

# 인터넷 방송 기술의 동향과 전망

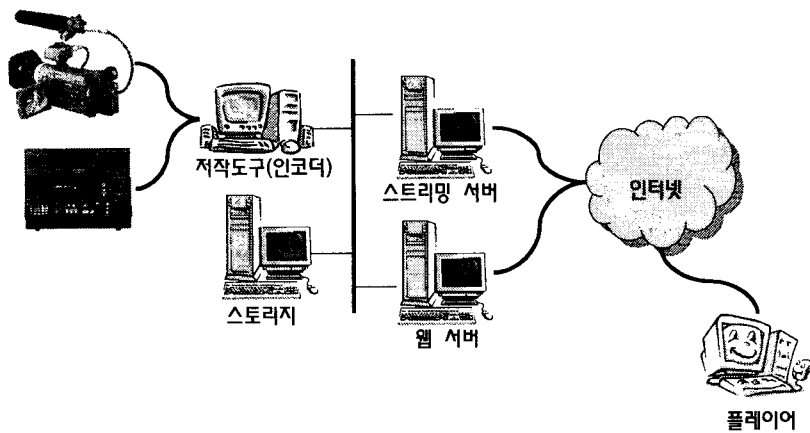
임 영 권


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## Internet Streaming System






*Core Technologies*


- Contents Representation
- QoS (Quality of Service) Management
- Rights Management
- Resource Management

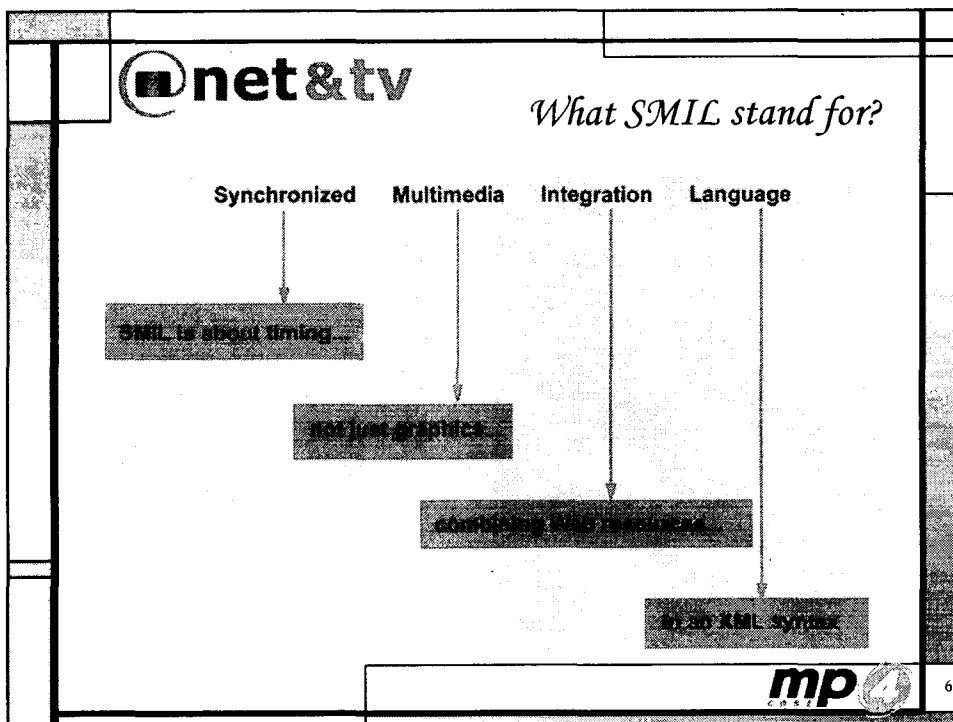
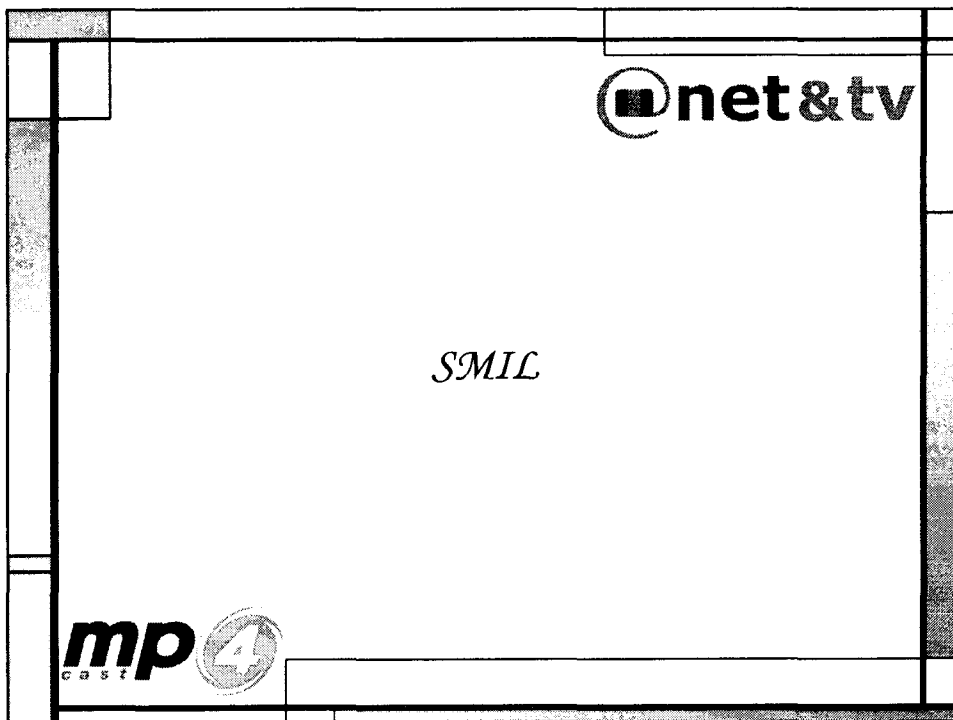


3

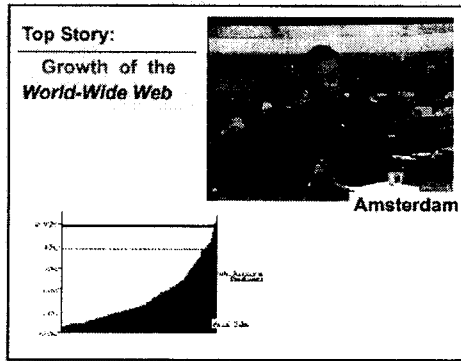


*Contents Representation*





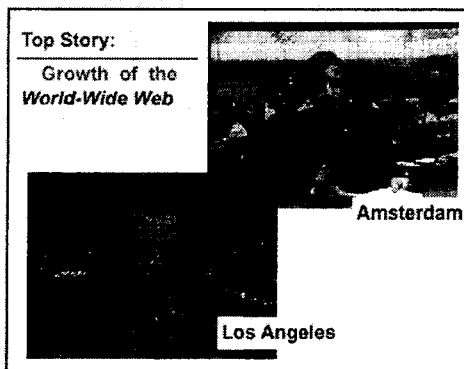
Top Story:  
Growth of the  
World-Wide Web



Amsterdam

Graph appears during spoken commentary

Top Story:  
Growth of the  
World-Wide Web

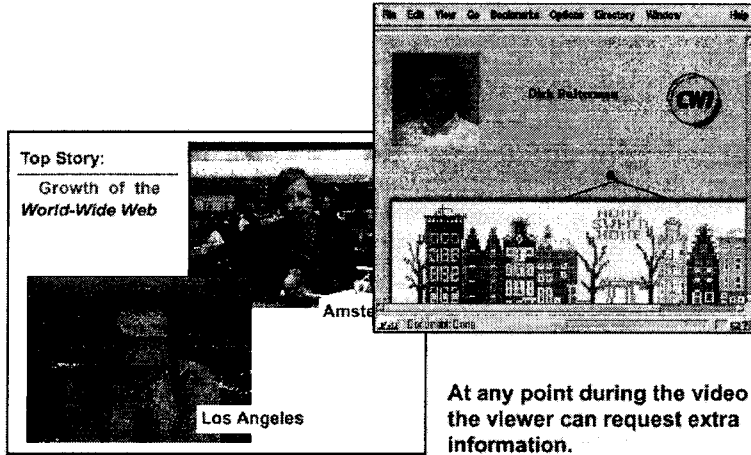


Amsterdam

Los Angeles

First video finishes, second video plays

*SMIL example (III)*



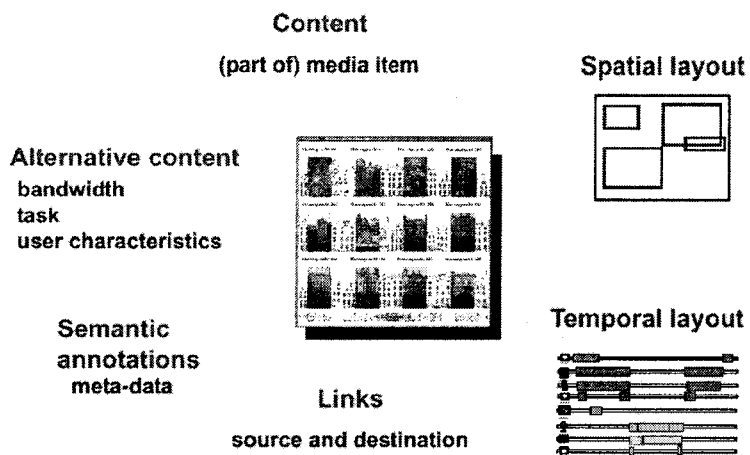
Top Story:  
Growth of the  
World-Wide Web

