Content Coding for TV Anytime and TV Anywhere

perspective for broadcast and internet integration

Jan van der Meer

Philips - Digital Video Systems

Eindhoven - The Netherlands

Overview

- Requirements for Content Coding tools
- TV Anytime tools
- TV Anywhere tools
- Support of MPEG-4
- Current status
- Conclusion

Requirements for Content Coding tools

- TV Anytime
  - MPEG-2 broadcast program
    - over MPEG-2 TS / IP
    - delivery in real-time / as file download
  - program schedule and other information
  - program segmentation
  - NOT : storage format, only interface to storage device

- TV Anywhere
  - audio, speech and video formats over IP
  - delivery format over IP
    - transfer method
    - playback synchronisation
    - memory constraints

TV Anytime tools

- MPEG-2 Broadcast Program over IP
  - Option 1 : transfer in content specific IP packets
    - common method for IP
    - no market accepted Conditional Access solution yet
    - no explicit memory requirements for playback, unknown IP multiplex
  - Option 2 : transfer of single (or partial) program TS
    - Broadcaster & STB friendly
    - use of market accepted CA solution from broadcast
    - explicit memory requirements for playback (T-STD), separate jitter
    - suitable as file format for playback from memory compensation
    - existing storage and interconnect solutions (D-VHS, 1394)
  - Decision : Single (or Partial) Program Transport Streams

    (extensible to support other formats in future such as MPEG-2 PS

TV Anytime tools (2)

- Delivery of MPEG-2 Broadcast Program
  - over MPEG-2 TS
    - real-time broadcast
    - file download : use DSM-CC
  - over IP
    - real-time : use of RFC2250
    - file download : use of ftp

TV Anytime tools (3)

- Program schedule and other information
  - Access to future and past program schedules
  - Service Information over MPEG-2 TS
    - exact or minimum SI subset to be defined
  - Additional Service Information over IP
    - could be broadcast but isn't, for bandwidth or other reasons
    - consistency between SI data on Broadcast and on Internet (e.g. timing accuracy)
    - linking between Broadcast Service and associated SI data on Internet
  - Need for Metadata

TV Anytime tools (4)

- Program Segmentation
  - Examples :
    - indication of news items in News program
    - indication of highlights in sports program
  - Can be used for item specific playback
    - only news items on specific subject
    - only highlights of sports program
  - Items can be overlapping
  - Item timing can be elementary stream specific
  - Proposal adopted from Japan (in review by ARIB)
  - Potential proposal to DVB-SI

TV Anywhere tools

- Audio, Speech and Video formats
  - open standard
  - scalable solution
- Audio and Speech
  - adopt scalable MPEG-4 audio and speech profile
  - preserving the right to subset (review status of this profile)
- Video
  - adopt simple MPEG-4 visual profile
  - no scalability (at same spatial resolution) yet

TV Anywhere tools (2)

- MPEG-4 delivery over IP
  - transfer method
    - in content specific IP packets
    - multiplexed in MPEG-4 Flexmux (carried in IP packets)
    - multiplexed in MPEG-2 TS (carried in IP packets)
  - playback synchronisation
    - real-time delivery
    - file download
  - memory constraints
    - jitter
    - playback
  - Options still in review

Support of MPEG-4

- Adopted
  - MPEG-4 Spatial Audio and Speech Profile
  - MPEG-4 Simple Visual Profile
- In review
  - MPEG-4 Multiplex
- Backward compatibility ensured of future MPEG-4 based services
  - arbitrary shapes
  - object oriented
  - VRML (BIFS)

Current status

- Some basic decisions taken
  - Use of Single Program Transport Stream for TV Anytime
  - MPEG-4 Profiles for TV Anywhere
- Several open issues
  - TV Anytime
    - service information
    - metadata
    - program segmentation
  - TV Anywhere
    - delivery of MPEG-4 over IP
- Freezing expected in Portland meeting (Jan 18-22, 1999)

Conclusion

- DAVIC : integration of Broadcast and Internet
  - NOT : Web surfing on a broadcast STB
  - Instead : application driven technology merge
- DAVIC 1.0-1.4 : use of Internet technology in Broadcast
  - HTML for text
  - PNG for graphics
- DAVIC 1.5 (TV Anytime / TV Anywhere)
  - use of Broadcast technology over Internet
    - MPEG-2 video, audio, TS
    - Conditional Access