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Desirable feature of IPTV system for DTTB re-transmission platform and an introduction of experimental IPTV system for ISDB-T

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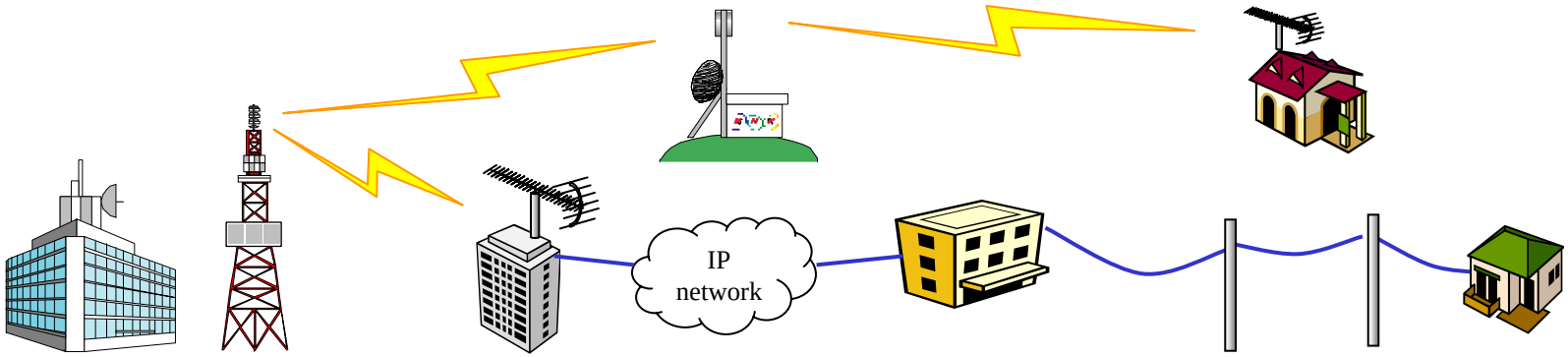
Objective of this talk

- Introduce very simple IPTV application.
- Just “transmit digital TVs over IP network”
  - designed to provide the same broadcasting service to the areas direct signal reception of TV is poor;
  - based on J.281, J.mcvif-arch
- Provide information for better understanding of requirements for retransmitting television broadcasting services.

Motivation

- Analogue TV → Digital TV
  smooth transition is a big problem!
  - [Big challenge] Digitalizing thousands of small TV relay stations in a short period of time.
  - [Our challenge] Developing an IPTV system for DTTB re-transmission platform using broadband IP network to fill the gap/expand the DTTB service coverage.



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Summary of desirable feature

- Ensure the integrity of broadcasting service
  - Same Service / Same Quality

    →DTTB Emulation, not simulation
- The copy control and content protection system and its enforcement should be maintained.
- Re-transmission service should be limited in the area of original DTTB's service area.
- ITU-T Recommendation J.281

Scope of ITU-T Recommendation J.281

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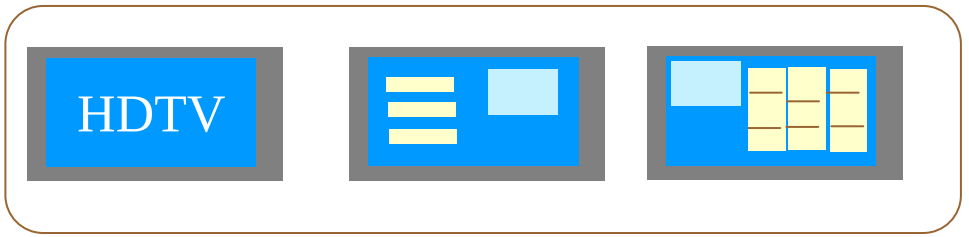
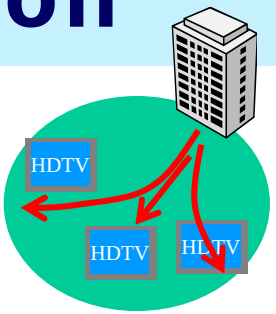
- J.281 defines the requirements for multichannel video signal transmission over IP-based fibre network.
- The video service is expected to be the same as the current digital broadcasting service in which high-quality video programmes including HDTV are provided as a part of a set of services, such as data service, conditional access system and electric programme guide.



