
High-realistic viewing and 4K linear TV

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OKI Corporate overview

OKI at a Glance

136th year since manufacturing the first telephone in Japan.
Now, OKI is a global company operating in over 100 countries world wide.

(The * mark represents data as of March 31, 2016)

- **Founded in:** 1881 by Kibataro Oki
- **President:** Shinya Kamagami
- **Net sales:** 490.3 billion yen (Ended March 31, 2016)
- **Capital*:** 44.0 billion yen
- **Employees*:** 20,190 (Japan: 12,048 Overseas: 8,142)
- **Number of subsidiaries*:** 89 subsidiaries (Overseas: 44)
- **Business:** Based on its corporate philosophy “enterprising spirit,” OKI provides products, technologies, and solutions of info-telecom systems and

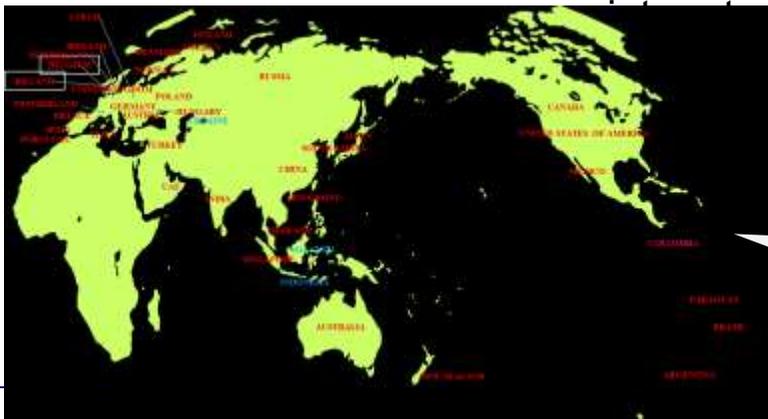


President
Shinya Kamagami



Founder:
Kibataro Oki

... meet the diversified needs of communities worldwide



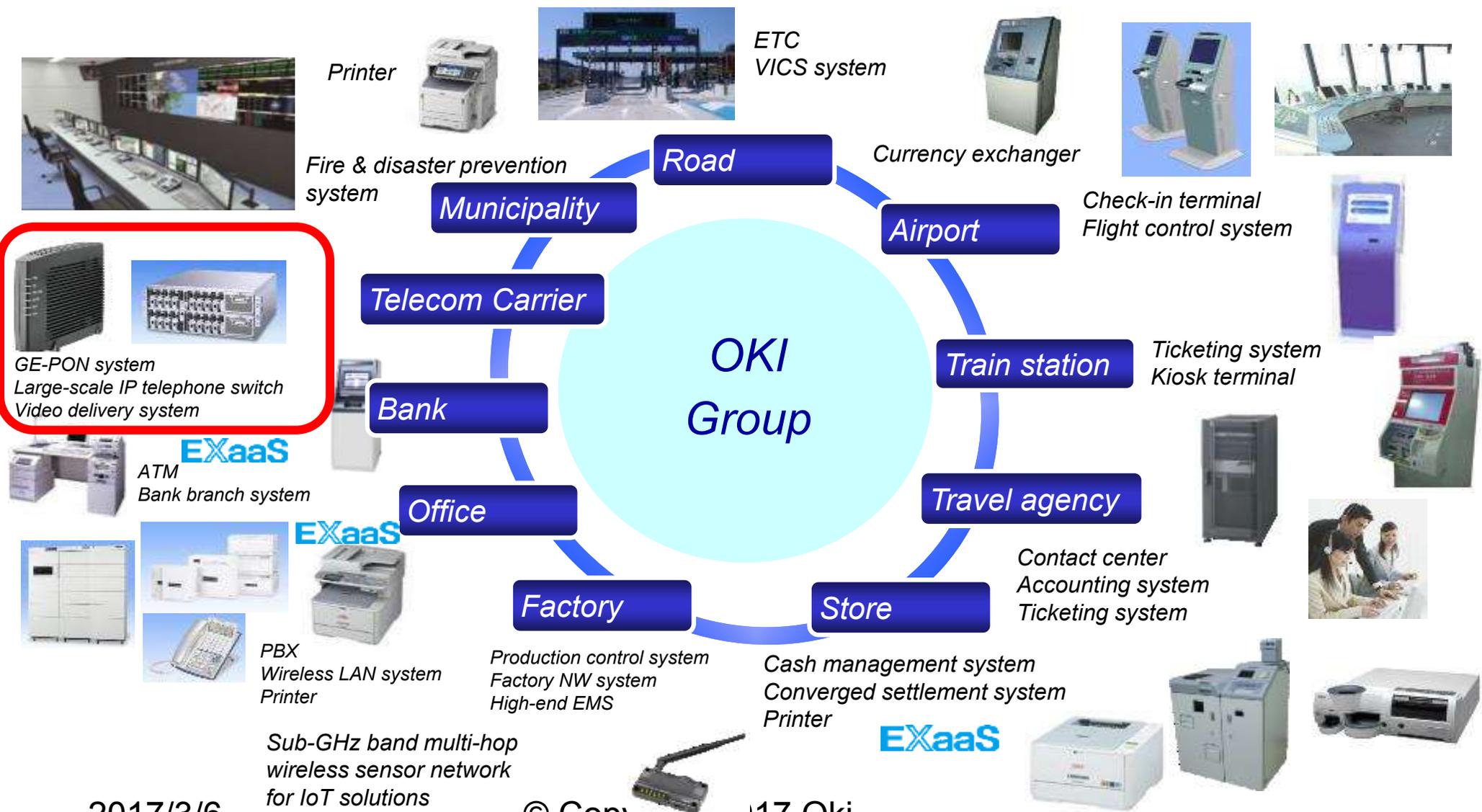
OKI offices: 64 footholds in 38 countries and regions