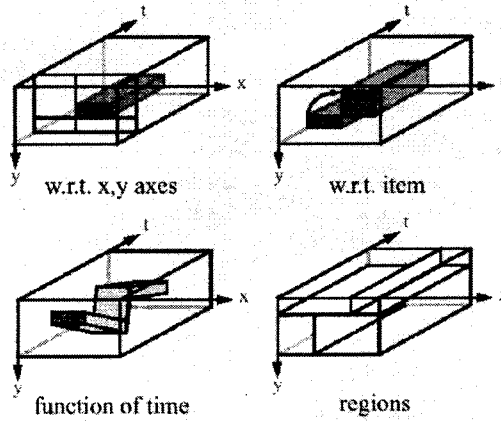
Amsterdam

Los Angeles


At any point during the video  
the viewer can request extra  
information.

*What is specified*







**Intrinsic**

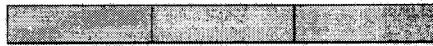
- derived from content of media item  
 audio (or video) lasts 5.3 seconds
- intrinsic duration of discrete media, such as text or image, is zero.

**Explicit**

- an explicit duration can be given  
 The `dur` attribute, value is a clock-value or "indefinite".  
`<video src="zoomin.mpv" region="V-main" dur="4s" />`  
 media object stops after 4 seconds
- `<video src="zoomin.mpv" region="V-main" dur="6.5s" />`  
 media object stops after 6.5 seconds
- in this case, the audio track just stops and the last frame of the video remains

Repeat

```
<video src="zoomin.mpv" region="V-main" repeat="3" />
```



media object stops  
after 15.9 seconds

```
<video src="zoomin.mpv" region="V-main" repeat="3" dur="11s" />
```



media object stops  
after 11 seconds

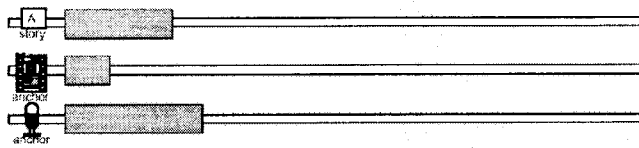
```
<video src="zoomin.mpv" region="V-main" repeat="indefinite" />
```



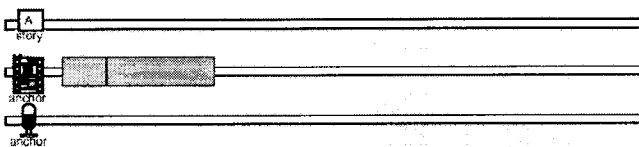
media object stops  
when parent stops

Synchronization

■ <par>



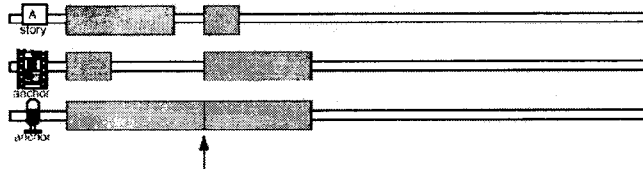
■ <seq>



```

<seq>
  <par>
    <text src="leader_title.html" region="m_title" dur="5s" />
    <video src="cnn.mpv" region="V-Main" />
    <audio src="cnn.aiff" region="music" />
  </par>
  <par>
    <text src="story_title.html" region="m_title" dur="2s" />
    <video src="anchor.mpv" region="V-Main" />
    <audio src="anchor.aiff" region="music" />
  </par>
</seq>

```



- switch
  - At most one of the children of a switch element is played.
  - The first acceptable element is chosen, so ordering should be best first.

