Cable IP Broadcasting in Japan

ITU-T SG9 Workshop

Future Integrated Broadband Cable Networks

Wuhan, China

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Japan Cable Laboratories

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Brief overview of Japanese Cable Television industry

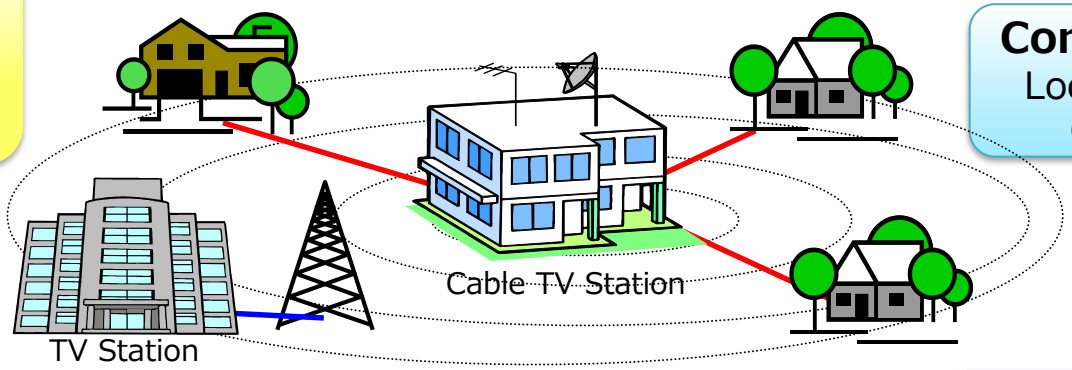
Japanese Cable Television

- The first Japanese cable television station began operation in 1955, two years after Japan Broadcasting Corporation (NHK) started television broadcasting, to retransmit NHK programs to a spring resort 150 kilometers north of Tokyo.
- As of March 2018, cable television reaches 52.6% of Japanese households, with 31.2 million subscribers (households).

Retransmission
Terrestrial TV and Broadcasting Satellite (BS)

