



International Telecommunication Union  
International Multimedia Telecommunications Consortium



# Emulating TV broadcasting over IP network

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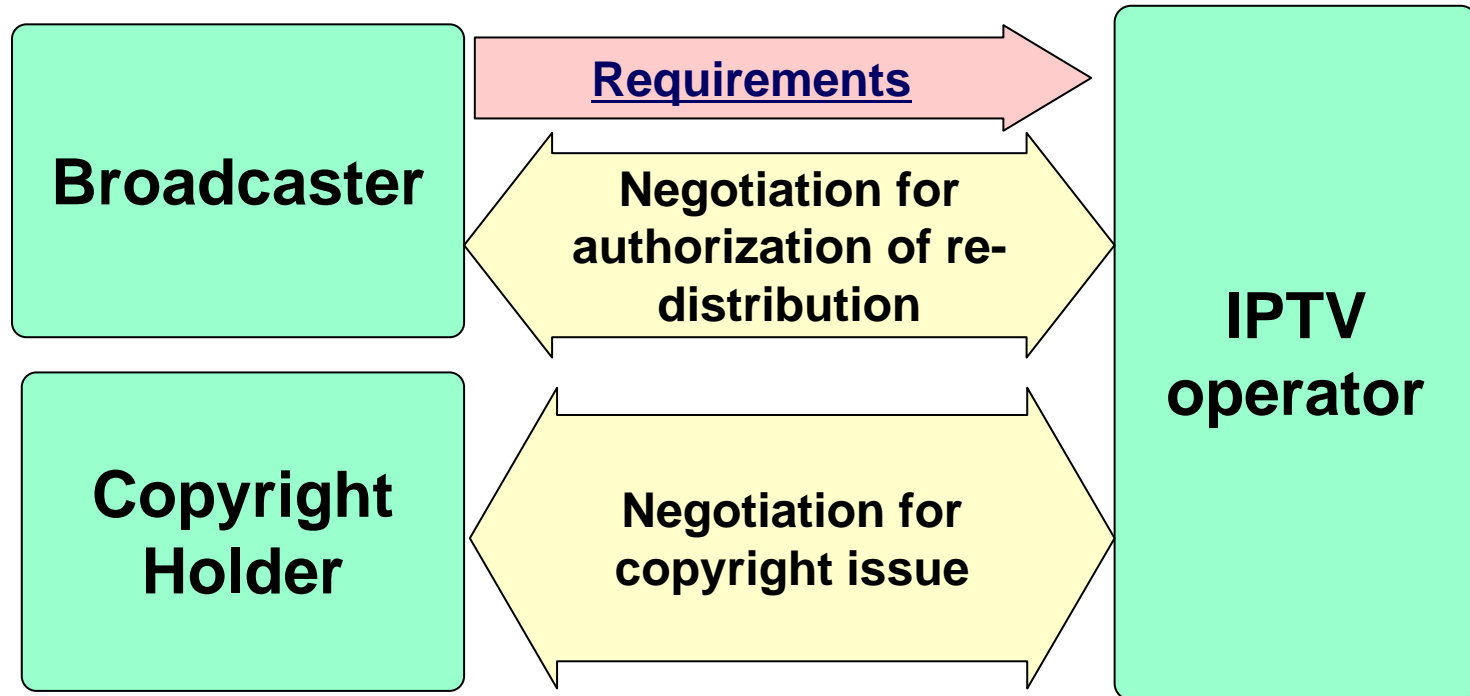
# TV broadcast in Japan



- o Terrestrial
  - Limited number of channels (5-10 ch)
  - Reception is free of charge (FTA : Free To Air)
  - Transition to the full digitalization is problem.
  - > Target for IPTV
  
- o Satellite
  - Relatively larger number of channels (several 100 ch)
  - Fee based service and free service
  
- o CATV
  - Originally developed as a complementary way of reception of Terrestrial.
  - Intending to develop the integrated service (e.g. VOD)

