

Satellite Markets and Technology Trends 2017

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Outline

- What is Broadcasting?
- Information Engineering
 - Physical layer
 - Delivery
- Content/Media
 - What is it?
 - Value chain
 - Platforms
 - Industry
- Classification
- Services
- Summary

What is Broadcasting ?

- RR 1.38 broadcasting service: A radiocommunication service in which the transmissions are intended for direct reception by the general public. This service may include sound transmissions, television transmissions or other types of transmission.
 - Radio Regulations (RR) of ITU

Information Engineering

- Channel capacity
- Shannon limit
- Sharing medium - Media Access Control - MAC
- TV – TDM
- **DTH – FDM**
- Mobile – CDM
- Fibre – WDM
- Air interface - LDM – Layered Division Multiplexing
- Air interface - WiB - a new system concept for digital terrestrial television (DTT) - wideband reuse-1

$$C = B \log_2 \left(1 + \frac{S}{N} \right)$$

Casting – Information delivery

- **Unicast** is the term used to describe communication where a piece of information is sent from one point to another point. In this case there is just one sender, and one receiver.
- **Multicast** is the term used to describe communication where a piece of information is sent from one point to a set of other points.
- **Broadcast** is the term used to describe communication where a piece of information is sent from one point to all other points. In this case there is just one sender, but the information is sent to all receivers.

Network Architecture

- internet - network of networks - enables P2P Communication (The Internet- public internet)
- Mobile/Cellular are networks - enables P2P Communication via BS (Base Station)
- Both above networks are not designed for broadcasting
- Mobile/Cellular networks - for unicasting
- Internet – for unicasting and multicasting
- Broadcasting NWs has been designed to broadcast – Radio, Television and Data Broadcasting (NWs are broadcast networks by design)
 - Generally, Architecture is high tower high power (with small Tx)

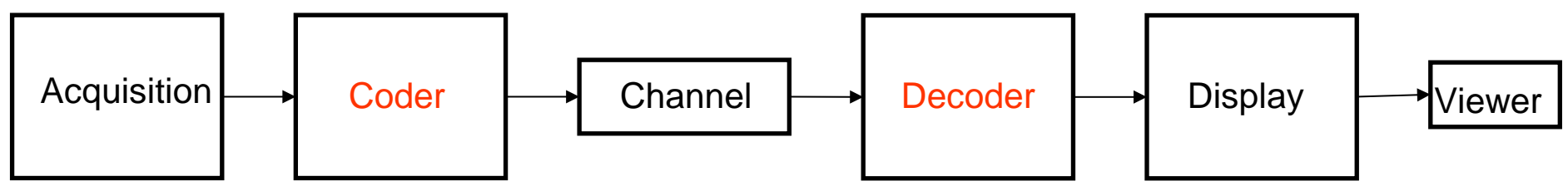
Content (Media)

- Radio
- Television
- New Media – Social media, VR, AR,etc.
- Text
- Voice
- Sound
- Video
- Film
-



Content (Media) Value Chain - end2end

- Complete chain from capture to receiver need to be digital to realise the full advantage of digital



- Visuals and audio are acquired using digital cameras
- Source and Channel encoding are done on video and audio data
- Digital receiver receives digitally processed signals

How to deliver and access media/content ?

- Over-the-air (OTA) – most efficient
- Over-the-cable (OTC) – most secured
- Over-the-broadband or Over-the-top (OTT) – growing form of delivery