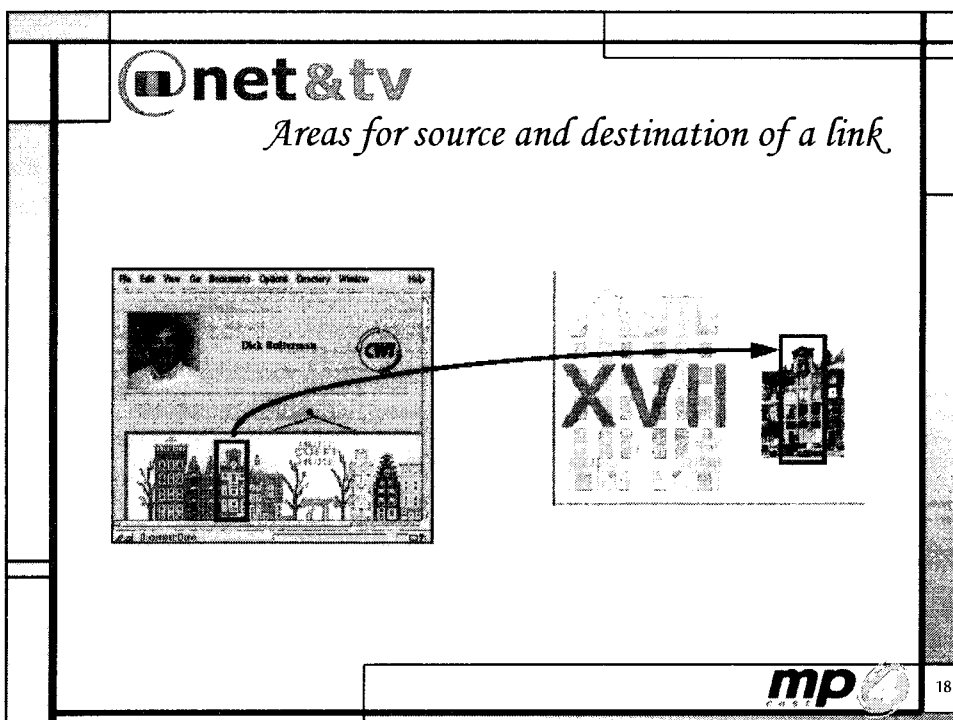
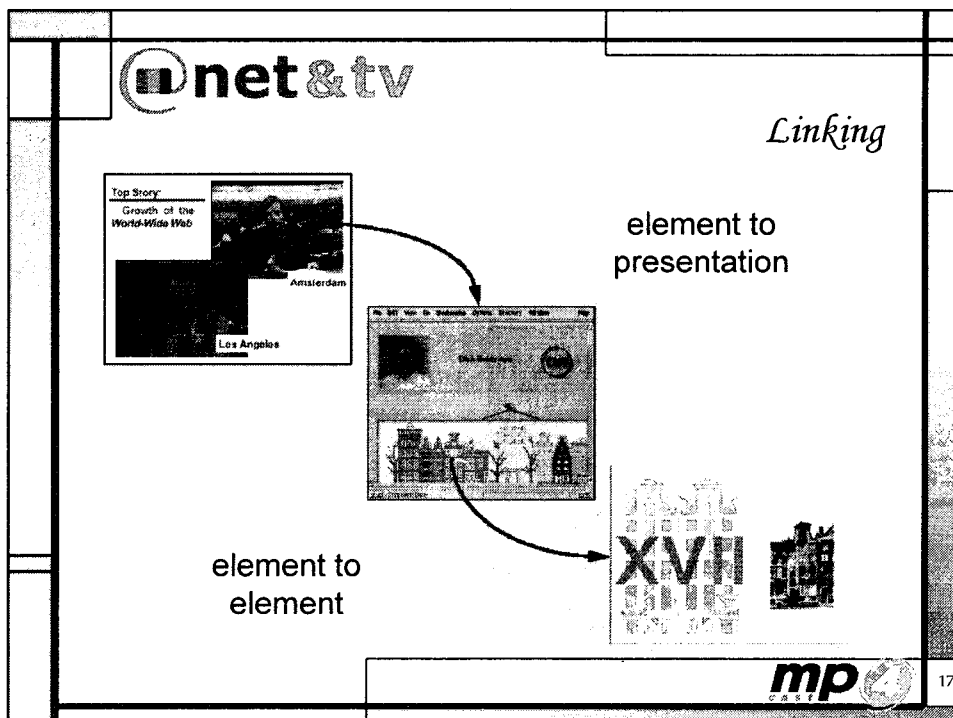
```

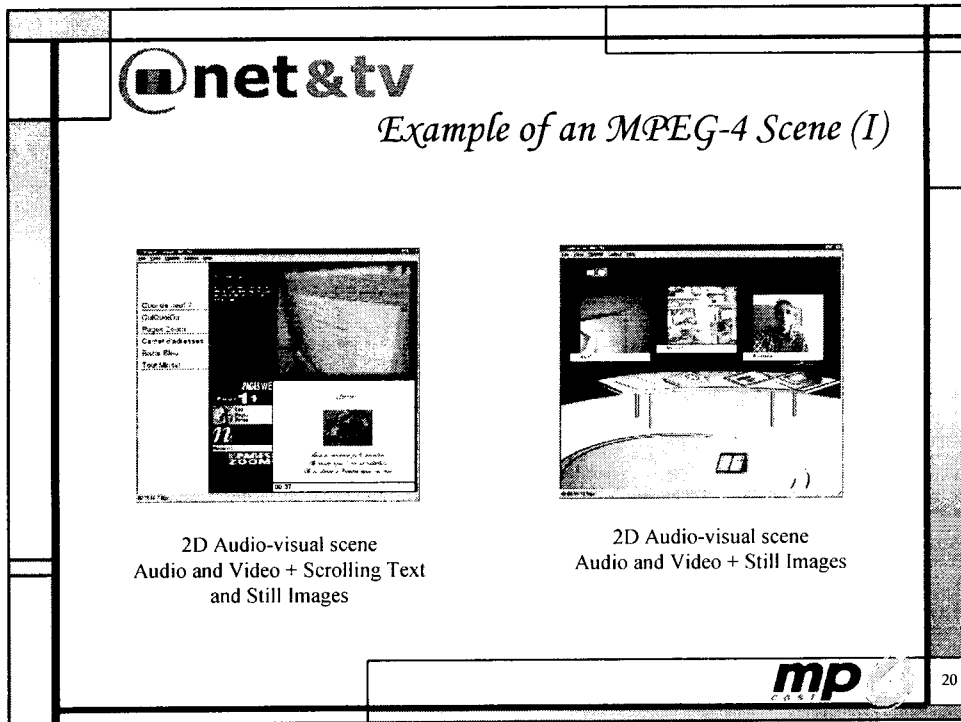
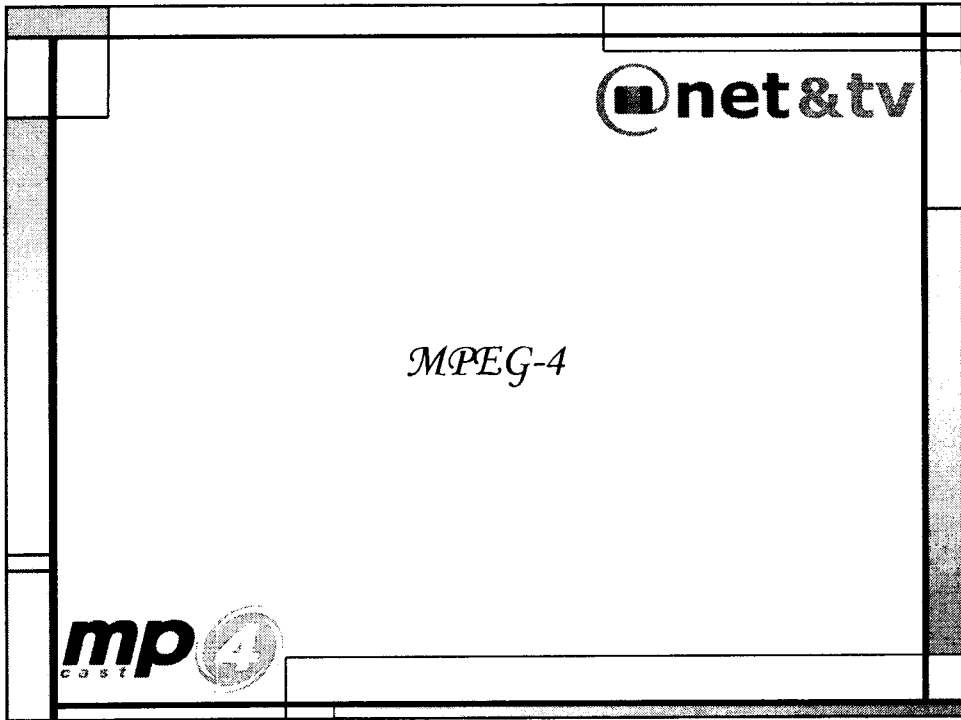
<switch>
  <audio system-bitrate="44000" src="hi-res.aiff" />
  <audio system-bitrate="16000" src="low-res.aiff" />
</switch>

```



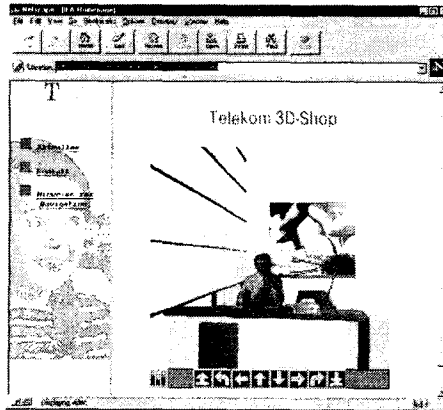






*Example of an MPEG-4 Scene (II)*

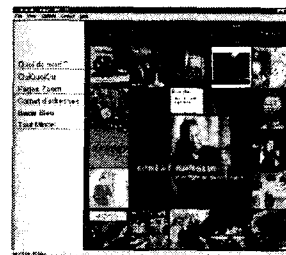
3D Audio-visual scene  
3D World + arbitrary shaped  
video + still images + 3D  
Objects



*Example of MPEG-4 Scenes (III)*

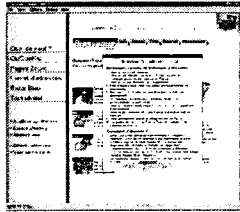


2D Audio-visual scene  
Animated Text+ Video + Still Images

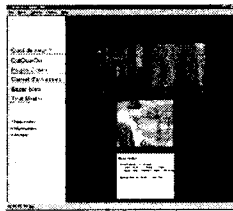


2D Audio-visual scene  
Audio and Video + Still Images

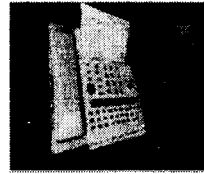
*Example of MPEG-4 Scenes (IV)*



Web-like MPEG-4 Scene

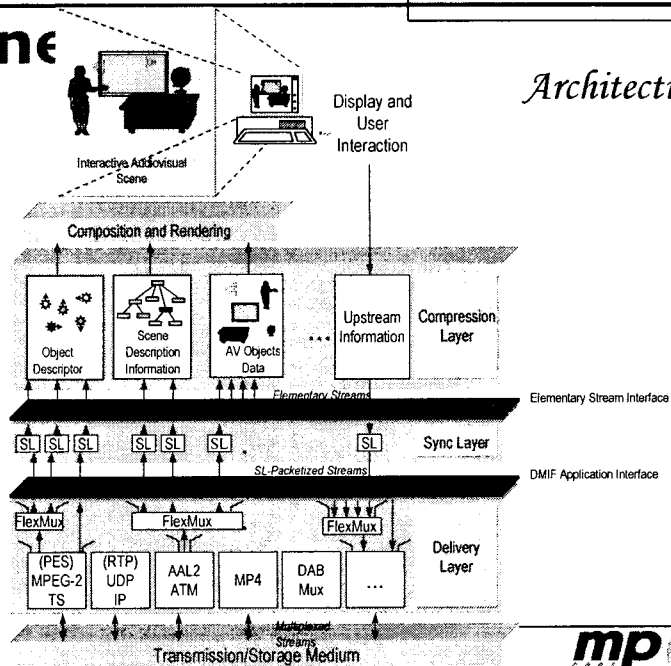


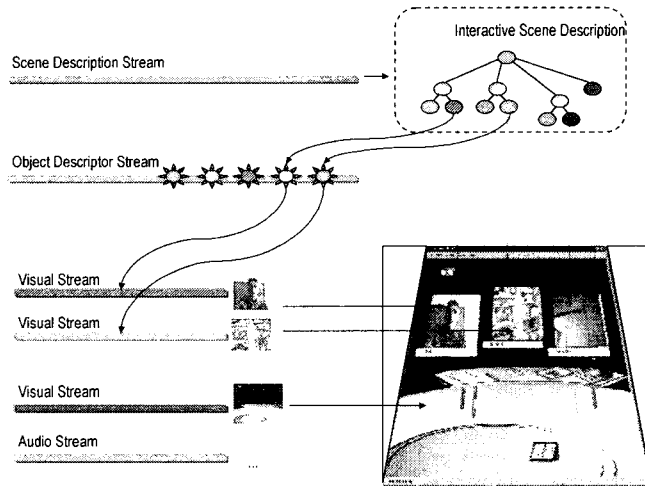
Multi audio and video  
MPEG-4 Scene with text



