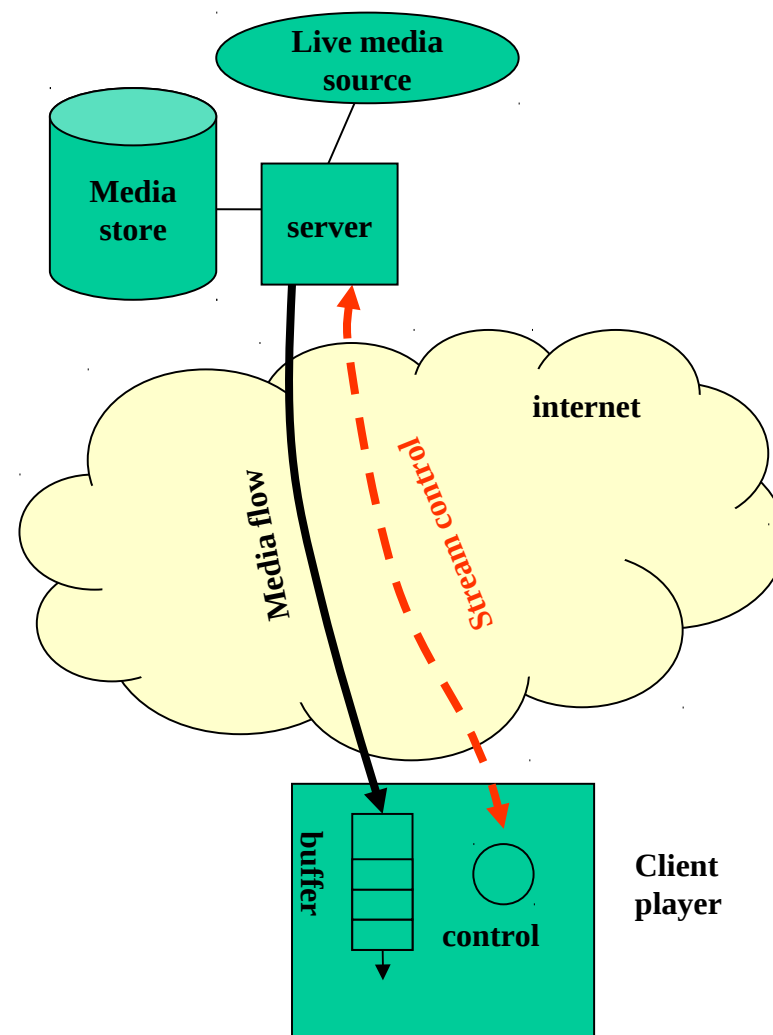


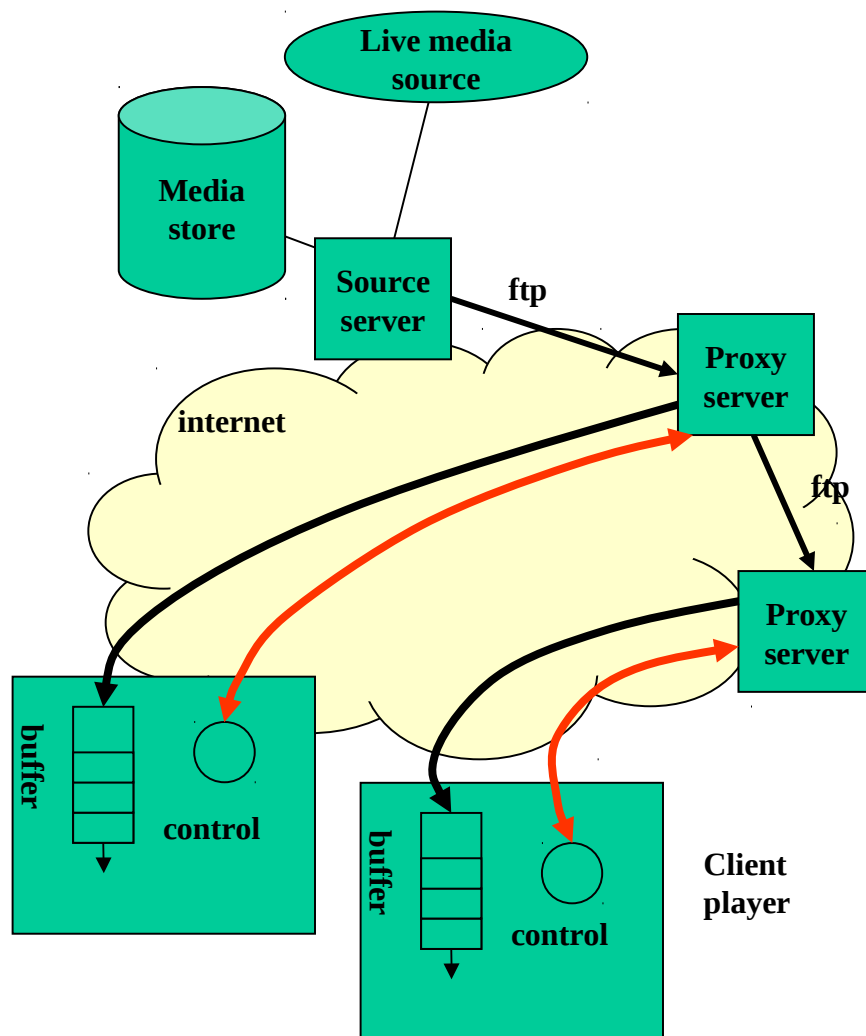
# Streaming unicast

- Unicast streaming is provided in a classic client-server fashion
- At least two flows are established between client and server. A distribution flow to deliver the media and a control flow to provide to the server quality feedbacks