Cable Television Channels
News, sports, movies, etc

Community Channel
Local programming by Cable TV stations

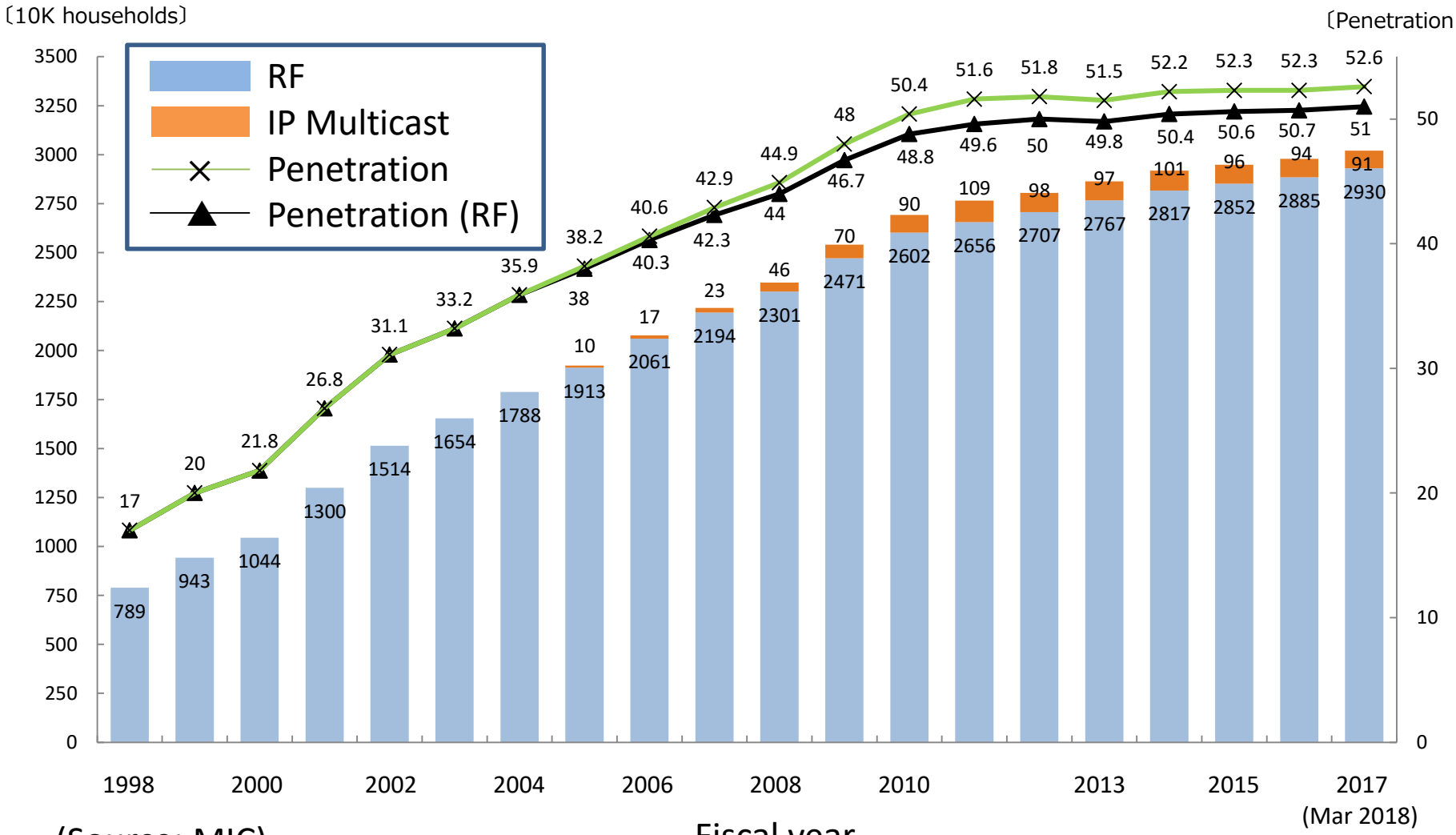


Video On Demand

Internet & IP Telephony

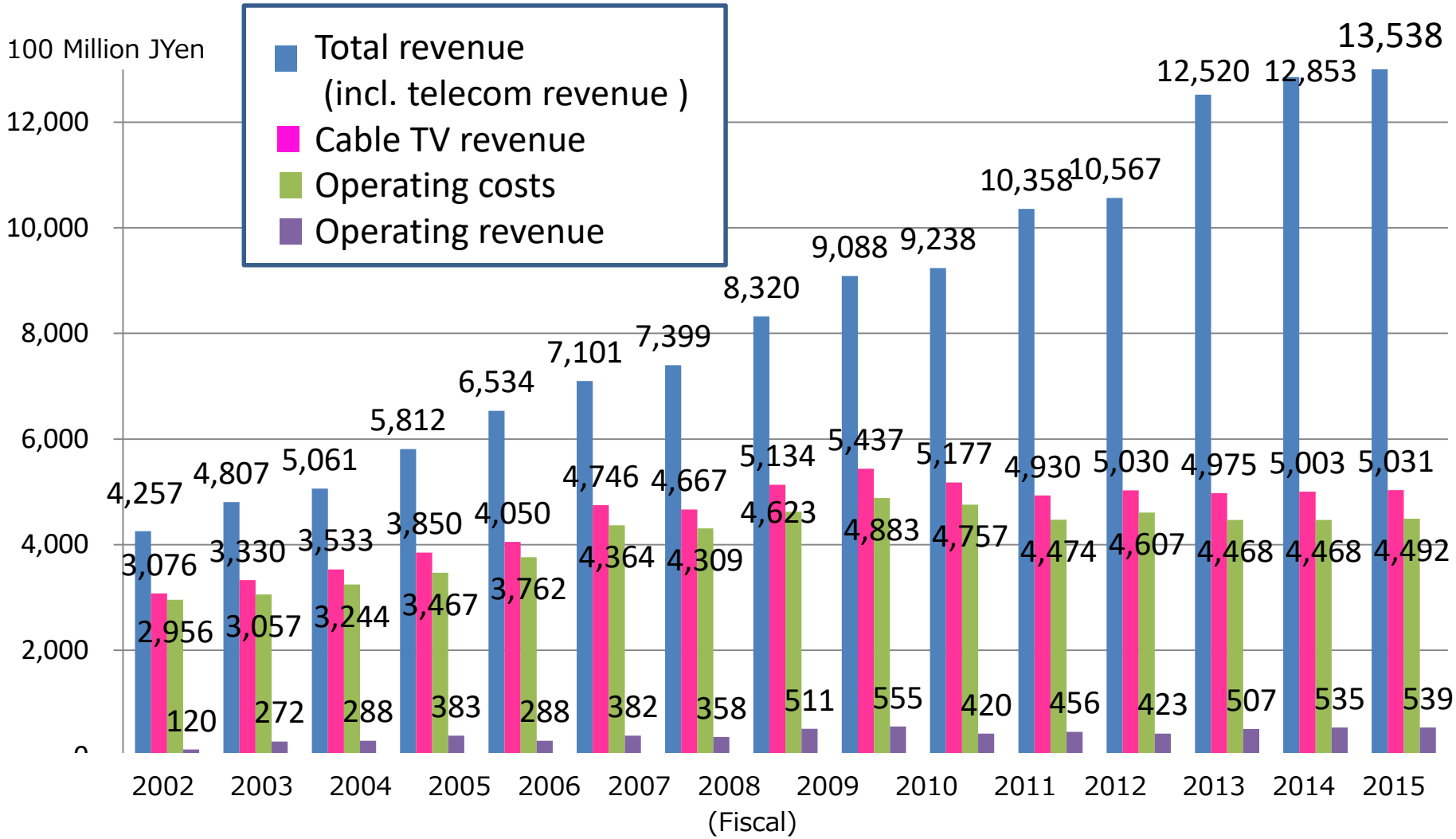
Fiscal year 2017
Number of Commercial Operators: 291
Total Commercial Revenues: 503.1 billion JYen