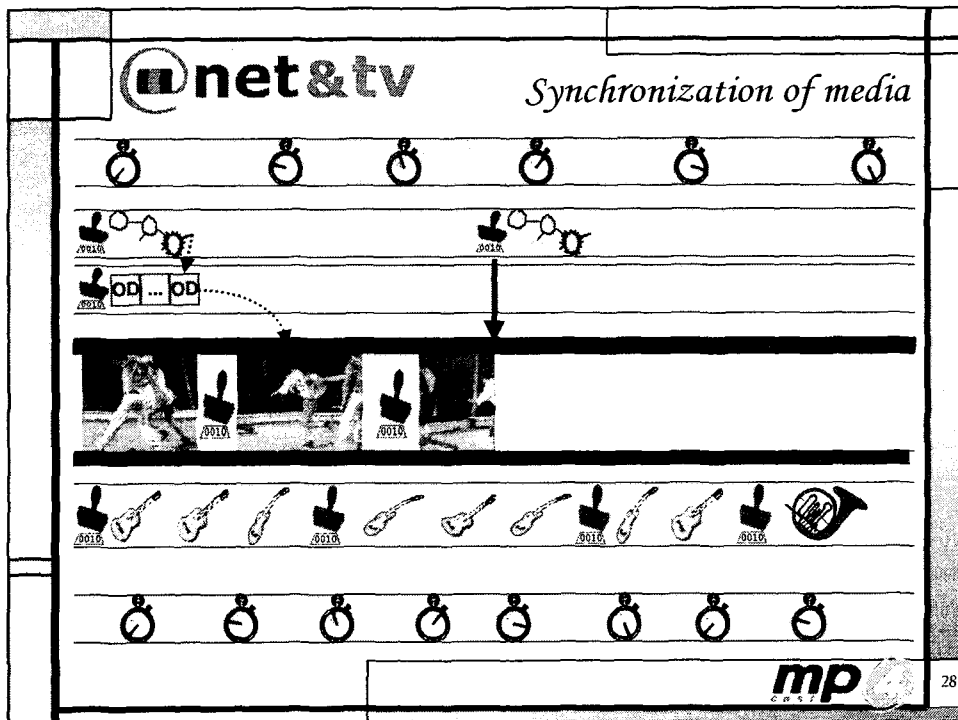
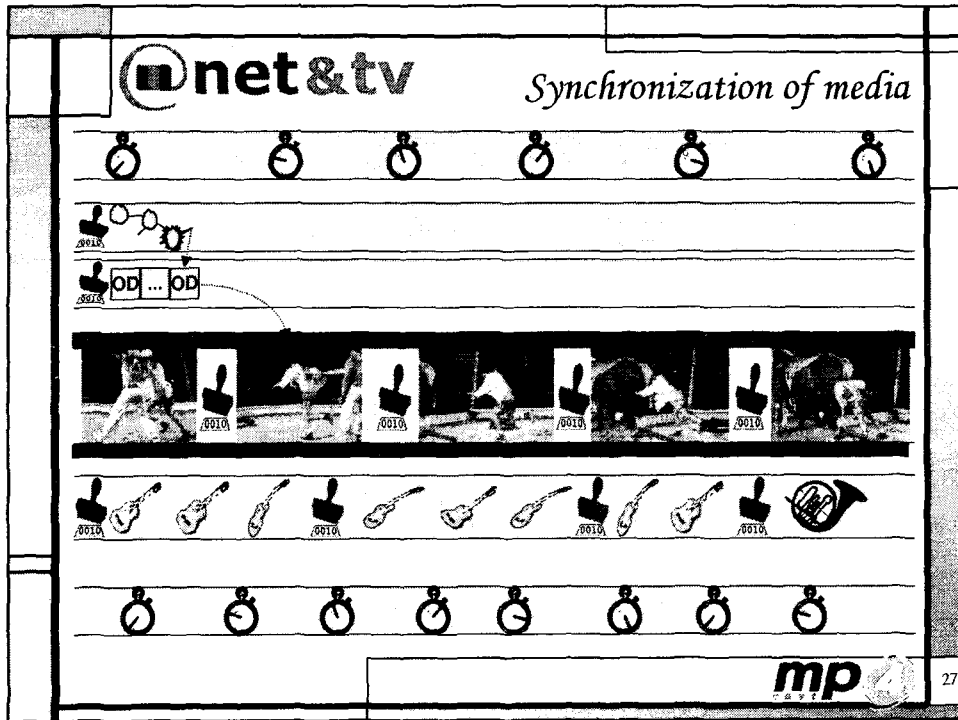
Scene with Face Object

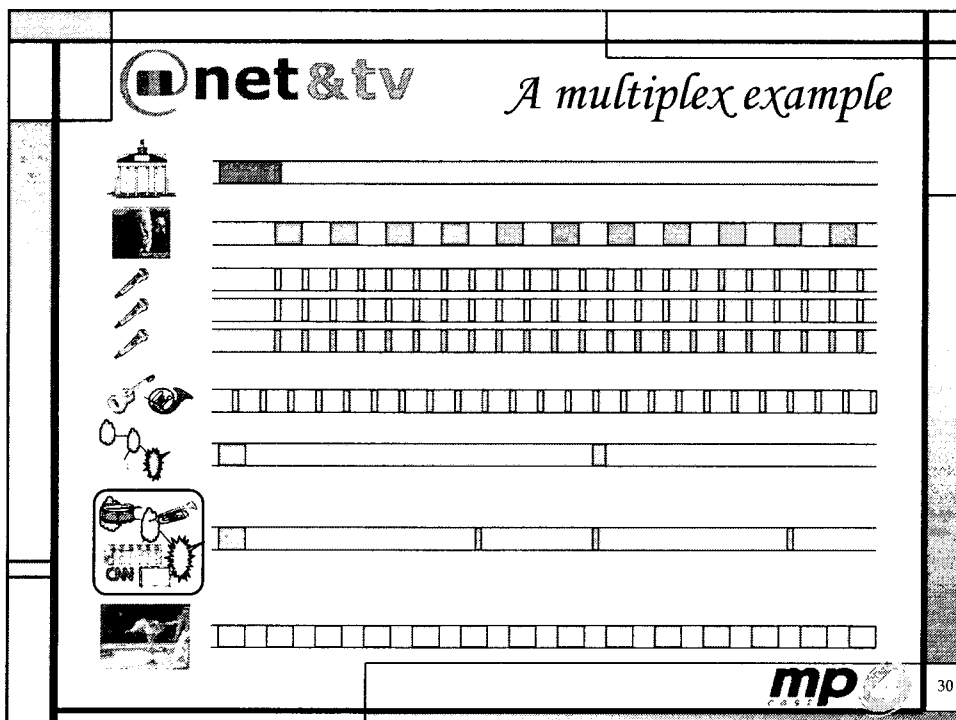
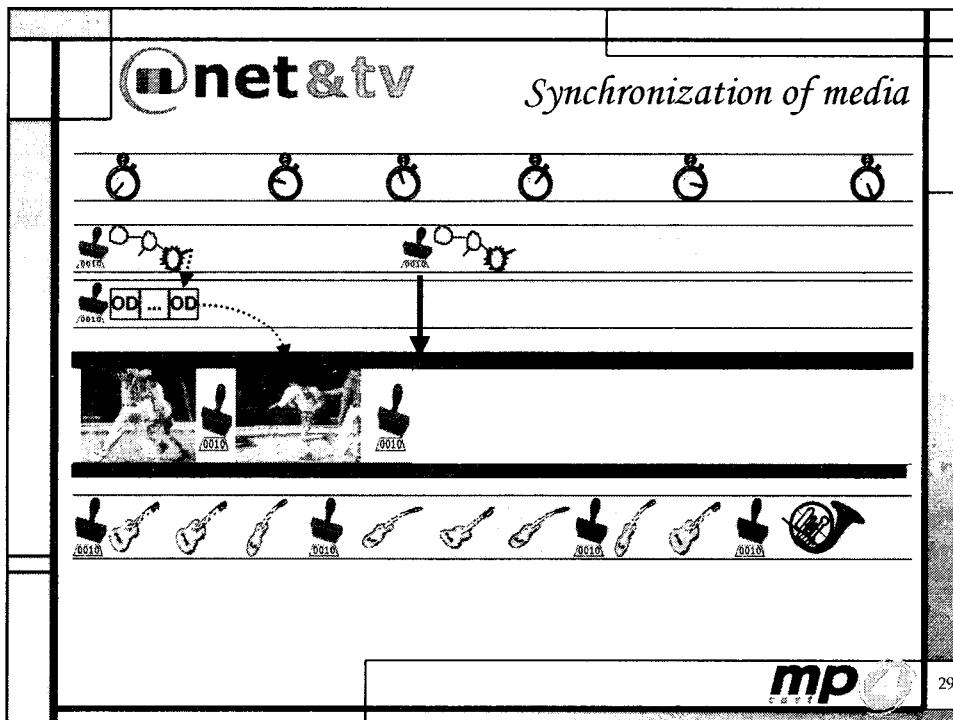
*Architecture*