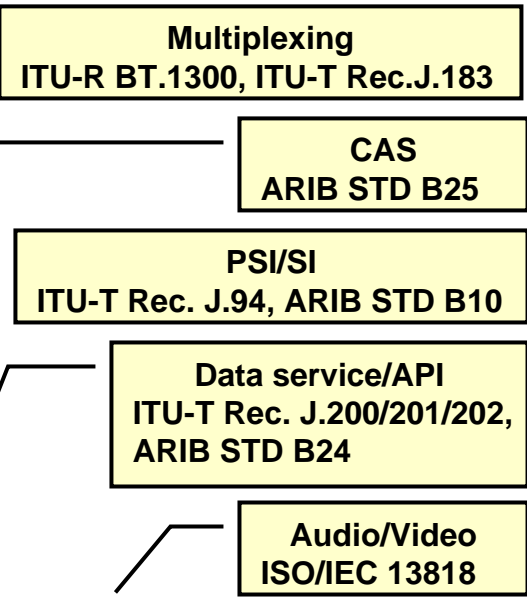
- o IP-TV: two approach
  - **Creation/innovation approach**  
Creating new service (e.g. VOD, Time-shift)  
Service differentiation from conventional broadcasting.
  - **Emulation/simulation approach**  
Emulating the existing broadcasting (e.g. ISDB, DVB)  
Not fashionable, but obvious demand.

- o Full digitalization of terrestrial TV broadcasting
  - Scheduled in 2011.
  - Full transition to digital broadcasting until then seems to be difficult, but necessary.
- > In some area, particularly in rural area, complementing with IPTV is highly expected.
- > Obvious demand for IPTV in form of simply emulating broadcasting.

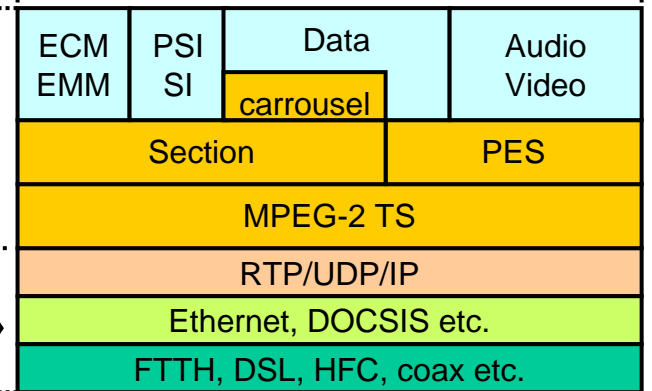
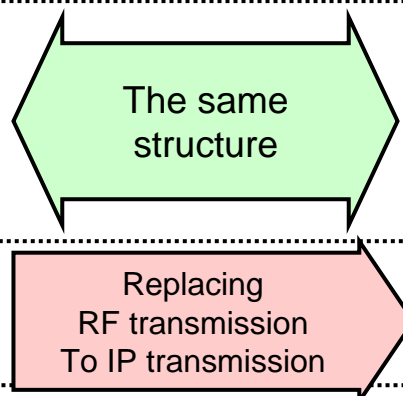
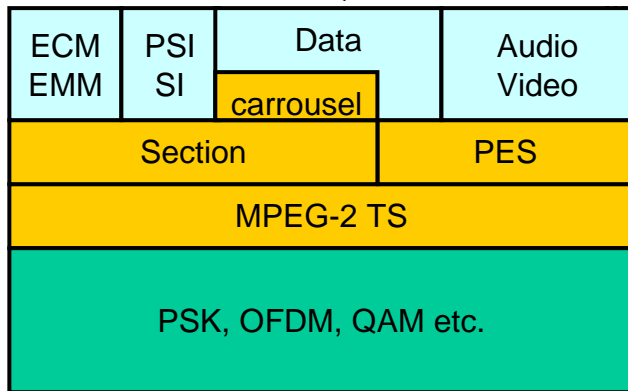
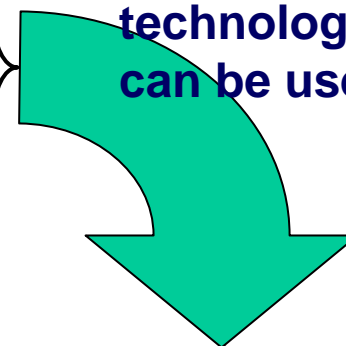


- Ensuring the high level **similarity** between original and re-transmitted signals.  
->Impact on **protocol stack, coding, and API etc.**
- Ensuring protection of the **end-user privacy** (“**Anonymous reception**”)  
->Impact on **channel switching** mechanism
- Controlling the **area of distribution.**  
->Impact on **network architecture.**
- Ensuring the same level quality enjoyed in the conventional broadcasting.