Yearly Increase of Cable Television Subscribers



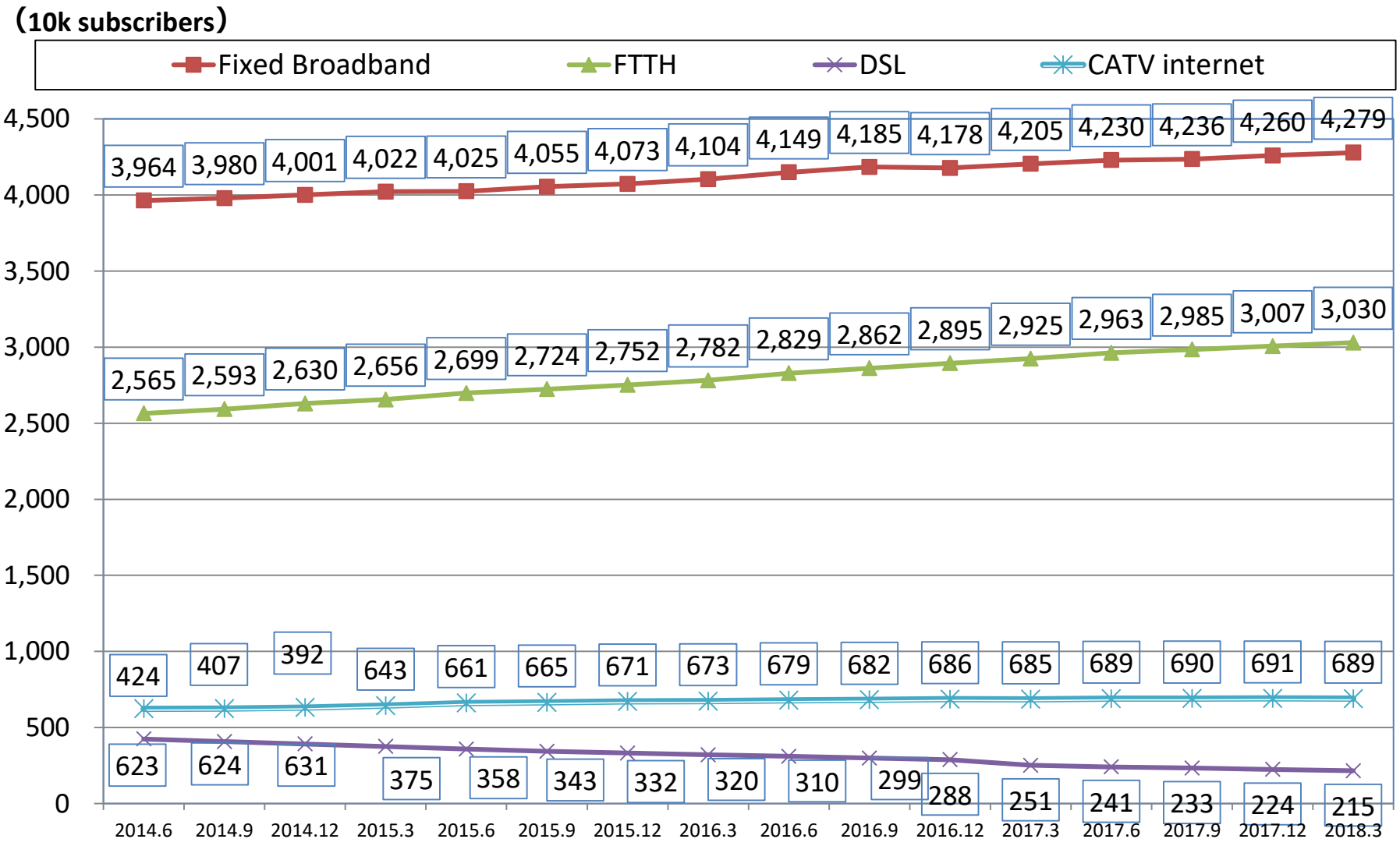
(Source: MIC)