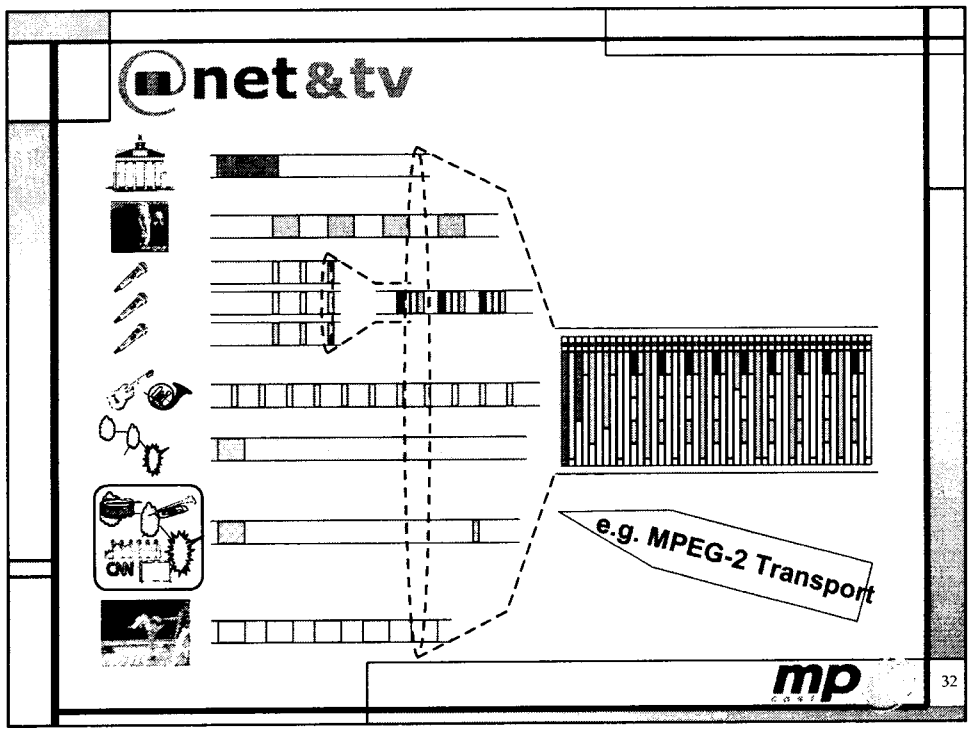
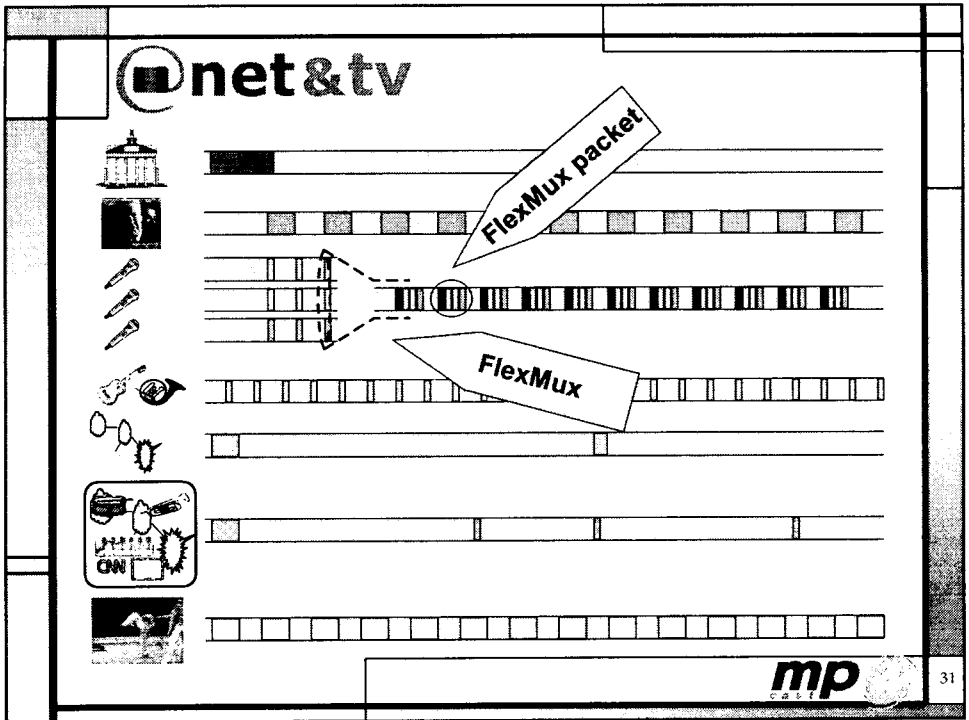




