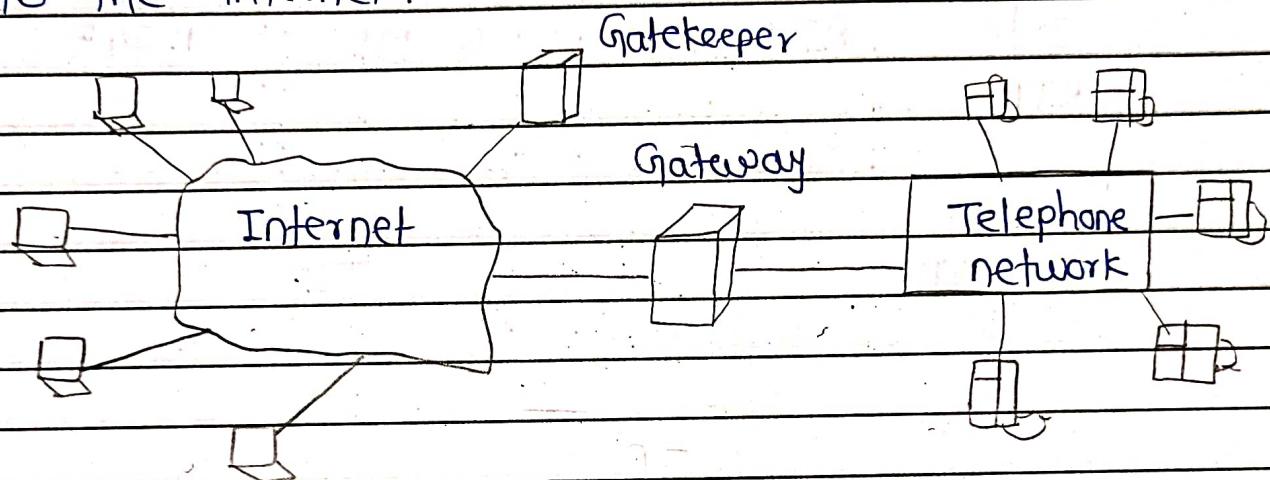




## Assignment No. 6.

1. Draw and explain architecture of H.323

H.323 is a standard designed by ITU to allow telephones on the public telephone network to talk to computers (called terminals in H.323) connected to the internet.



- 1] A gateway connects the Internet to the telephone network.
- 2] In general, a gateway is a five layer device that can translate a message from one protocol stack to another.
- 3] The gateway here does exactly the same thing. It transforms a telephone network message into an internet message.
- 4] The gatekeeper server on the local area network plays the role of the register server, as



## Protocols :-

H.323 uses a number of protocols to establish & maintain voice (or video) communication

Audio		Control and Signaling			
Compression code	RTCP	H.225	Q.931	H.245	
RTP					
UDP		TCP			
IP					

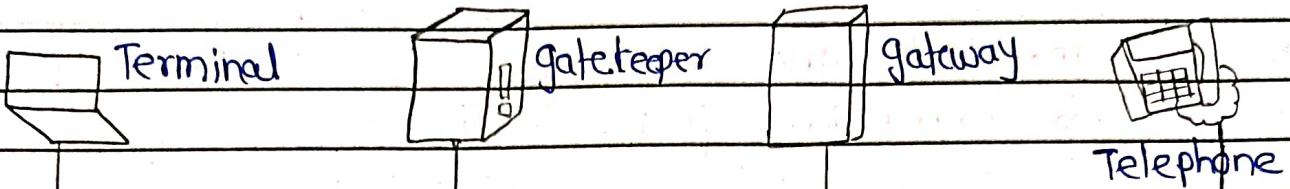
fig. H.323 protocol

- 1] H.323 uses G.71 or G.723.1 for compression
- 2] It uses a protocol named H.245 which allows the parties to negotiate the compression method.
- 3] Protocol Q.931 is used for establishing & terminating connections.
- 4] Another protocol called H.225 or RAS (Registration Administration / status), is used for registration with the gatekeeper.



### Operation -

Let us show the operation of a telephone communication using H.323 with a simple example.



find IP address  
of gatekeeper

H.225 message  
for bandwidth  
allocation

Q.931 message  
for setup

H.245 message  
compression method  
negotiation

RTP for audio exchange  
RTCP for management

Q.931 message  
for termination

fig. H.323 example



1. The terminal sends a broadcast message to the gatekeeper. The gatekeeper responds with its IP address.
2. The terminal and gatekeeper communicate, using H.225 to negotiate bandwidth.
3. The terminal, the gatekeeper, gateway & the telephone communicate using Q.931 to set up a connection.
4. The terminal, the gatekeeper, gateway & telephone communicate using H.245 to negotiate the compression method.
5. The terminal, gateway, and the telephone exchange audio using RTP under the management of RTCP.
6. The terminal, the gatekeeper, gateway and the telephone communicate using Q.931 to terminate the communication.



2] Explain all the methods of streaming stored audio & video using media Server & RTSP.

→ The methods of streaming stored audio & video using media Server & RTSP are as follows.