Yearly Increase of Cable Television Revenue



(Source: MIC)

Broadband Services Subscribers



(Source: MIC)

IP Broadcasting

RF to IP Migration

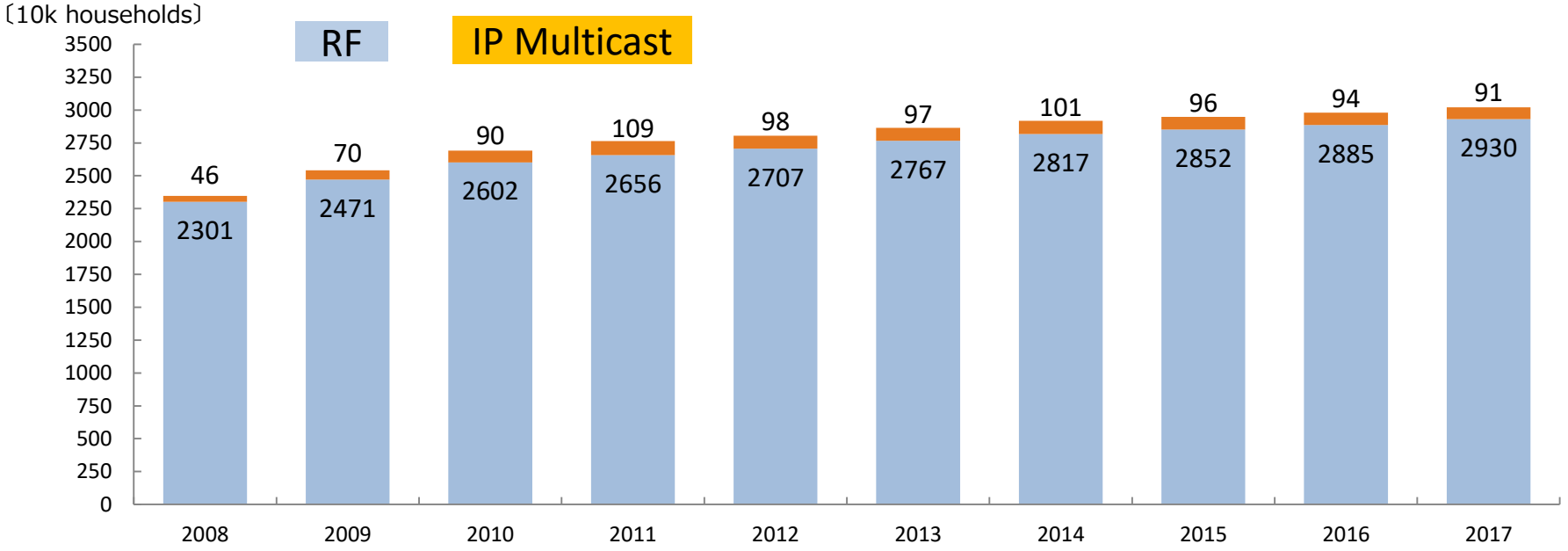
- Japanese Ministry of Internal Affairs and Communications (MIC) issued a report called “Cable Vision 2020+” in May 2017

- One of the steps that cable television operators are asked to take, is the migration to IP.