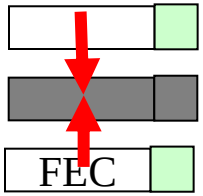
Requirements (J.281)

- 7 sections
  - 6.1 Transmission and service
  - 6.2 Packet format
  - 6.3 Multiplexing and programme selection
  - 6.4 Network QoS and bandwidth
  - 6.5 STB
  - 6.6 Security
  - 6.7 Coordination with other service and technology

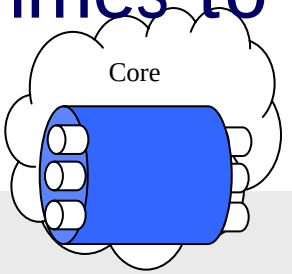
Examples from each section



- IP network should rigidly control the distribution area.



- Error protection encoding that is performed on either MPEG-2 TS packets or RTP packets should work against IP-level packet-loss.
- Programmes should be received on transport stream basis.
- Core Network should provide sufficient bandwidth to enable all programmes to be distributed simultaneously.

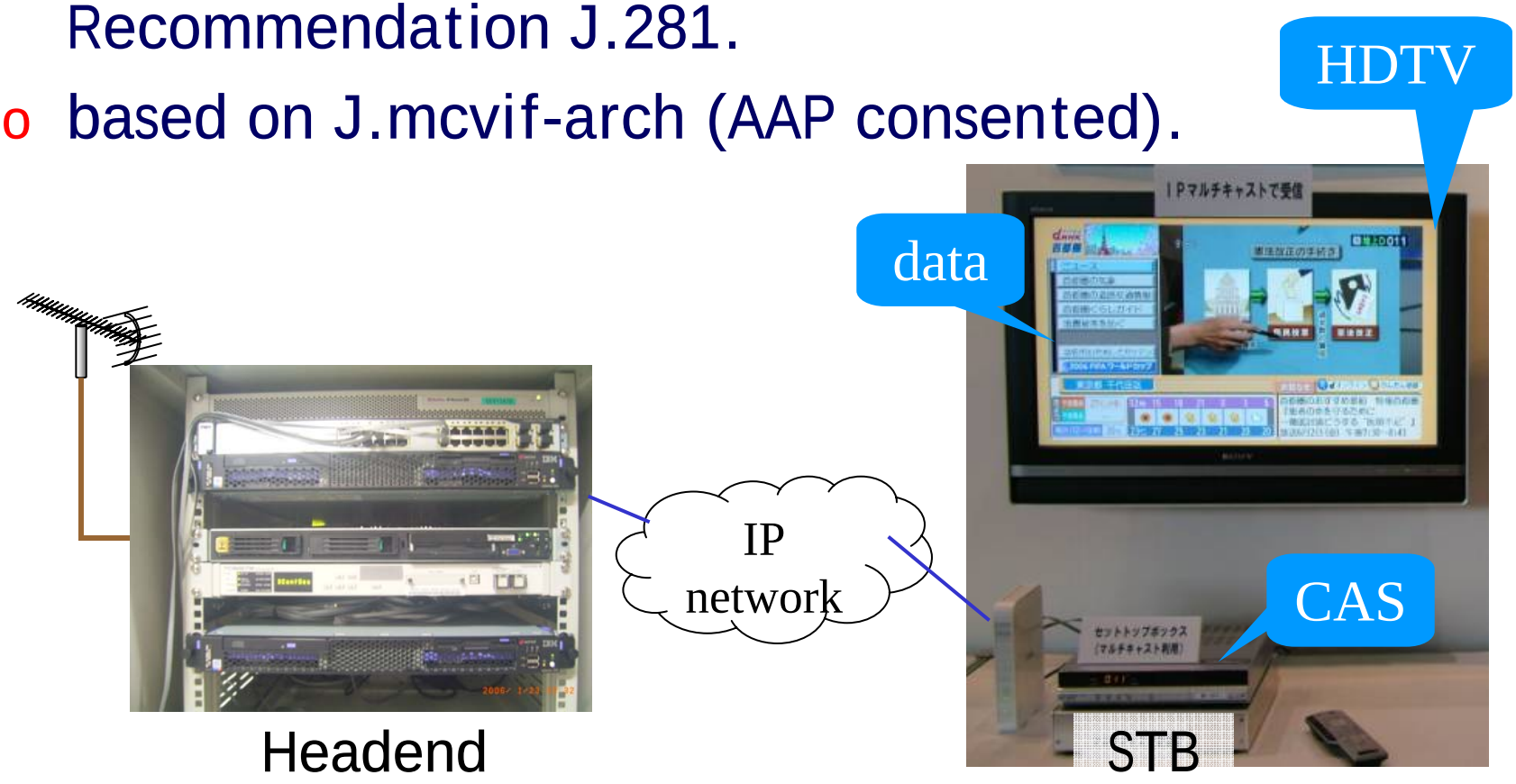


Examples from each section

- STB should provide copy control.
- Headend and/or IP network should prevent unauthorized STB from receiving any programme.
- Headend and/or IP network should prevent illegal wiretapping and spoofing.
- STB should coordinate with home network technologies (for example, LAN).

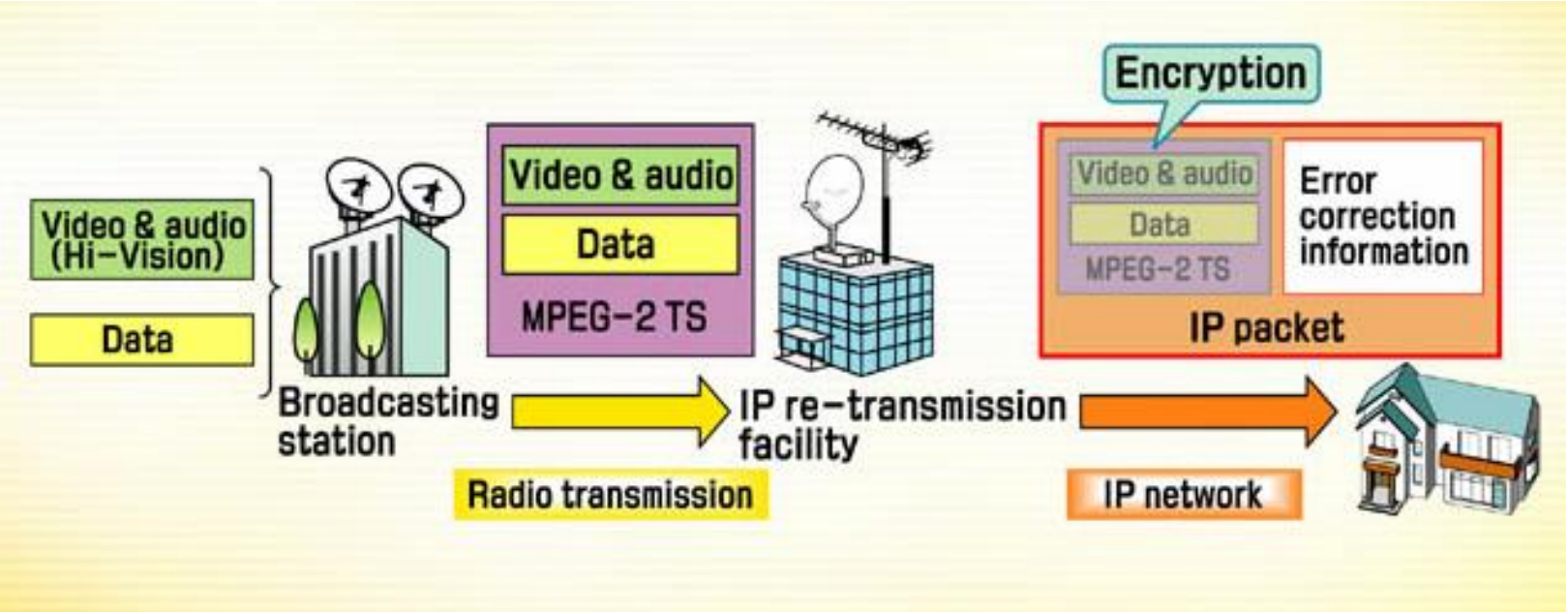
NHK has developed an experimental system

- It keeps the integrity of ISDB-T broadcasting service.
- It satisfies the requirements defined in ITU-T Recommendation J.281.
- based on J.mcvif-arch (AAP consented).