1] First Approach : Using a Web server

1. A compressed audio /video file can be downloaded as a text file. The client (browser) can use the services of HTTP & send a GET message to download the file.
2. The web server can send the compressed file to the browser. The browser can then use a help application , normally called a media player , to play the file.
3. This approach is very simple & does not involve streaming. However it has a drawback.
4. An audio / video file is usually large even after compression. An audio file may contain tens of megabits , and a video file may contain hundreds of megabits.
5. In this approach , the file needs to download completely before it can be played. Using contemporary data rates , the user needs some seconds or tens of seconds before the file can be played.

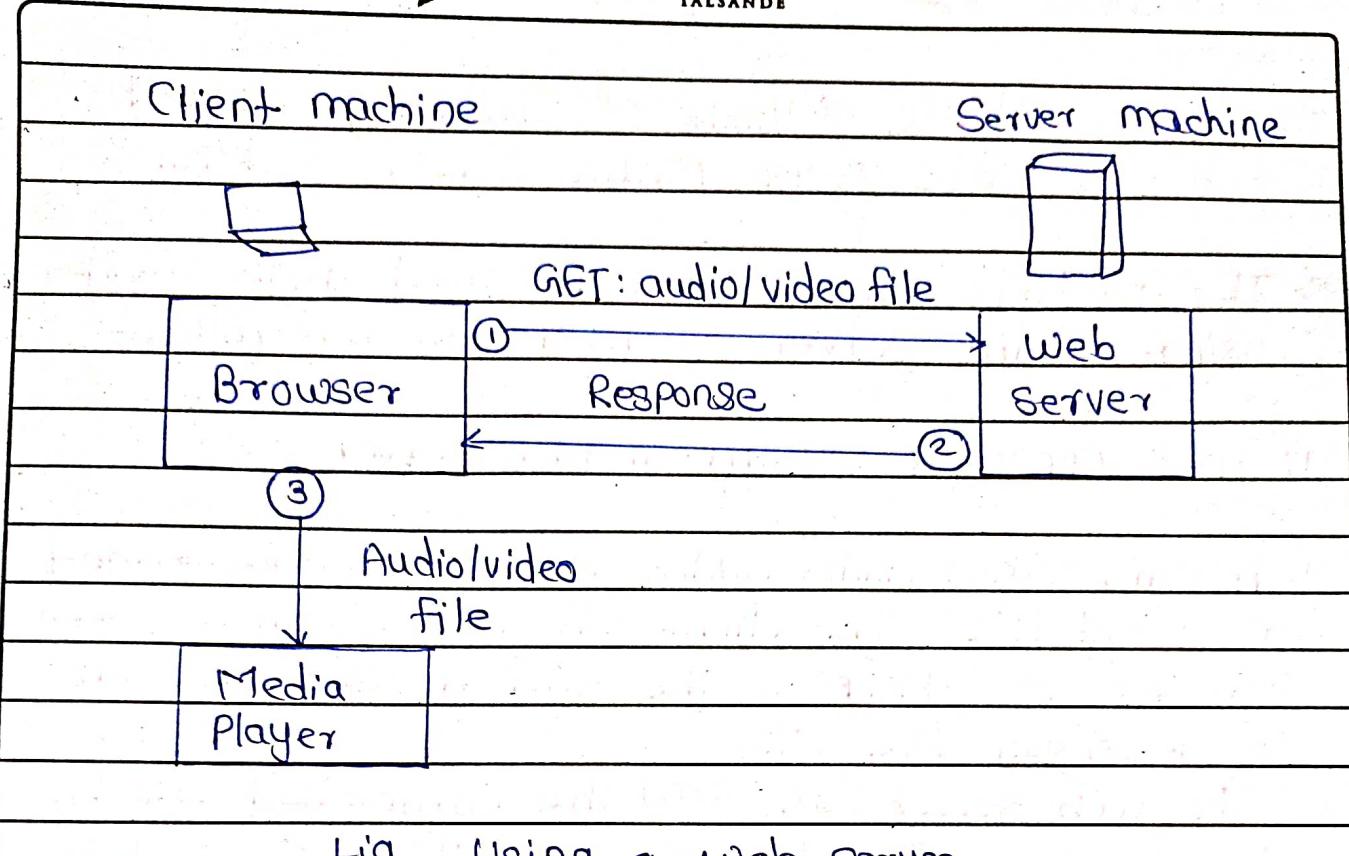


fig. Using a web server

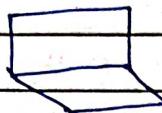
## 2] Second Approach : Using a web server with metafile

In another approach, the media player is directly connected to the web server for downloading the audio / video file. The web server stores two files: the actual audio / video file and a metafile that holds information about the audio / video.

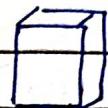
1. The HTTP client accesses the web server using the GET msg.
2. The information about the metafile comes in the response.
3. The metafile is passed to the media player.
4. The media player uses the URL in the metafile to access the audio / video file.
5. The web server responds.