- RF to IP migration will benefit operators in various ways, including:
  - Convergence to all IP facility (i.e. no parallel operation of RF and IP) will reduce OPEX.
  - New services based on IP can be introduced.

IP Multicast in Japan

IP Multicast services yet to take off in Japan, especially in cable TV.



(Source: MIC Japan 2017)

- Most of the 1 million IP multicast subscribers above actually belong to Telco (NTT and KDDI).
- Currently only a few cable operators provide IP multicast
- IP retransmission of 4K/8K satellite services may change this situation

IP Broadcasting vs. Internet TV

In Japan, ***IP Broadcasting*** and ***Internet TV*** is not the same...

	IP Broadcasting	Internet TV
Quality	Video and audio quality equivalent to ***RF Broadcasting,*** must conform to **MIC technical standards**	Video and audio quality subject to network conditions such as congestion
Network	Transmitted over quality managed IP network by means of ● Priority control, or ● Fixed bandwidth assignment	Transmitted over open internet (best effort network)
Unicast/ Multicast	Multicast	Unicast in most cases

MIC Technical Standards for IP Broadcasting

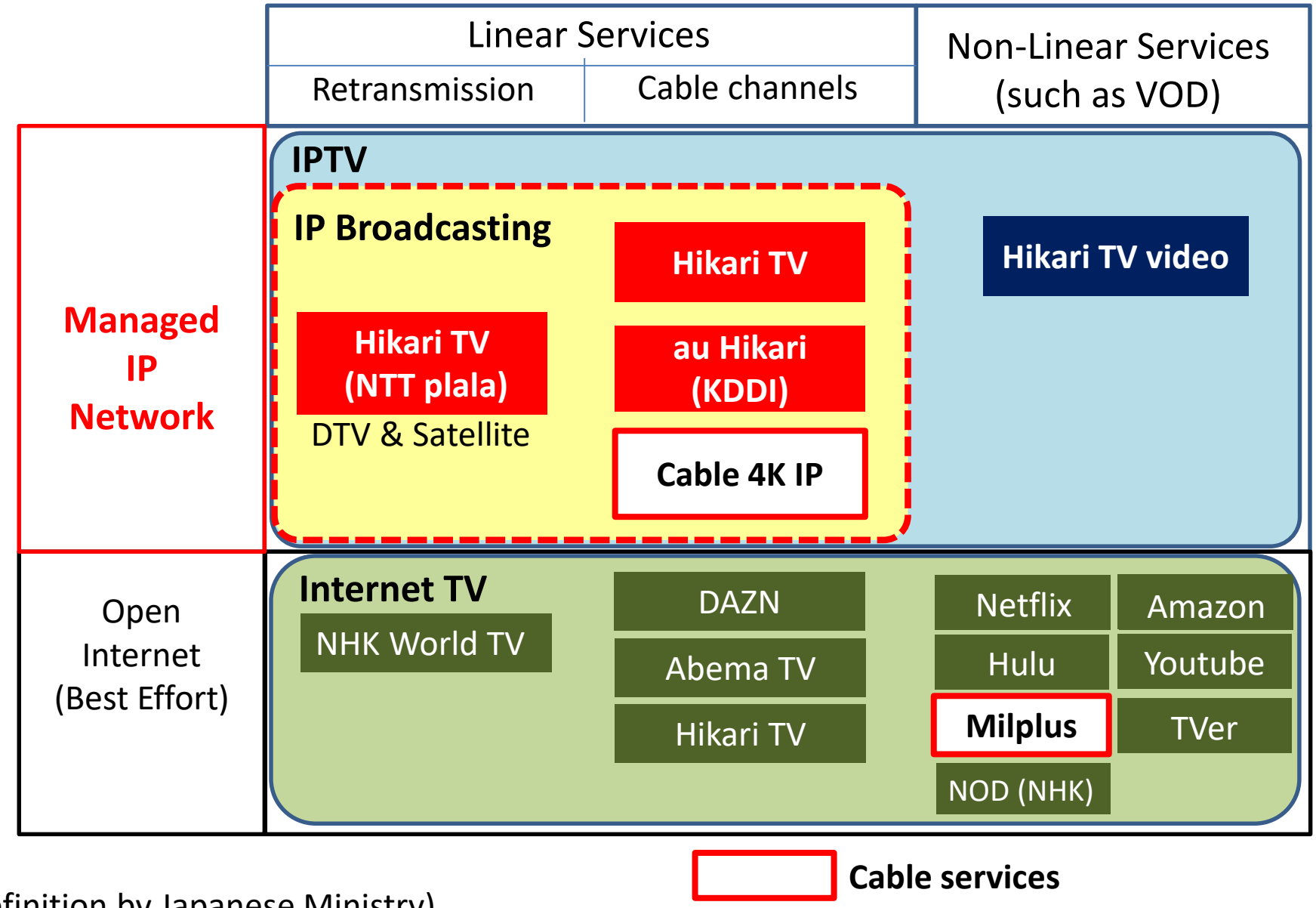
- To achieve signal quality equivalent to RF Broadcasting, MIC Broadcasting System Committee has defined the following Technical Standards for IP Broadcasting