- How to access content?
 - Free-to-access
 - Pay-to-access

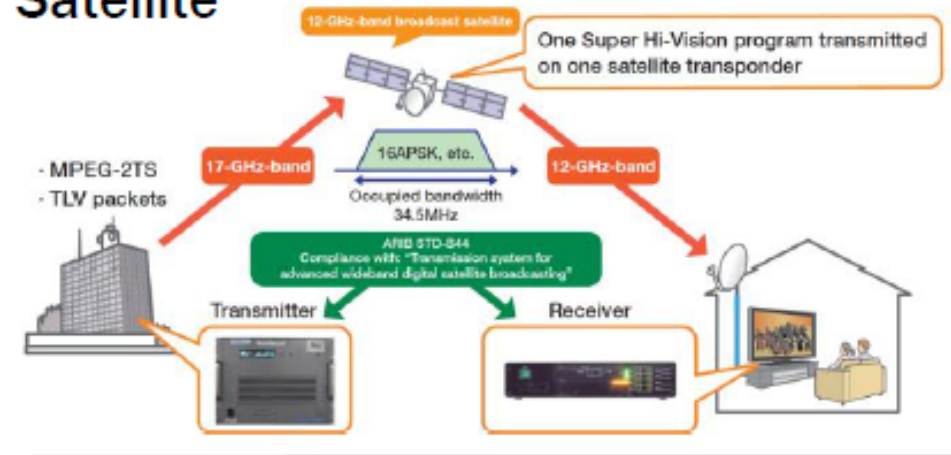
Content (Media) Delivery Platforms

- Terrestrial
- **Satellite**
- Cable
- IP/Broadband

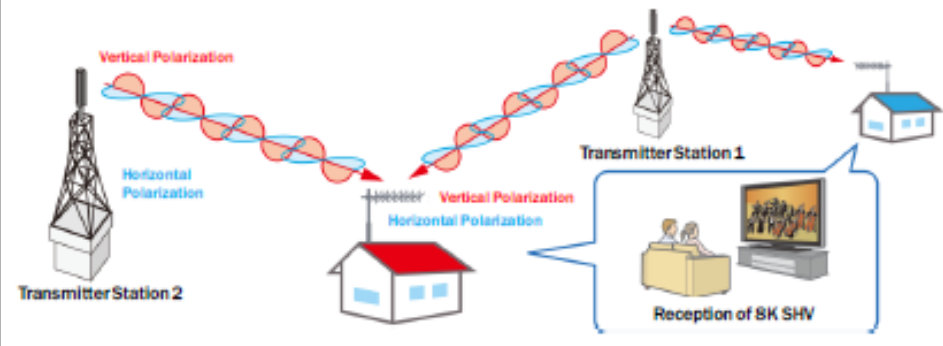
Platforms - Quality Assured

Terrestrial, Cable, Satellite and now IP [Courtesy of NHK]

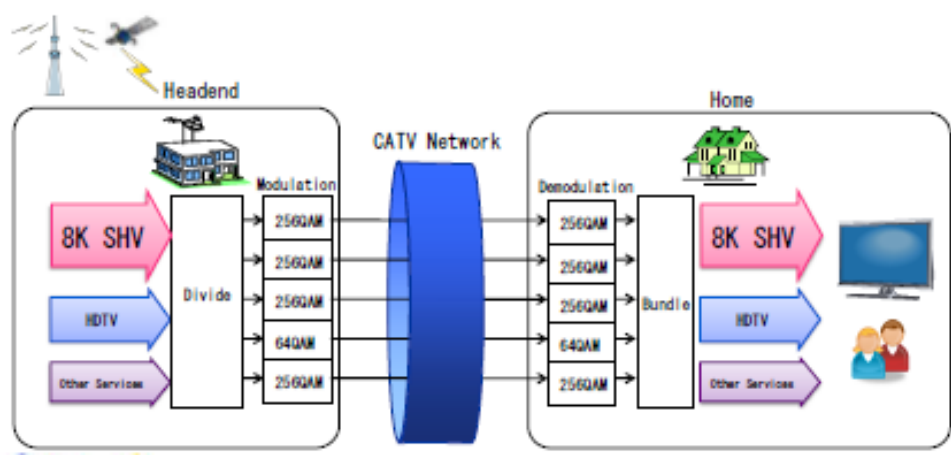
Satellite



Terrestrial



CATV



IP Transmission



Media (Content) Industry

- Demographics – mixed – young and aging nations
- Geography – borderless – satellite and OTT
- Economic development
- Disposable income
- Growth
- Innovation
- NGTV - UHDTV (UHDTV-1 and UHDTV-2)
- NG Transmission standard? ISDB-S3, DTT 3.0

Classification

	Video service with managed QoS	Video service with unmanaged QoS
(Semi interactive) traditional broadcast networks	<p>Traditional 1</p>	
(Interactive) integrated networks	<p>Wired IBB 2</p>	OTT
	<p>Wireless IBB 3</p>	OTT - wireless
(Fully interactive) duplex networks	<p>4</p>	
	<p>7</p>	
	<p>5</p>	Internet TV
	<p>6</p>	OTT Wireless OTT