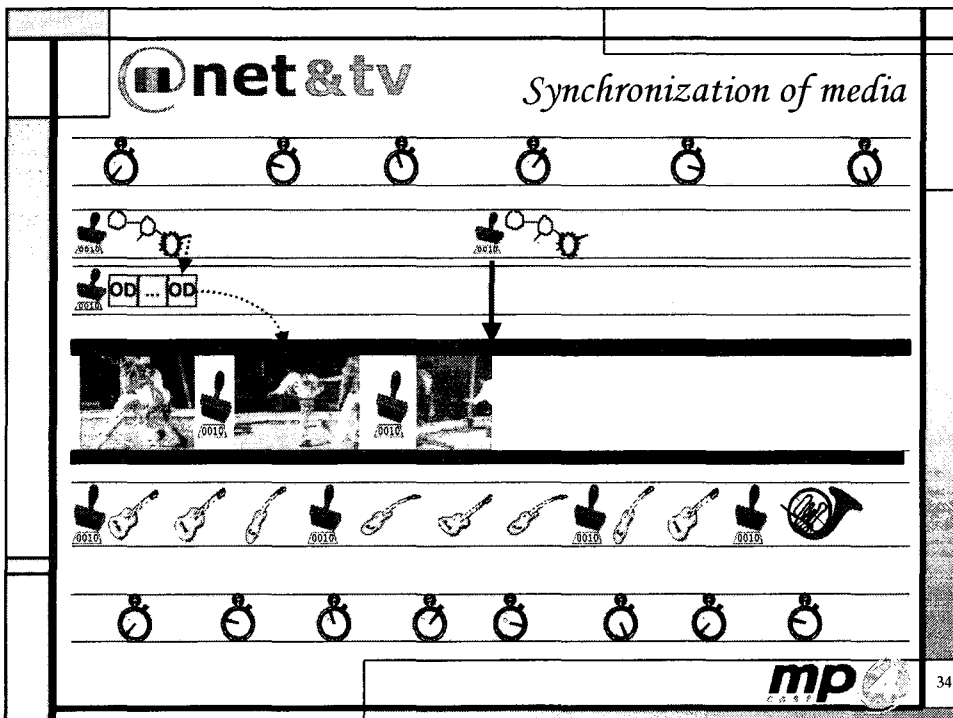
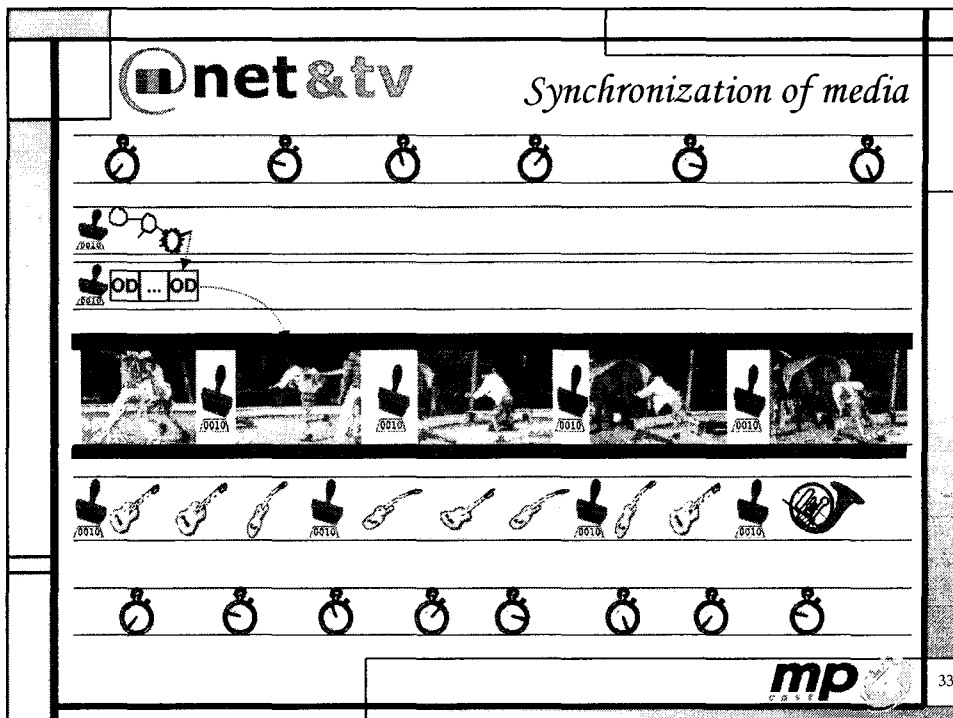
- Time line ("object time base") for the scene
- Scene description stream with time stamped BIFS access units
- Object descriptor stream with pointers to all other streams
- Video stream with (decoding & composition) time stamps
- Audio stream with (decoding & composition) time stamps
- Alternate time line for audio and video

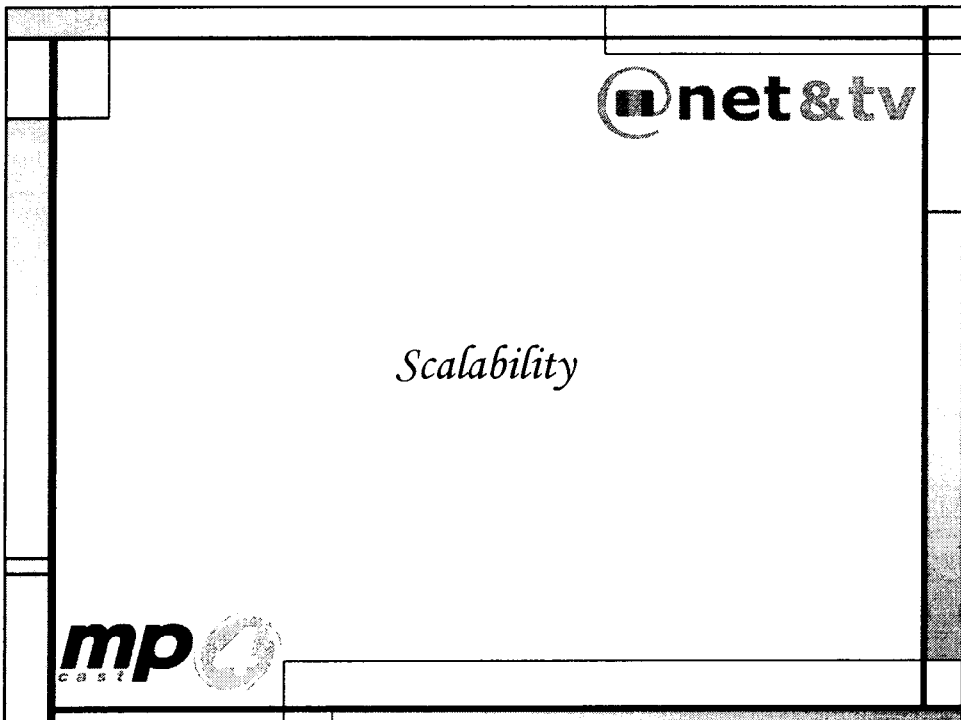
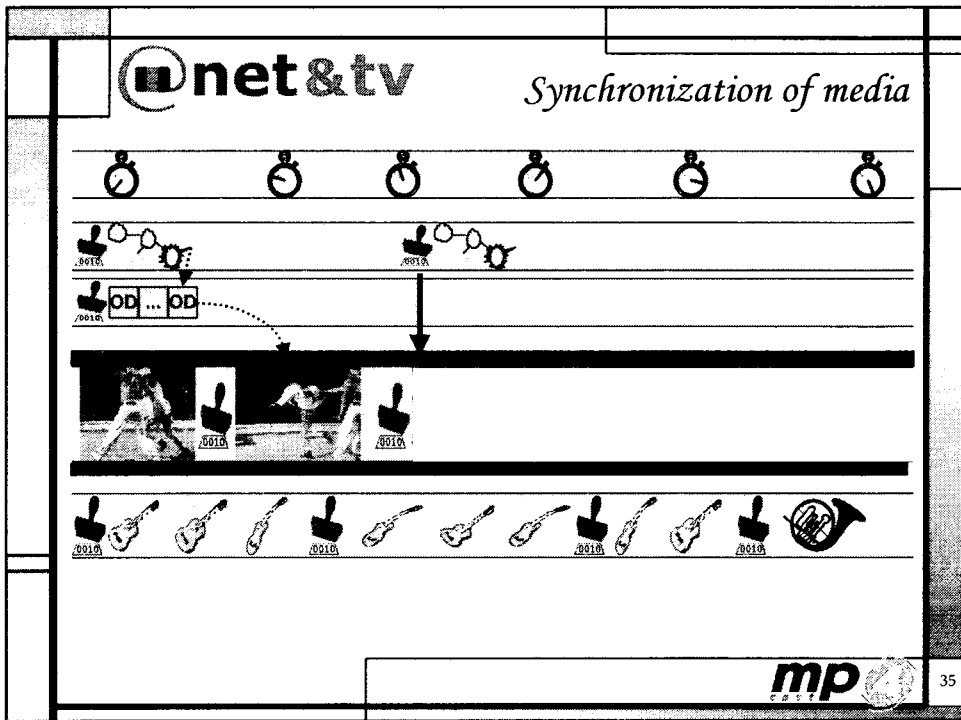












**net&tv** *Enhancement type*

The diagram illustrates enhancement types for two video layers, VOL1 and VOL2. It is structured as a grid with two columns: 'Base Layer' and 'Enhancement Layer'. The rows represent 'Enhancement type 1' and 'Enhancement type 2'. The cells contain icons of a truck and a car. Below the grid, a legend shows a small square icon labeled 'region to be enhanced by an individual enhancement type'.

**mp** 37

**net&tv** *Scalability – Temporal (type 1)*

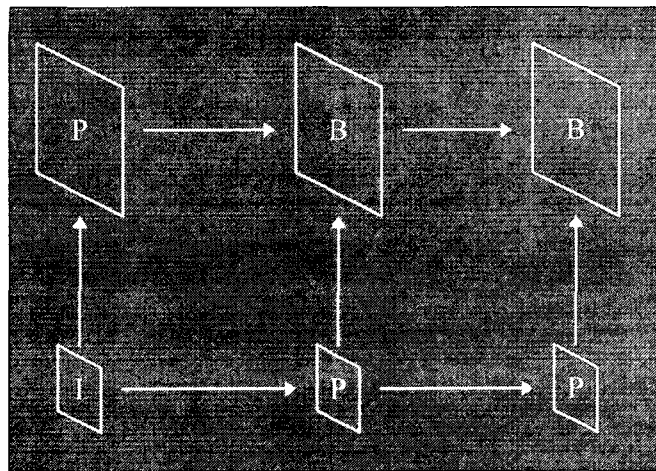
The diagram illustrates temporal scalability. At the top, a sequence of frames is shown, numbered 0 through 12, with the label 'Sequence' to the right. Below the frames, there are three rows of boxes representing enhancement layers: 'VOL1', 'VOL2', and 'Enhancement Layer'. Arrows indicate the temporal relationships between frames and layers, showing how enhancement layers are applied to specific frames in the sequence.

