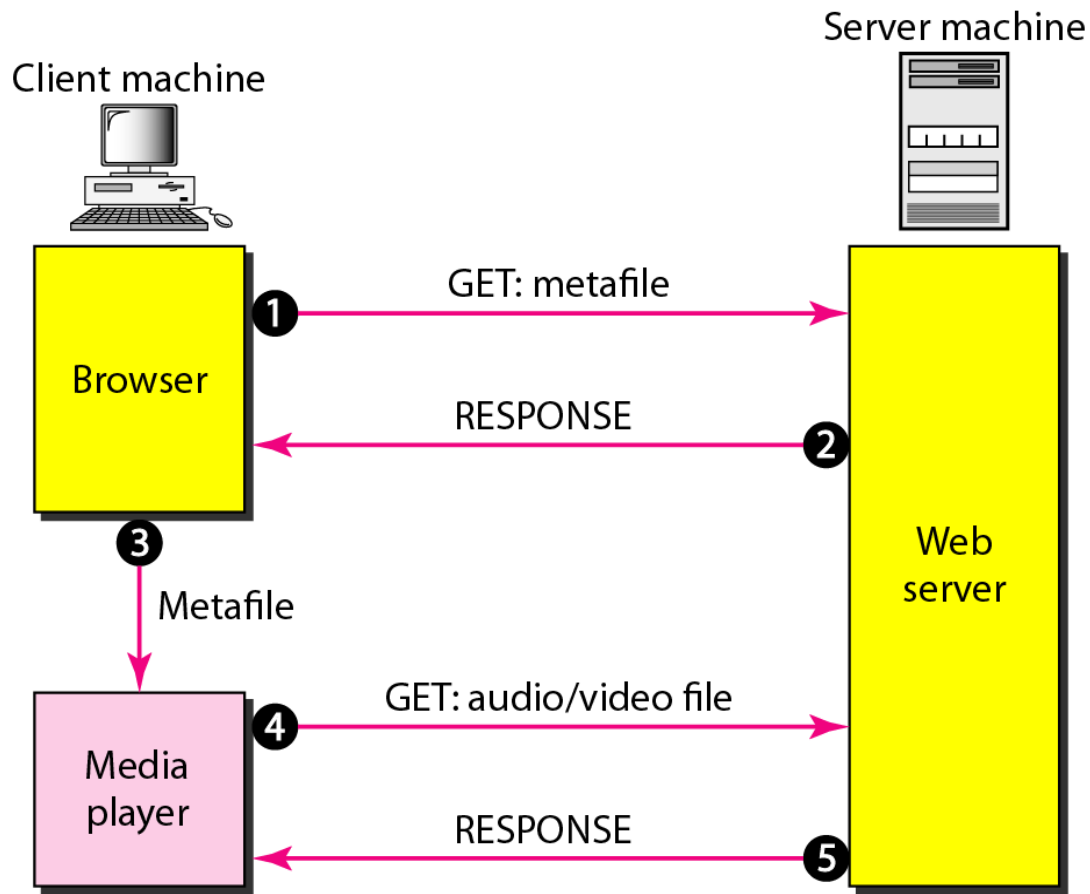
- Using a Web Server
- Using a Web Server with a Metafile
- Using a Media Server
- Using a Media Server and RTSP

Video Streaming (Contd..)