項目	内容	値
Overall	IPLR (IP packet Loss Ratio)※1	Less than 1×10^{-7}
Network Performance	IPTD (IP packet Transfer Delay)	Less than 1,000ms
	Jitter/IPDV (IP packet Delay Variation)	Less than 100ms

※1 With Forward Error Correction

- IP Packer Loss Ratio (IPLR) must be less than 10^{-7} after the use of AL-FEC (Application Layer-Forward Error Correction).
- Delay due to encoding is not included.
- Jitter is based on IPDV (IP packet Delay Variation) as defined in Appendix II of ITU-T Y.1541: Network performance objectives for IP-based services (12/2011)

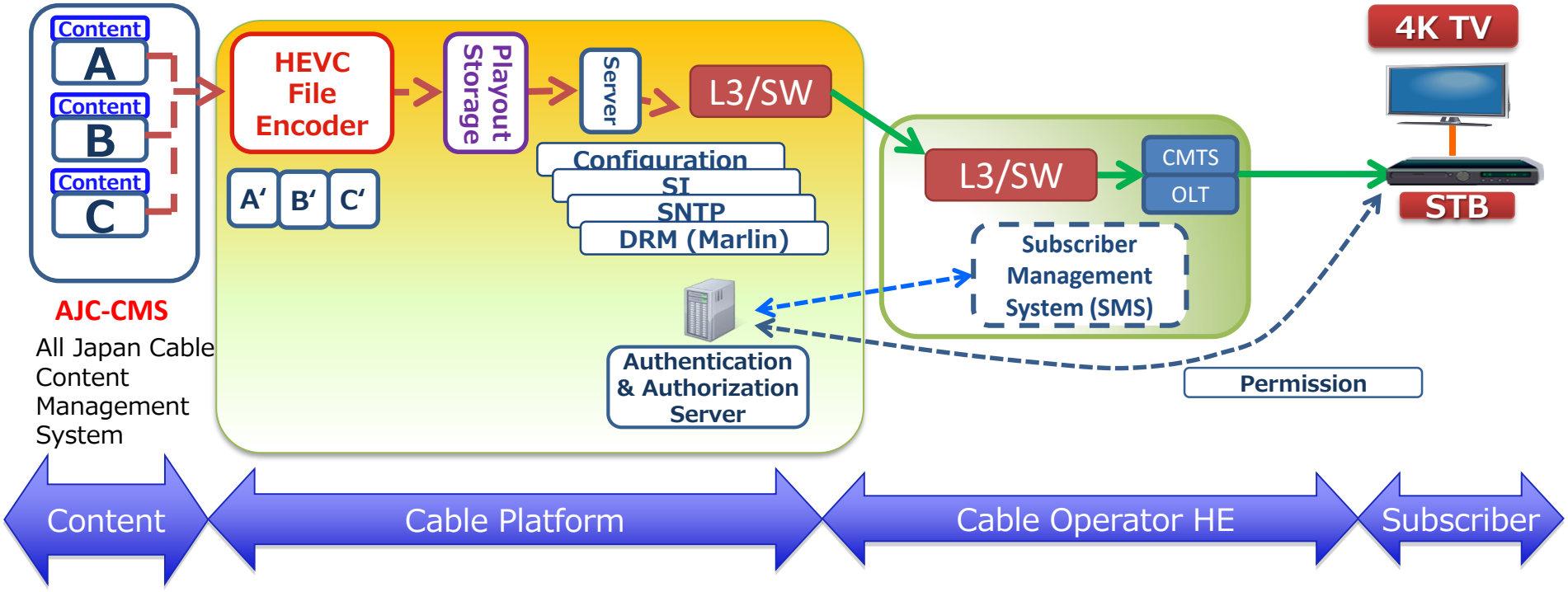
Classification of Video Services over IP