**mp** 38

Scalability – Temporal (type 2)



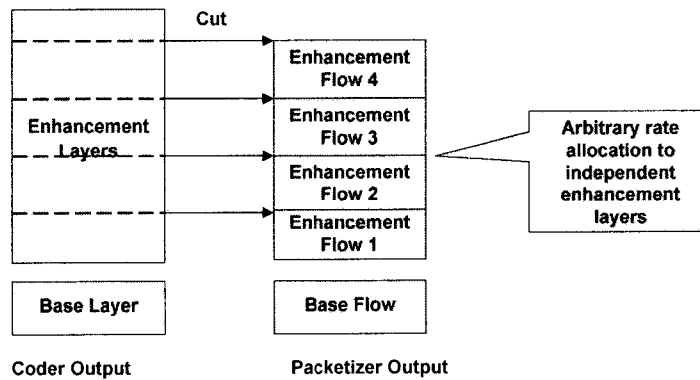
Scalability - Spatial



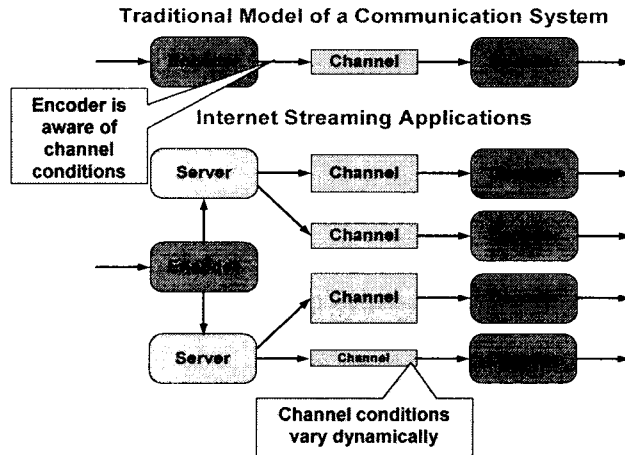
*Fine Granularity Scalability - Objectives*

- Multi-level SNR (quality) scalability
- Separation of encoding and rate allocation
- Graceful degradation of quality under
  - network losses or bandwidth variation
  - limited decoding power
- Multicast and Statistical Multiplexing
- Tailoring of rates without transcoding

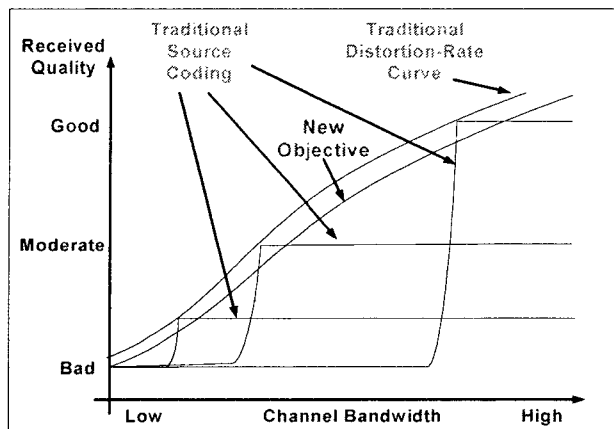
*Multi-Level Scalability*

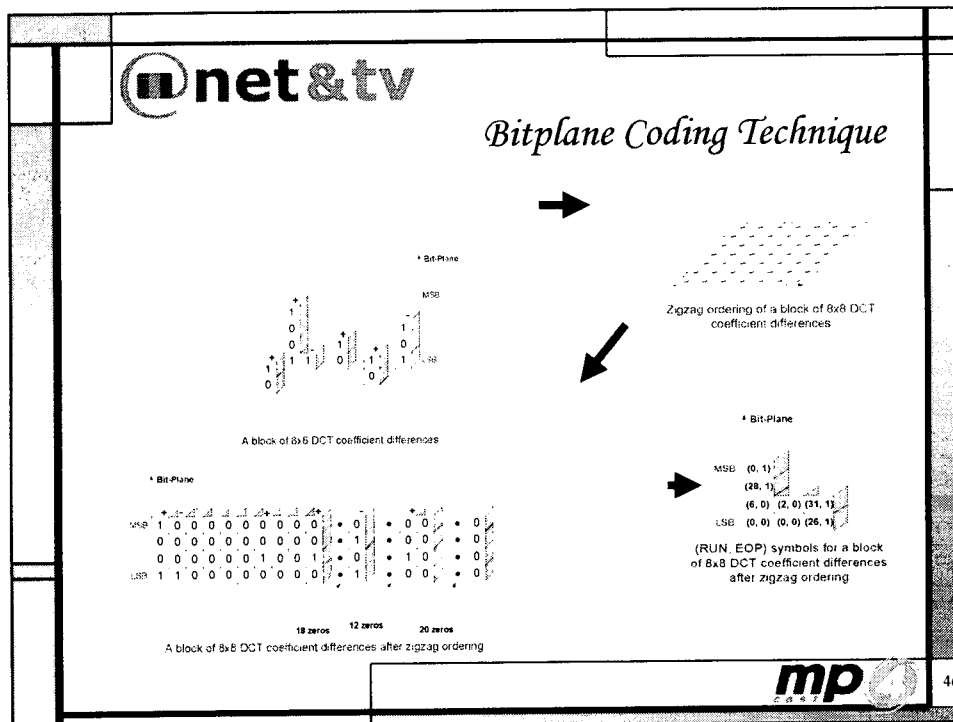
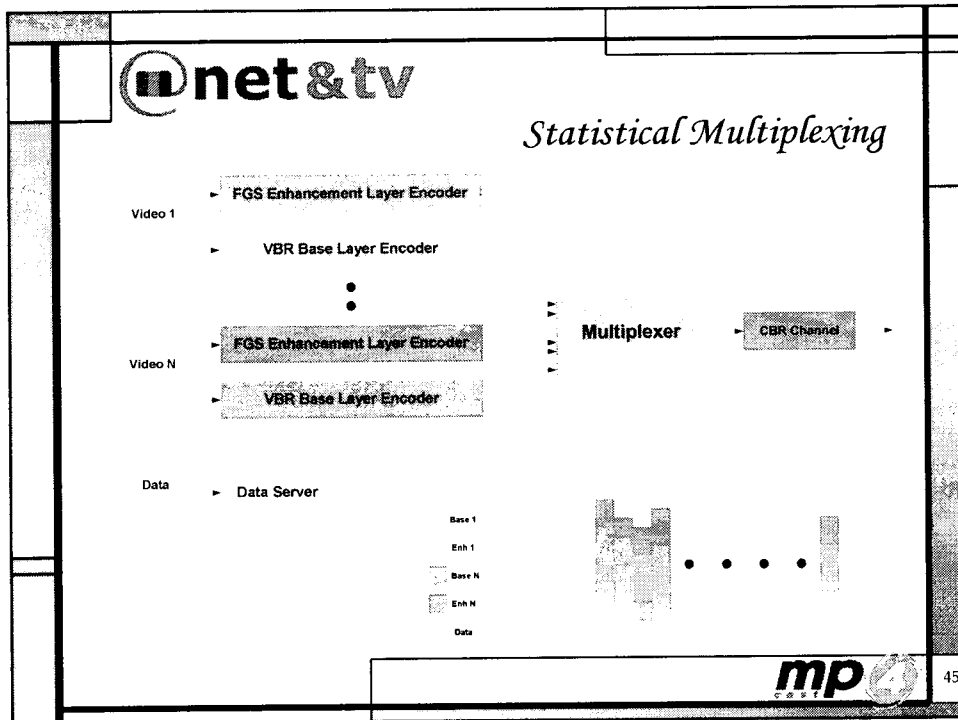