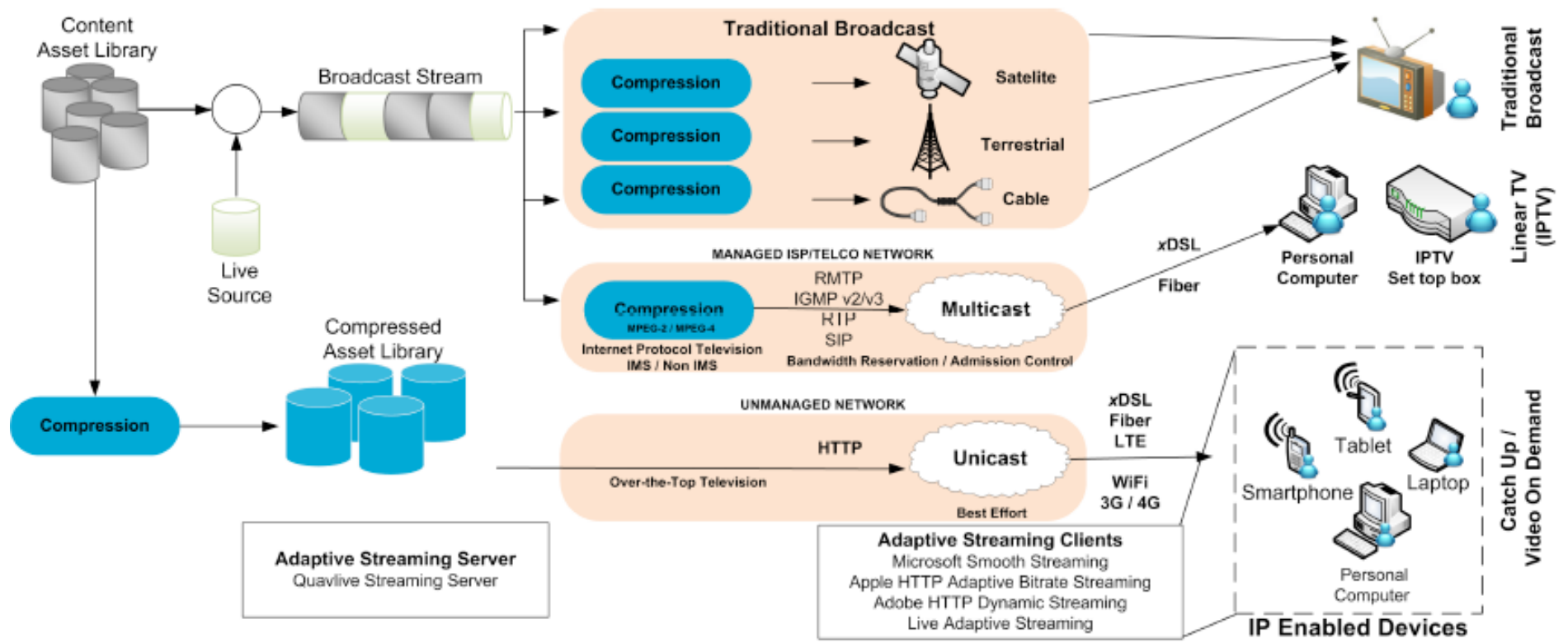
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DTV Standards

- **ATSC - Advanced Television System Committee in USA**
 - Currently in USA and Canada
 - Mainly Terrestrial standard, extended to other forms such cable
- **ISDB – Integrated Services Digital Broadcasting**
 - Mainly in Japan, Brazil and some other south American countries
 - Extended to forms such as terrestrial, cable and satellite standard
- **DVB – Digital Video Broadcasting**
 - Most of the countries in the world
 - Developed through a consortium known as DVB in Europe
 - Many variants or forms of DTV operations
- **DTMB – Digital Television Broadcasting System - China**