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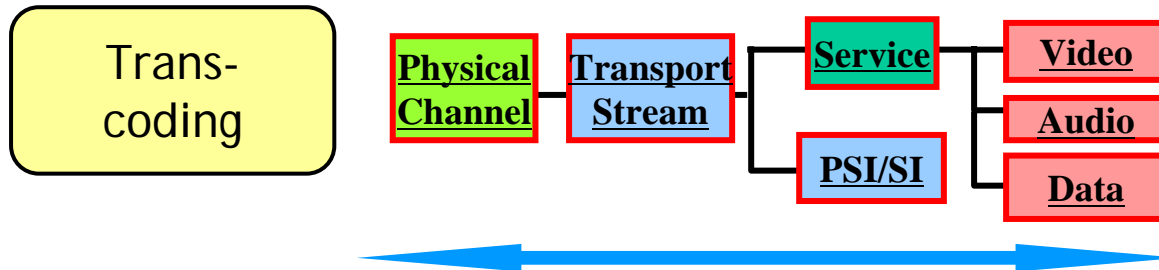
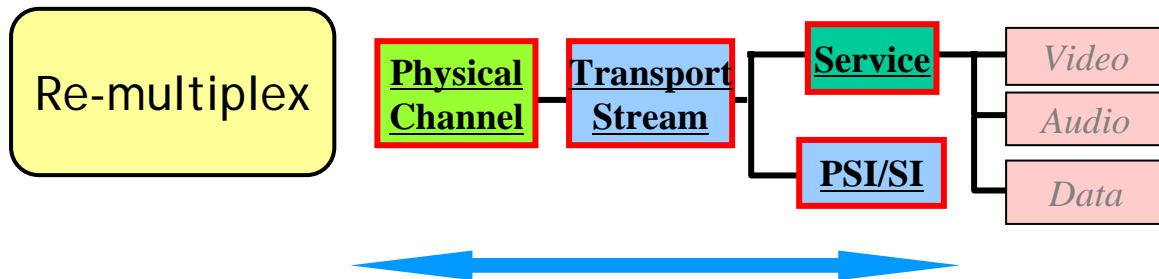
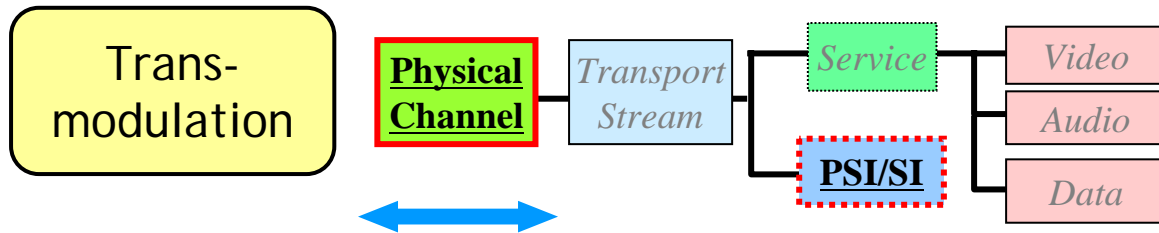
The broadcasters demands to use these technologies as long as can be used in IPTV.



The protocol stack of broadcasting (e.g. ISDB-S/T)

The protocol stack of IPTV

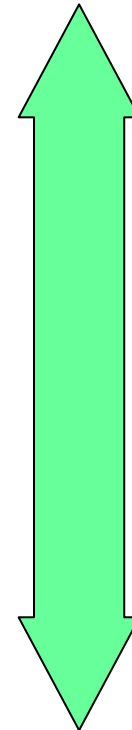
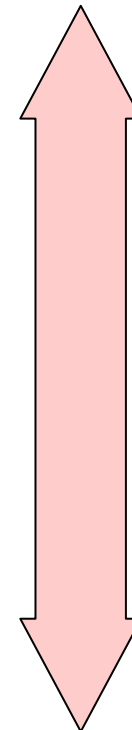
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Similarity Efficiency