(Definition by Japanese Ministry)

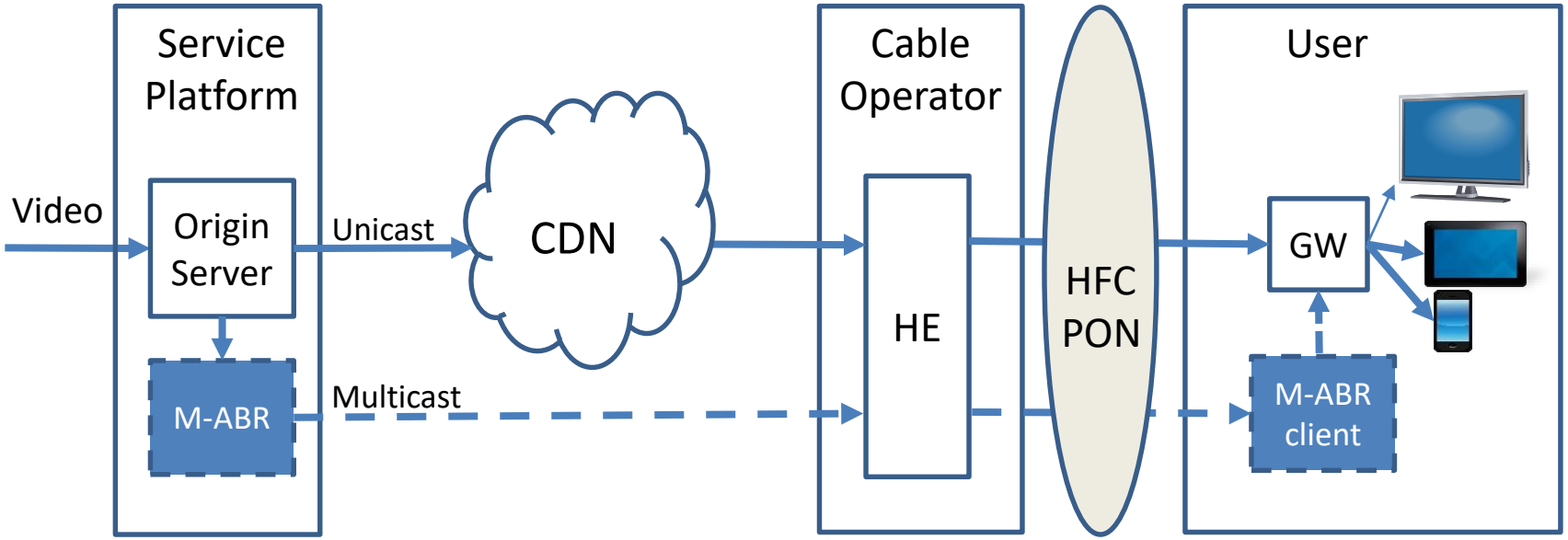
IP Broadcasting for Cable TV

- For cable television operators, IP Broadcasting is considered to be replacement for the current RF broadcasting, as the cable infrastructure migrates from RF to IP.
- Currently, IP version of Cable 4K is in service.
- Retransmission of terrestrial and satellite television channels including 4K/8K will be coming in the near future.