Developed IPTV system

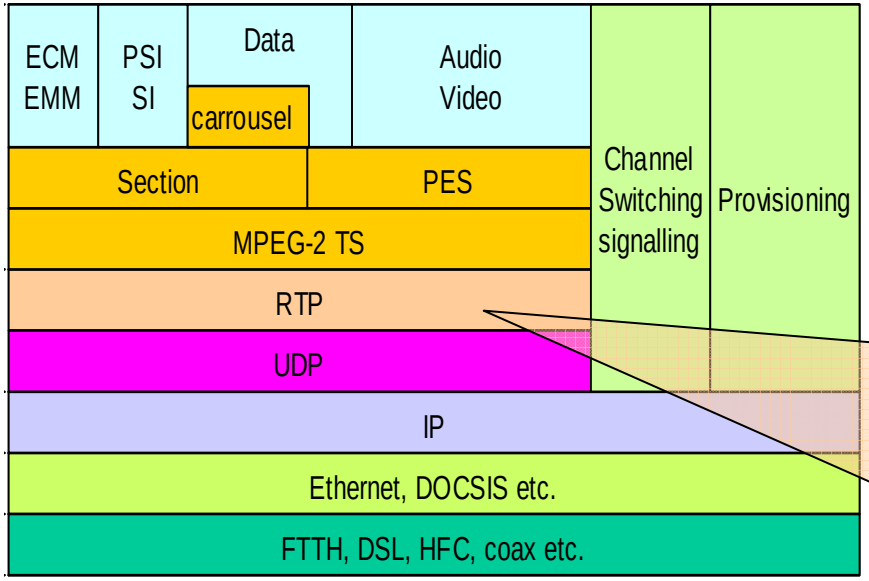
- Received MPEG-2 TS packets are encrypted and encapsulated in RTP packet.
- Error protection encoding is adopted



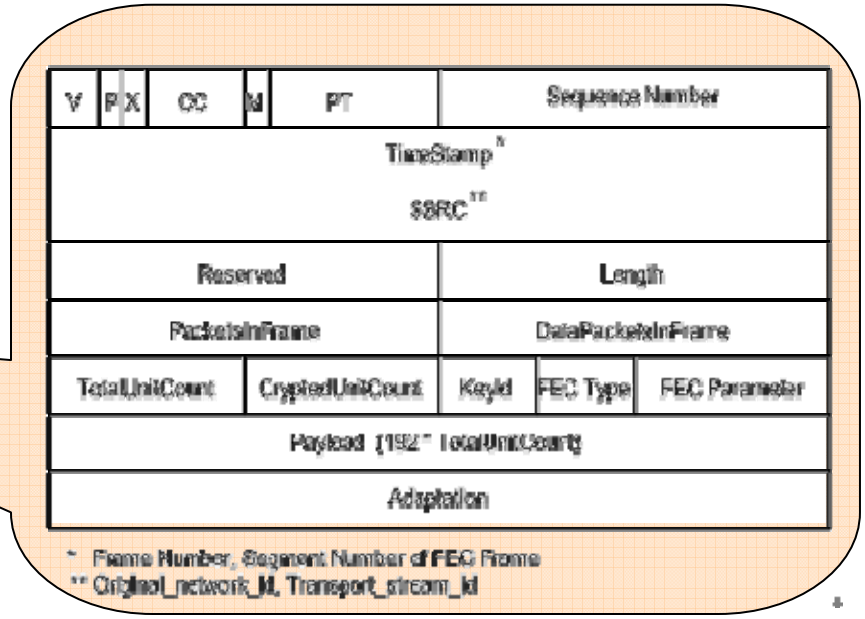
Overview of IPTV re-transmission system

Protocol stacks

- Based on protocol stacks of J.mcvif-arch.
- Newly developed RTP payload format



Protocol stack described in J.mcvif



RTP payload format for re-transmitting DTTB

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Performance

- Increased delay: about 400 - 600msec.
- Service integrity : Full compatible !
  - HDTV, data, CAS, subtitling, internet.
- Channel Switching : about 1sec.
- Packet loss recovery: XOR(8,7),RS(15,11)
- Security
  - CAS:MULTI-2 64bit
  - Added: AES 128bit,CBC

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Summary

- ITU-T Recommendation J.281
  - the requirements for multichannel video signal transmission over IP-based fibre network.
- NHK(Japan Broadcasting Corporation) achieved successful development of an experimental IPTV system which transmit digital TVs over IP network.
  - It provides the same broadcasting services.
  - It is based on J.281, J.mcvif-arch.