Encoder/channel separation

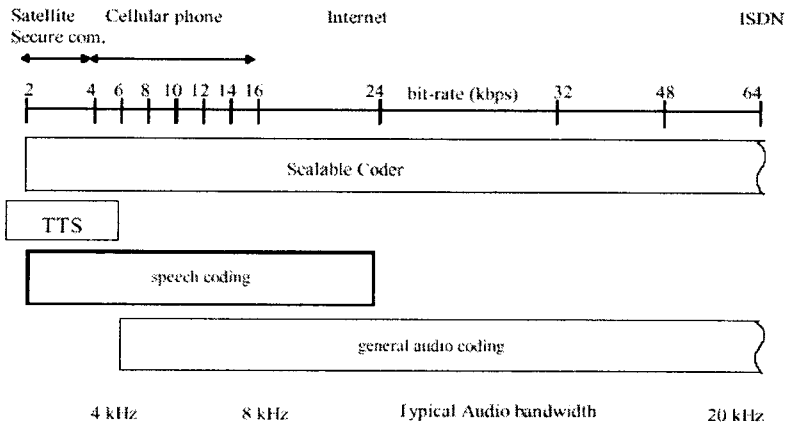


Graceful Degradation



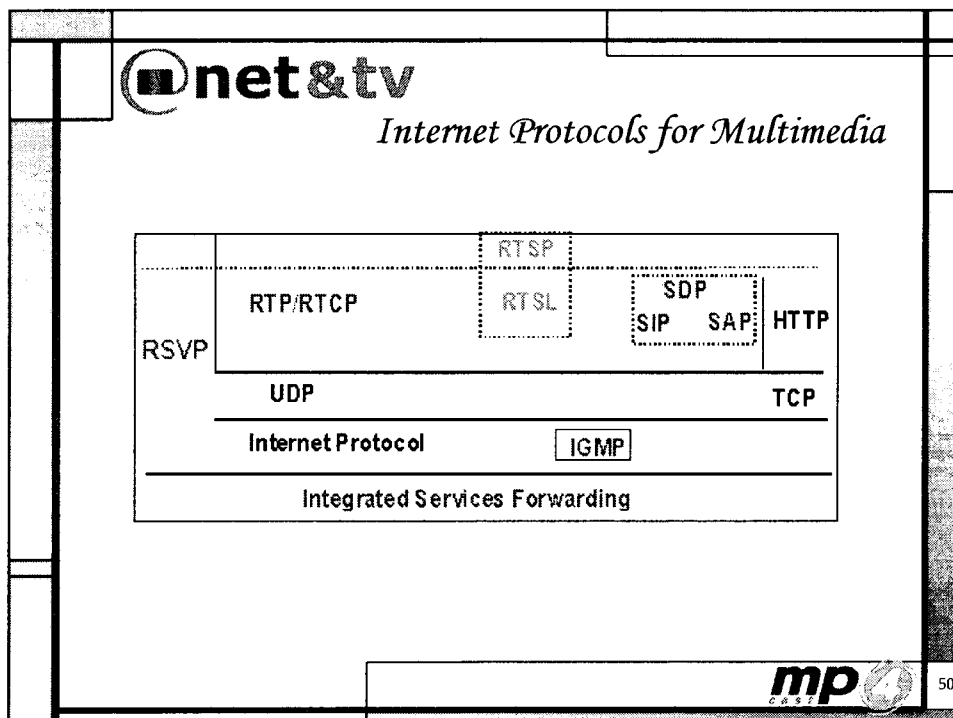
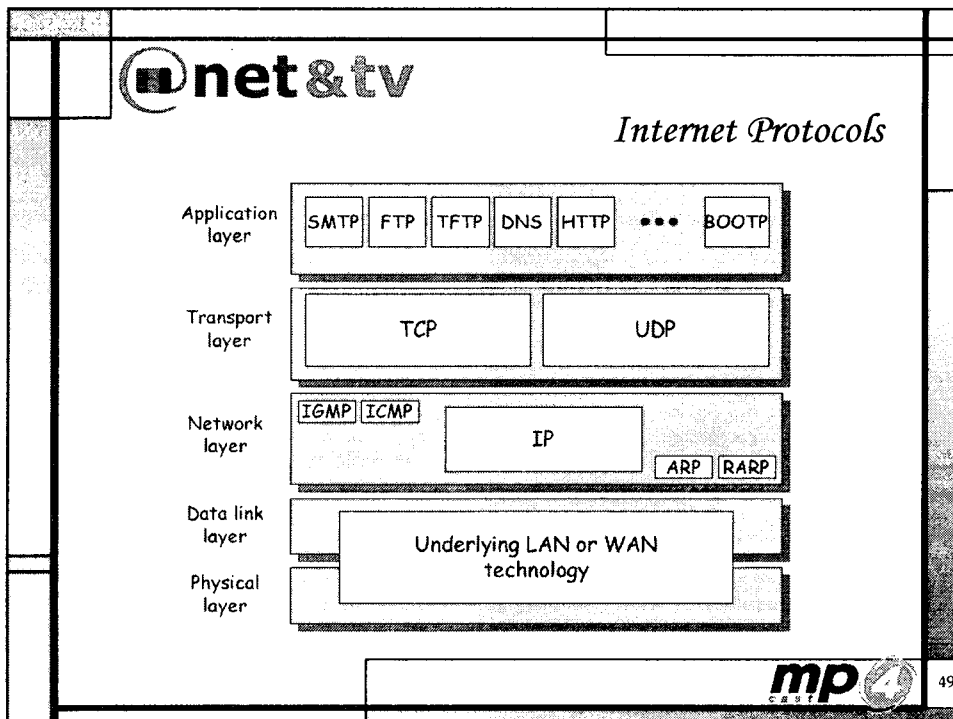


Tools in MPEG-4 Audio



QoS Management

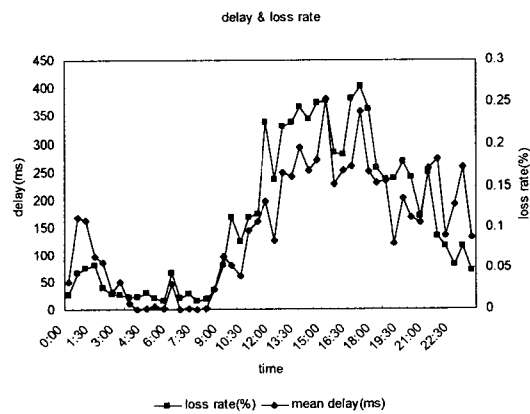




Quality of the current Internet

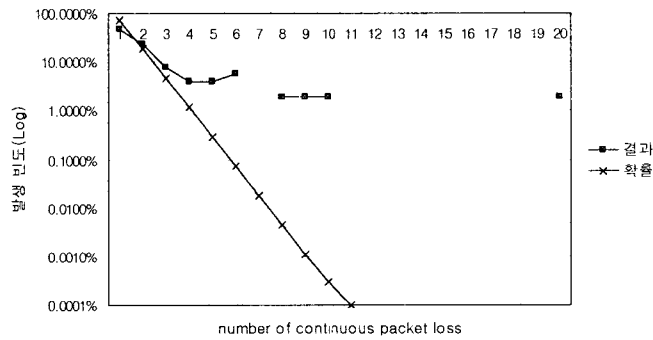
- best effort protocol
  - time varying QoS : loss, delay, jitter
  - Packet loss is bursty.
  - packet size dependent

Time varying QoS (Suwon ↔ Pusan)



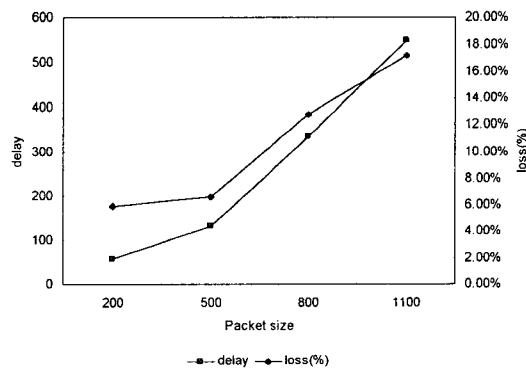
Packet loss is bursty.

손실률(25%)에 따른 패킷 손실 분포  
(서울-부산, IDT=30ms, 크기=500byte)



Packet size dependent

패킷 크기에 따른 평균 지연과 평균 손실율 변화



- IntServ/RSVP(Integrated Service/Resource Reservation Protocol)
  - Per flow based QoS
  - Be suitable for small size network
  - Explicit set-up mechanism
  - Fitting well for a policy framework
- DiffServ (Differentiated Service)
  - Per aggregate based QoS
  - Be suitable for backbone network
  - No Signaling
  - Simple Core

*Thank you!*

*Questions and Answers*