# Streaming unicast

- High hit-rate contents can be placed into peripheral servers (proxies) and then distributed through media streaming from proxies to clients
- The distribution of contents to proxies can be carried out through classic ftp



# Streaming multicast

- Multicasting is an efficient way to distribute the same content to many users
- The basic problem is that IP provides primitive multicasting capabilities, insufficient for providing a scalable distribution of contents
- Technologies such as MPLS are quite effective for the implementation of multicasting
- In p2p systems, multicasting is performed at the overlay layer

# Real Time Streaming Protocol

- The Real Time Streaming protocol (RTSP) is a client-server protocol for the distribution of multimedia contents over IP networks
- RTSP has been originally developed jointly by Progressive Networks, Netscape Communications and Columbia University

# RTSP

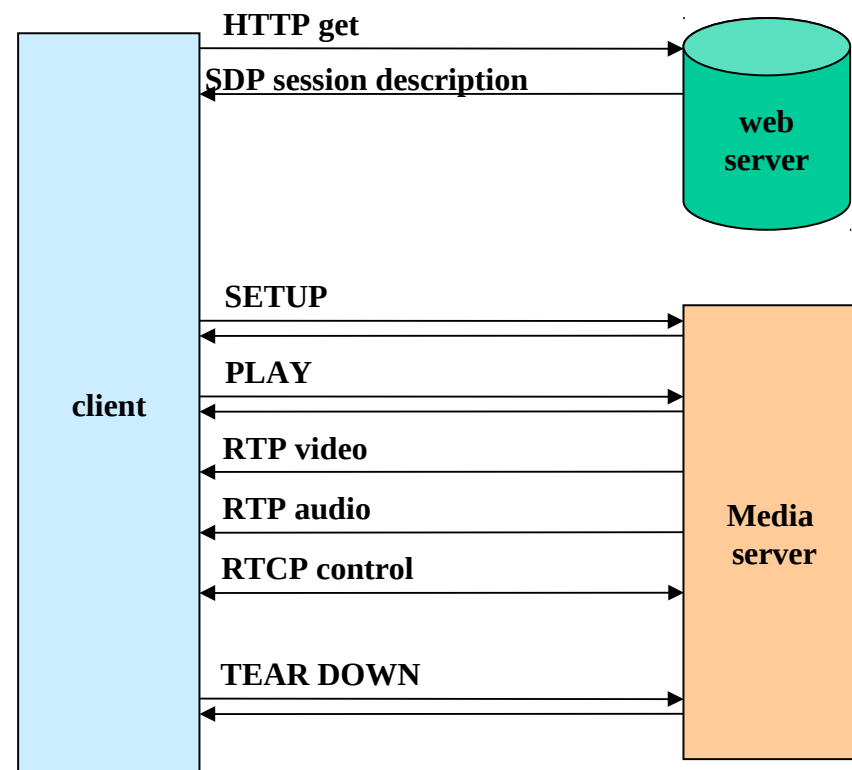
- RTSP can interwork with popular media-related internet protocols:
  - Real Time Protocol and Real Time Control Protocol
  - ReSerVation Protocol
  - Session Initiation Protocol
  - HyperText Transfer Protocol
  - Session Description Protocol

# RTSP

- RTSP provides commands to control the media replay:
  - Start
  - Pause
  - Jump
  - Fast forward
  - Fast reverse

# RTSP

- Through HTTP the user can obtain the SDP (Session Description Protocol) description of the session
- After the HTTP phase, the streaming of media contents can start



# Example (1)

```
// client to web server
GET /Mission_to_Mars.sdp HTTP/1.1
Host: www.movieinfo.com
Accept: application/sdp

// web server to client
HTTP/1.1 200 OK
Content-Type:application/sdp
V=0
O=2890844526 2890842807 IN IP4 192.16.24.202
S=RTSP session
M=audio 0 RTP/AVP 0
A=control:rtsp://audio.source.com/Mission_to_Mars/audio
M=video 0 RTP/AVP 32
A=control:rtp://video.source.com/Mission_to_Mars/video

//client to audio server
SETUP rtsp://audio.source.com/Mission_to_Mars/audio RTSP/1.0
CSeq:1
Transport: RTP/AVP/UDP;unicast;client_port=3056-3057
```