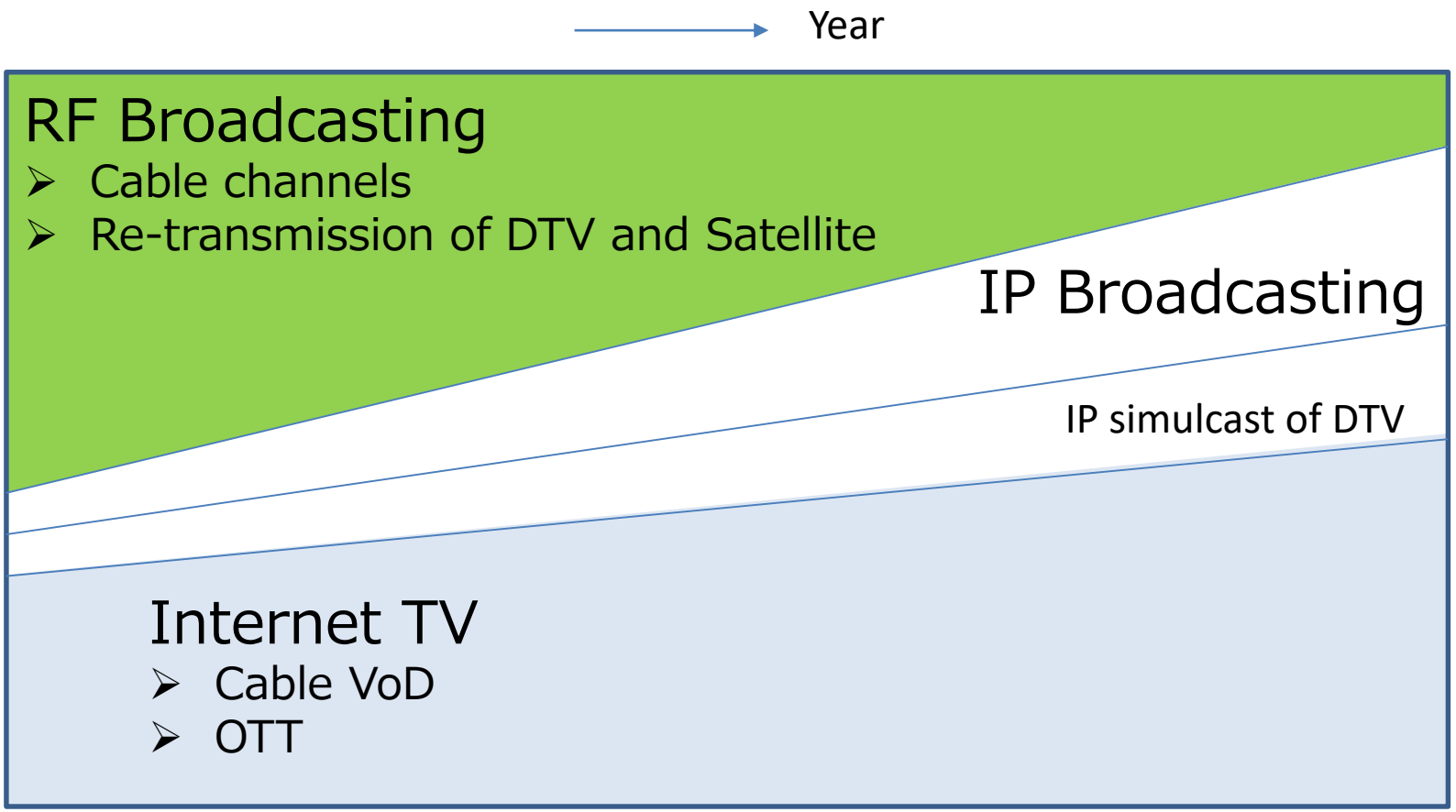


IP simulcast of DTV planned for late 2019

- Japanese digital terrestrial TV (DTV) stations have plans to start IP simulcasts on their own as early as 2019 – 2020.
- This will have some negative impacts on cable operators business – increase of cable operators' IP traffic
- Two ways to reduce this type of traffic
  - Use of CDN, which can reduce traffic on the transit network
  - Use of M-ABR (Multicast-assisted Adaptive Bit Rate), which can reduce traffic on both transit and access networks but requires a specialized device at both ends.



Cable Service Migration from RF to IP



- RF broadcasting will migrate to IP
- On demand video will be more popular choice for consumers than linear TV, giving opportunity for Internet TV to grow
- Cable television should incorporate Internet TV to survive

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Thank you very much