Easy

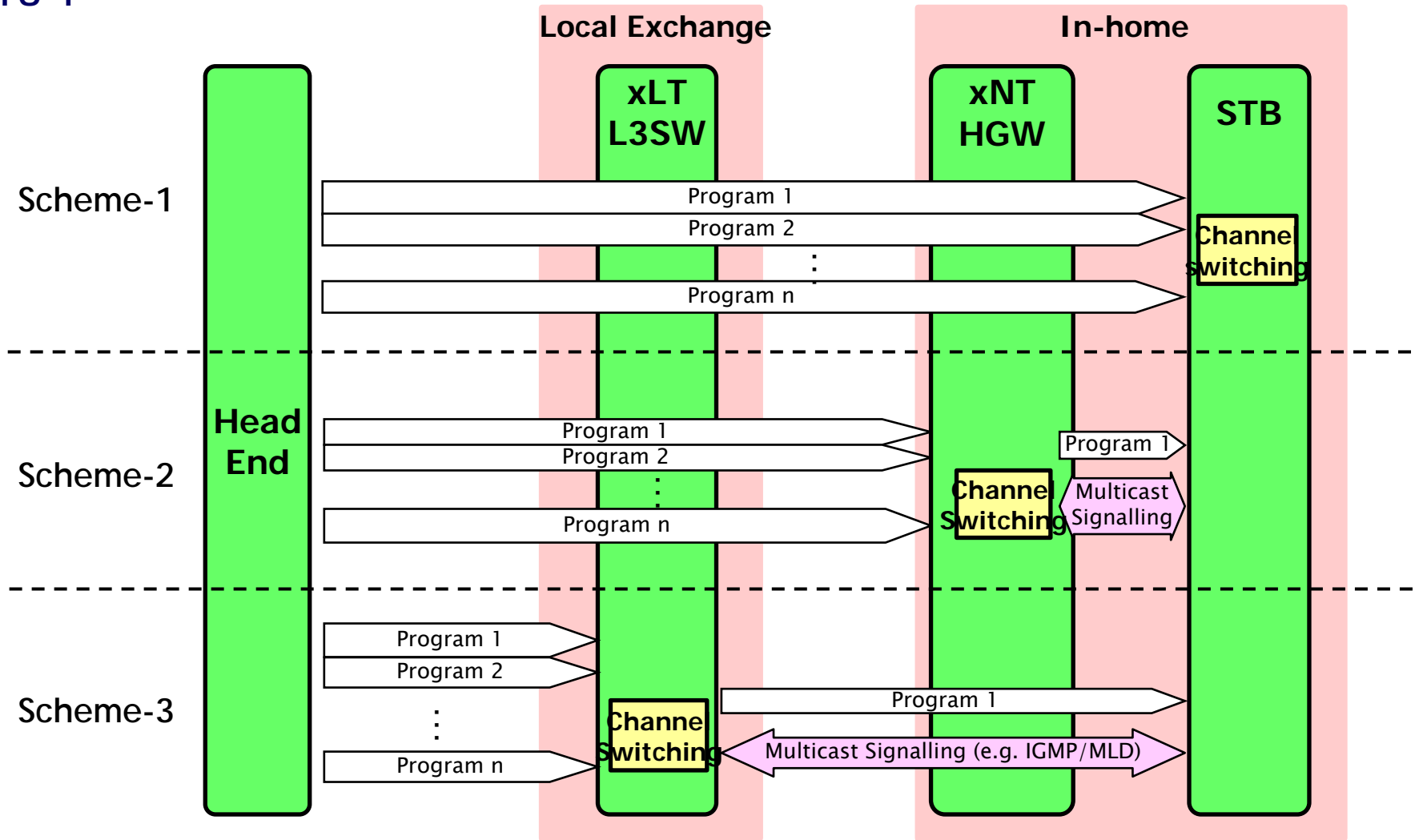
Less Efficient

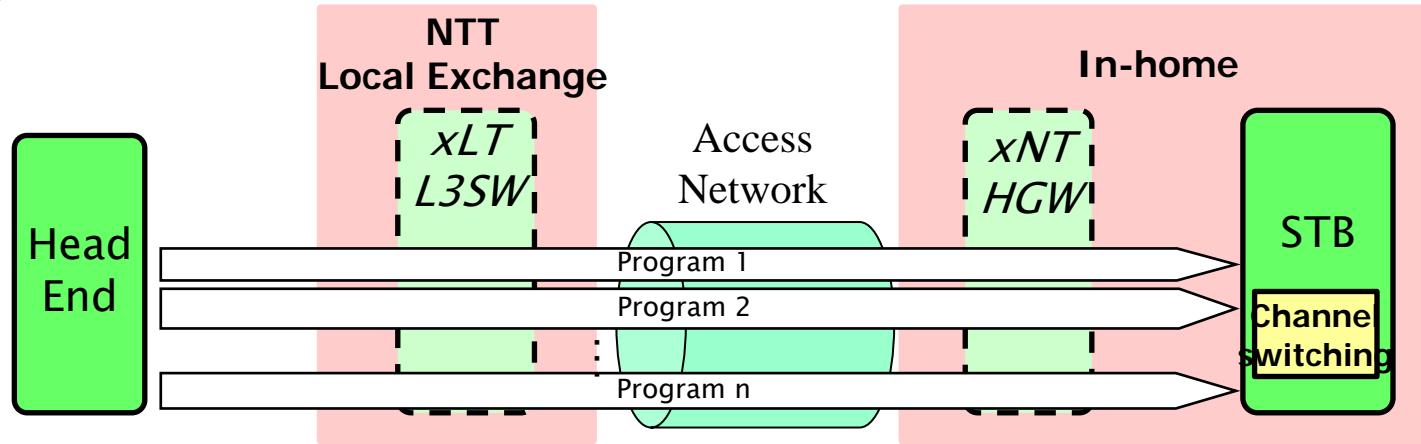


Hard

More Efficient







Typical bandwidth of terrestrial channel : 23 Mbps/ch

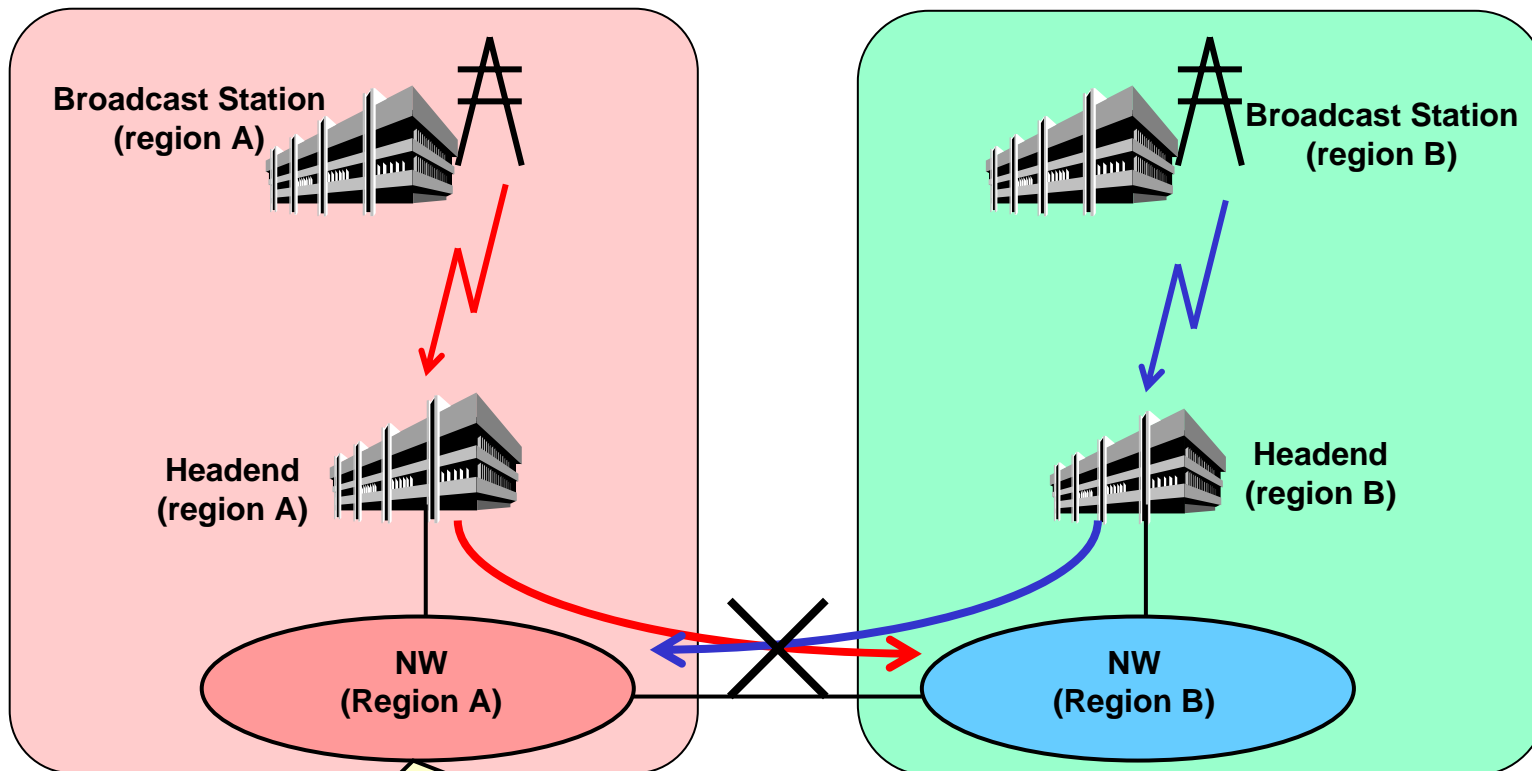
Number of channel : < 10 CH

⇒ Total required bandwidth :  $23 \text{ Mbps/ch} * 10\text{ch}$   
 $= 230 \text{ Mbps} < 1\text{Gbps (GE-PON)}$

Optical Access network has a capability to deliver all terrestrial programs simultaneously.

- o Main reasons for area control are;
  - Broadcast license is given on regional basis, not nation wide. (particularly terrestrial)
  - Right holder demands to do so.

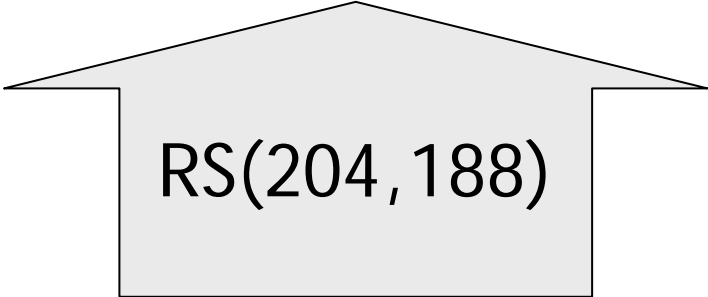
# Area Control



Considerations;  
Routing control, network structure etc,

BER= $10^{-11}$