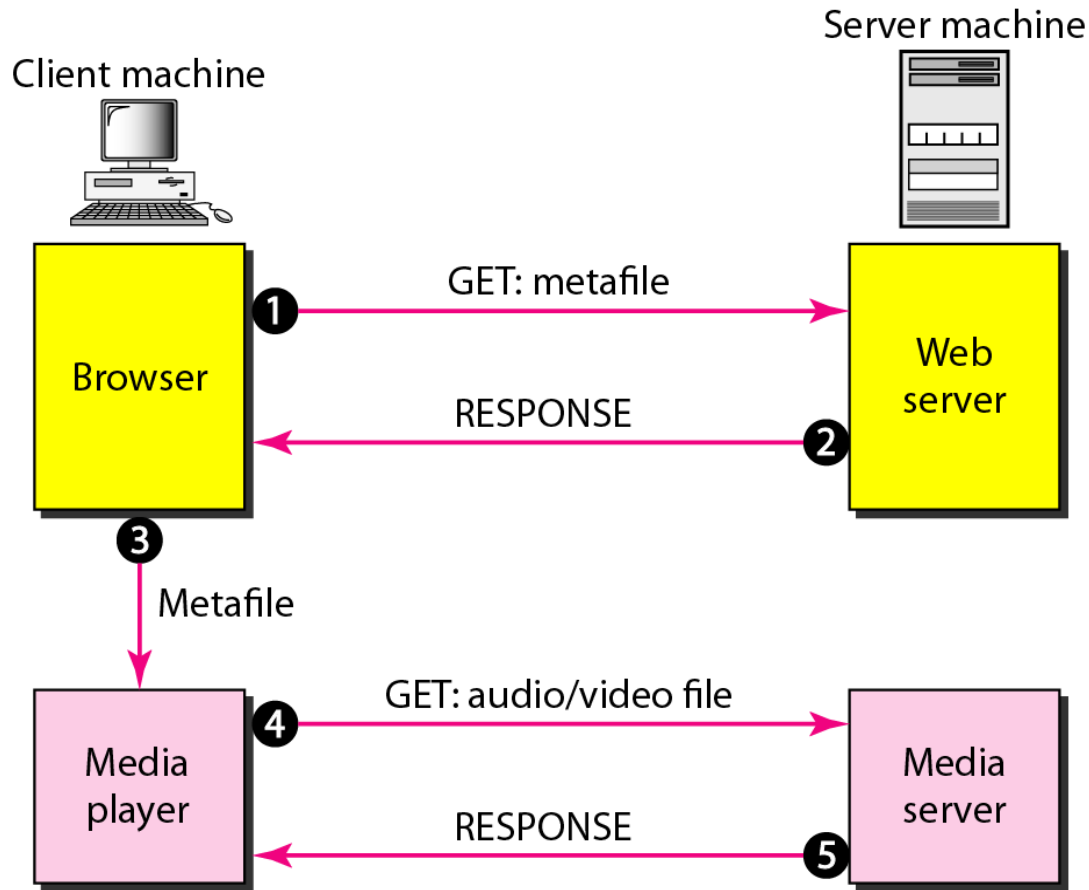
Using a Web server

Video Streaming (Contd..)



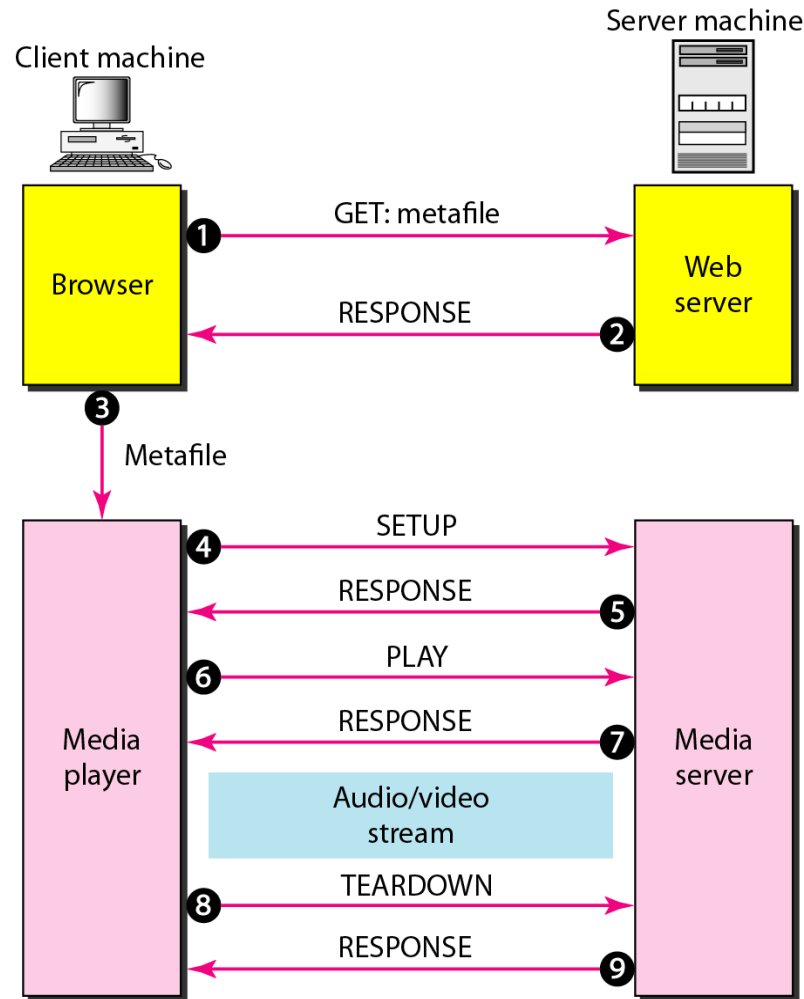
Using a Web server with a metafile

Video Streaming (Contd..)



Using a media server

Video Streaming (Contd..)



Using a media server and RTSP

Video Streaming (Contd..)

STREAMING LIVE AUDIO/VIDEO

- Similar to the broadcasting of audio and video by radio and TV stations.
- Instead of broadcasting to the air, broadcast through the Internet.
- Streaming stored audio/video and streaming live audio/video are both sensitive to delay.
- Neither can accept retransmission.
- In stored audio/video streaming the communication is unicast and on-demand.
- In live audio/video streaming the communication is multicast and live.

Video Streaming (Contd..)

REAL-TIME INTERACTIVE AUDIO/VIDEO

People communicate with one another in real time.

- Internet phone
- Voice over IP
- Video conferencing