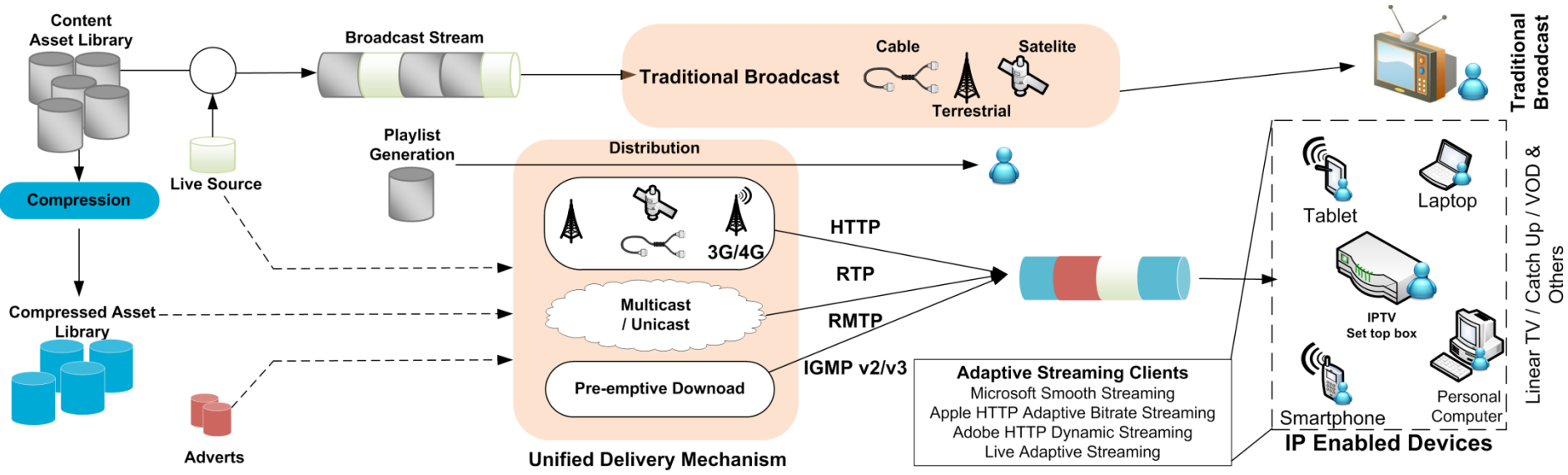
Multimedia delivery techniques

Current multimedia delivery techniques across managed and unmanaged IP networks

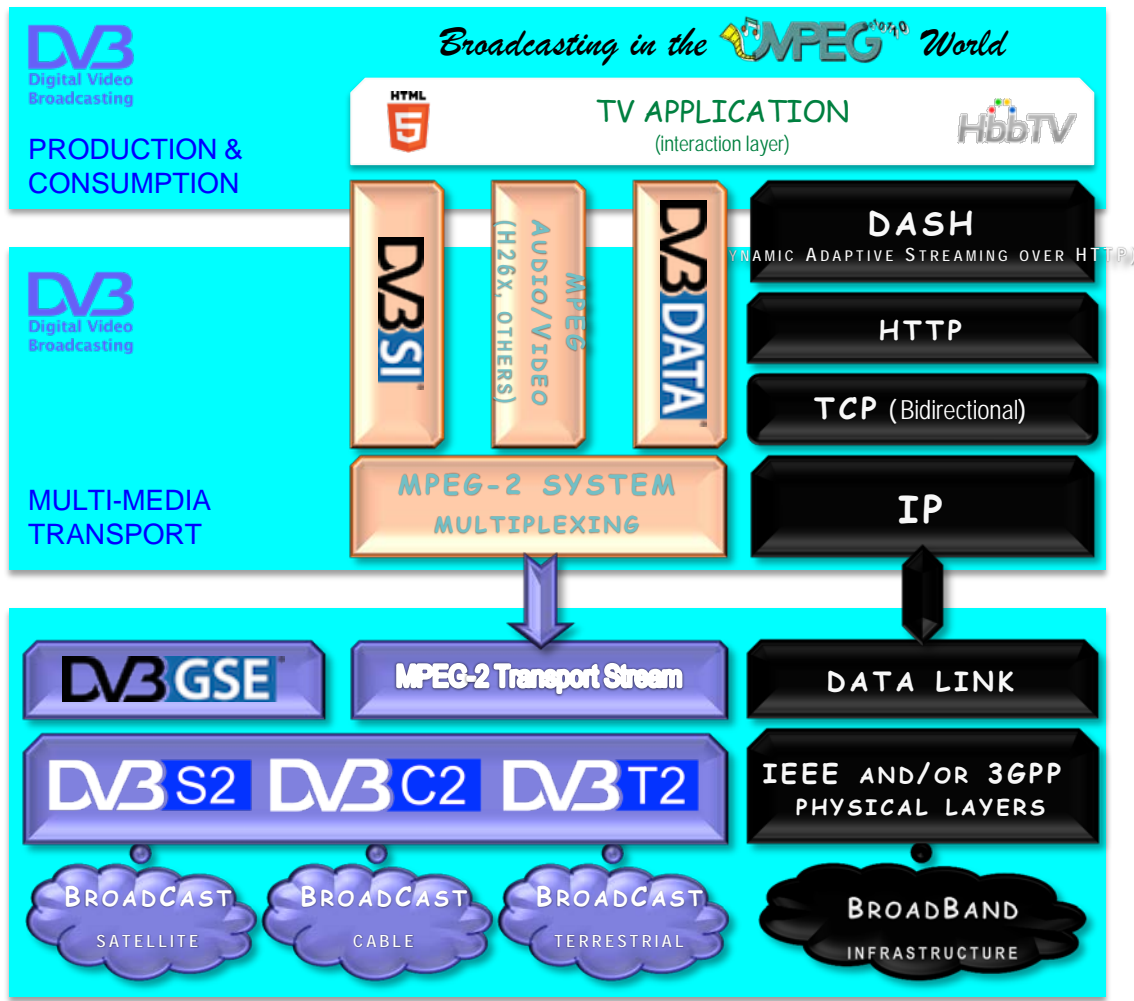


An unified architecture

Unified architecture



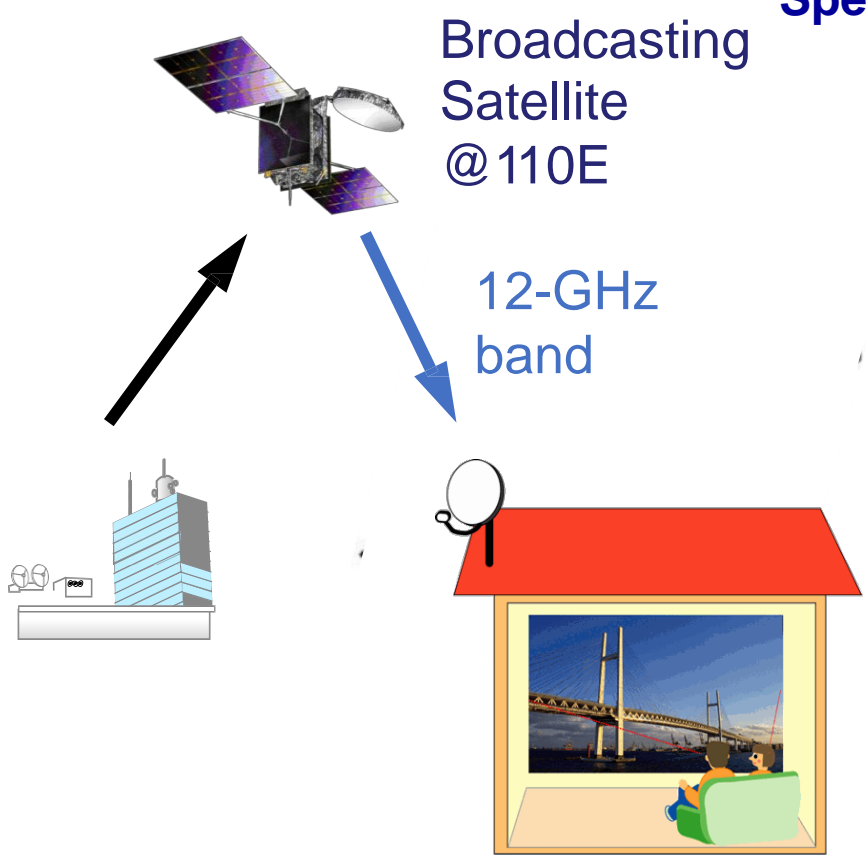
Broadcasting in IP World



Broadcasting in UHD-2 world

Test broadcasting started on Aug. 1st, 2016

Specifications of UHD-2 8K Satellite Broadcasting



Modulation	$\pi/2$ -shift BPSK, QPSK, 8PSK, 16APSK, 32APSK
Frequency	12-GHz band
Bandwidth	34.5 MHz
Compression	Video : HEVC Audio : MPEG-4 AAC
Bit rate	About 100 Mbit/s

[Courtesy of NHK]

UHD-1 and UHD-2



Commencement of 4K/8K broadcasting

- Start date: Dec. 2018
- Operation: BS, CS
- Service channel: 8K/60p 1ch, or 4K/60p 1ch for each broadcaster
- Gamut: WCG (BT. 2020), HDR(HLG) or BT. 709, SDR
- Broadcasters: NHK, 10 BS/CS commercial broadcasters
- Receiver: Consumer 4K/8K TV

Progress on SHV technology

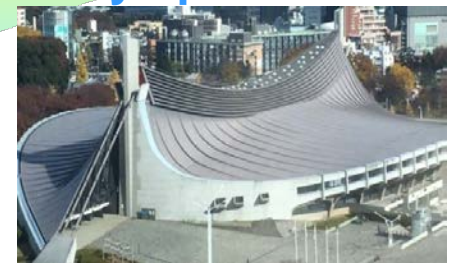


Summer Olympics in Rio de Janeiro

2012
4K cable TV
4K IPTV

2016
4K/8K test broadcasting

2018
4K/8K broadcasting
Winter Olympics in Pyeongchang



2020
Summer Olympics in Tokyo

Summary

- Broadcasting is still the most efficient way to deliver content to masses
- Satellite broadcast play a vital role in the media delivery portfolio
- ISDB-S3 has been standardised as a technology for UHD-2
- Services are continually evolving DTH markets especially for UHD-1

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