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RS(204, 188)

BER= $10^{-4}$

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Various FEC technologies  
(e.g. Trellis, Viterbi)

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- o Quality issues (particularly data loss) specific to IP network.
  - Packet basis loss
  - Burst packet loss consideration
  
- o ITU-T recommendations for QoS;
  - ITU-T Rec. Y.1541
  - ITU-T Rec. J.241

Further consideration is necessary.



# The history of standardization



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## Activity

2004

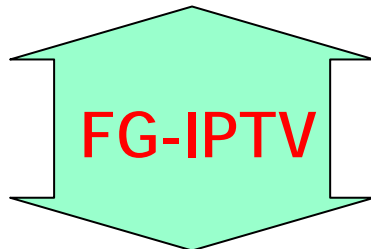
- JCTEA: Japan Cable Television Engineering Association  
Potential IPTV players start considering the possibility of IPTV.  
This result was published as a technical report JCTEA TR005 (Japanese only).

2005

- Japanese domestic committee for ITU-T  
Under the leadership of MIC (Japanese Government), IPTV has been actively discussed. The results are reflected in some ITU-T recommendations.

2006

- IPTV meeting (ITU-T)  
Organizing FG-IPTV was agreed.





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# Conclusion



- o There are two approach, creation/emulation.
  - Obvious demand for emulation approach.
  
- o The requirements from broadcaster is important for emulation approach.
  - Ensuring similarity with conventional broadcasting
  - Protecting end-user's privacy (anonymous reception)
  - Area control
  - Quality.
  
- o The standardization activity is ongoing from 2004.