Client machine



Server machine



GET : metafile

①

RESPONSE

Browser

②

Web

③

metafile GET: audio/video file

media player

④

RESPONSE

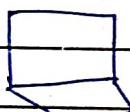
⑤

Server

fig. Using a web server with a metafile

3) Third approach : Using a media Server

Client machine



Server machine



GET: metafile

①

Browser

RESPONSE

Web

②

Server

③

media player

④

GET: audio/video file

⑤

media server

RESPONSE

fig. Using a media server.



1. The HTTP client accesses the web server using a GET message.
2. The information about the metafile comes in the response.
3. The metafile is passed to the media player.
4. The media player uses the URL in the metafile to access the media Server to download the file. Downloading can take place by any protocol that uses UDP.
5. The media Server responds.

#### 4] Fourth Approach : Using a media Server & RTSP

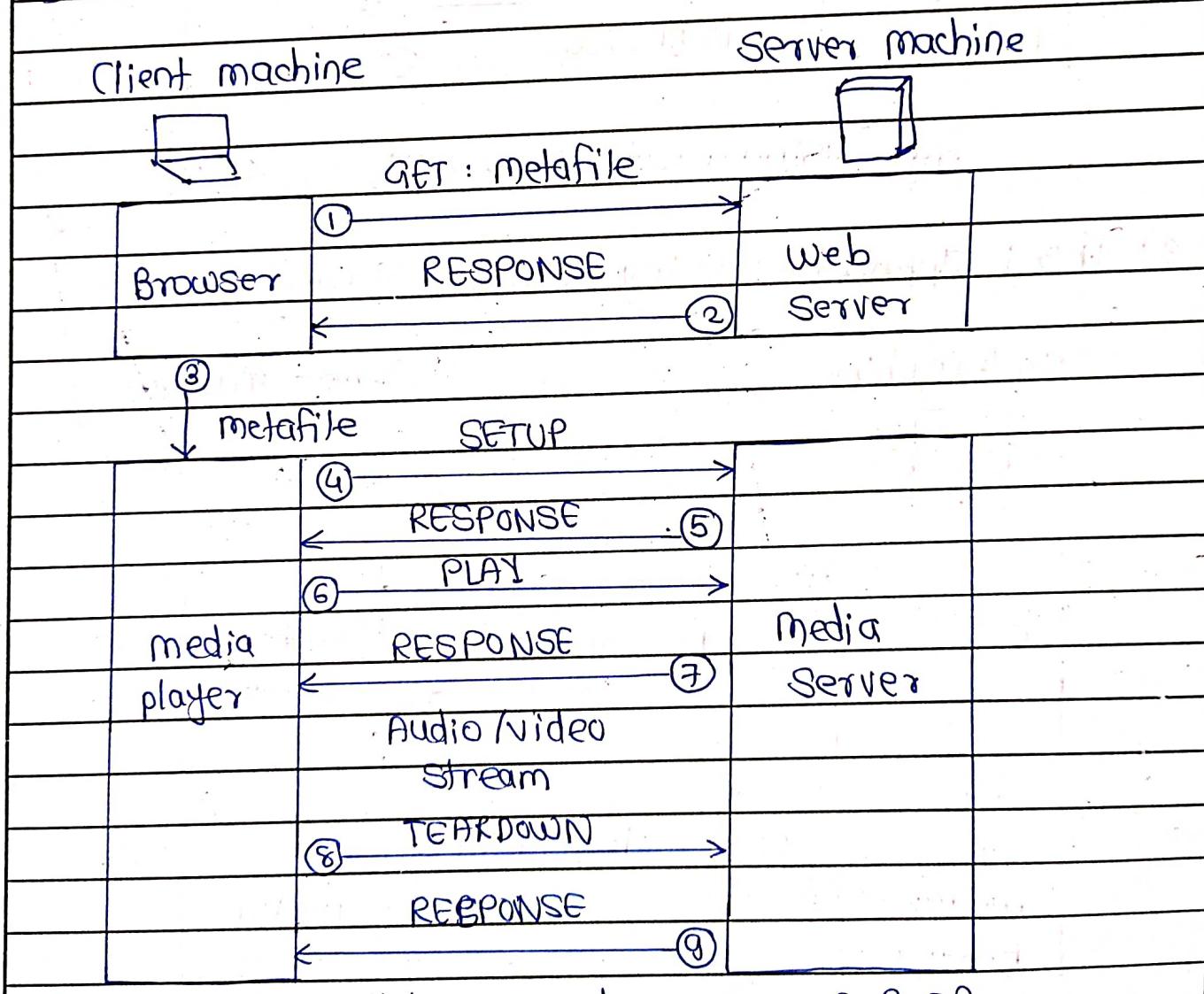


fig. Using a media Server & RTSP



1. The HTTP client accesses the web server using a GET message.
2. The information about the metafile comes in the response.
3. The metafile is passed to the media player.
4. The media player sends a SETUP message to create a connection with the media server.
5. The media server responds.
6. The media player sends a PLAY message to start playing (downloading).
7. The audio / video file is downloaded using another protocol that runs over UDP.
8. The connection is broken using the TEARDOWN message.
9. The media server responds.