Rep offices

2016 was



Businesses in OKI Group



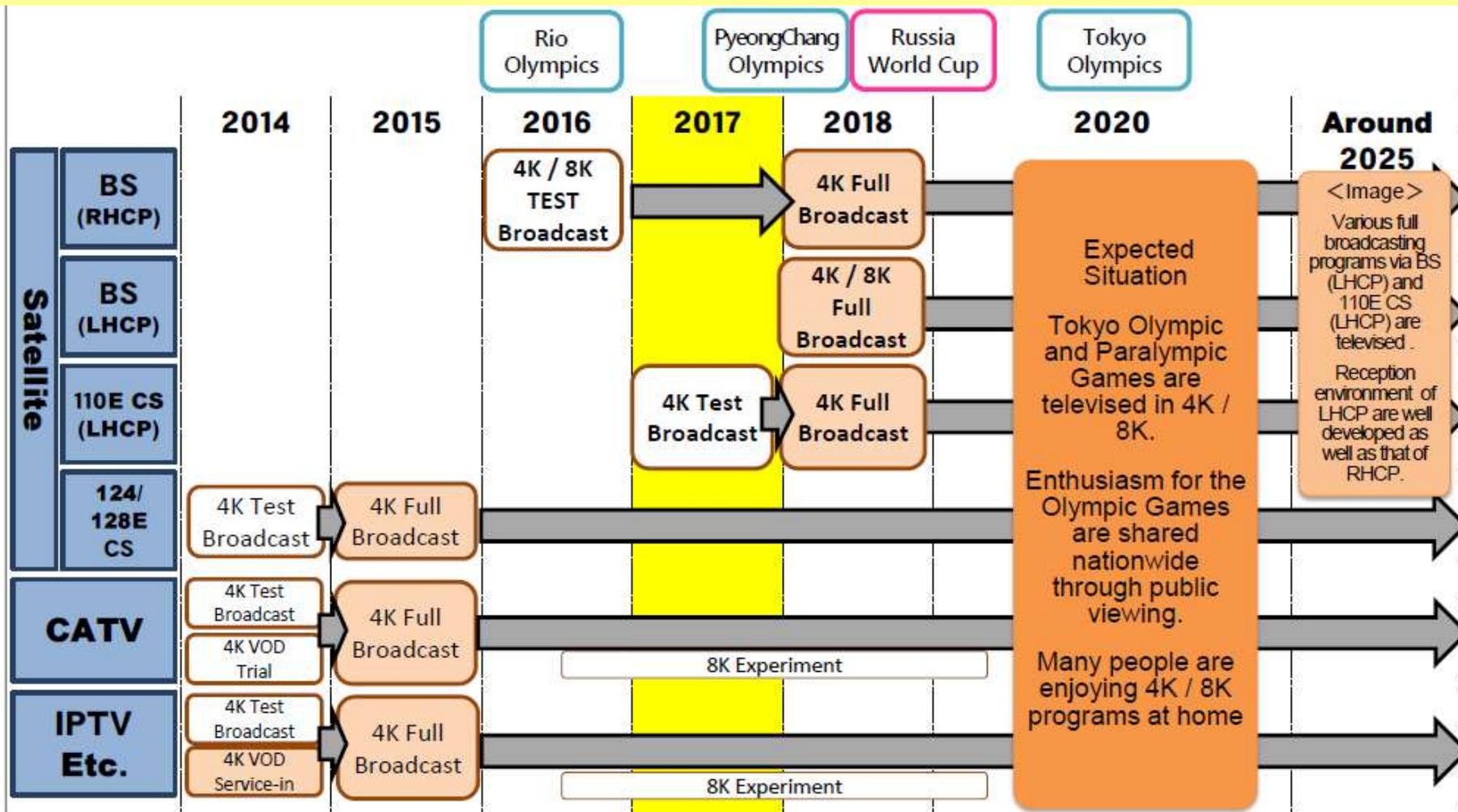
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■ Super high-vision broadcasting (4K / 8K) and public viewing in Japan

New Roadmap for Promotion of 4K and 8K (Published in July 2015)

- The roadmap was formulated in the Study Group on Upgrading of the Broadcasting Services(June, 2013).
- “Follow-up Meeting on 4K and 8K Roadmap“ has been held since February 2014, and how to accelerate implementation of the roadmap has been discussed. The interim report was published in September 2014 and July 2015
- In order to promote the further spread of 4K and 8K, issues will continue to be investigated in the follow-up meetings.

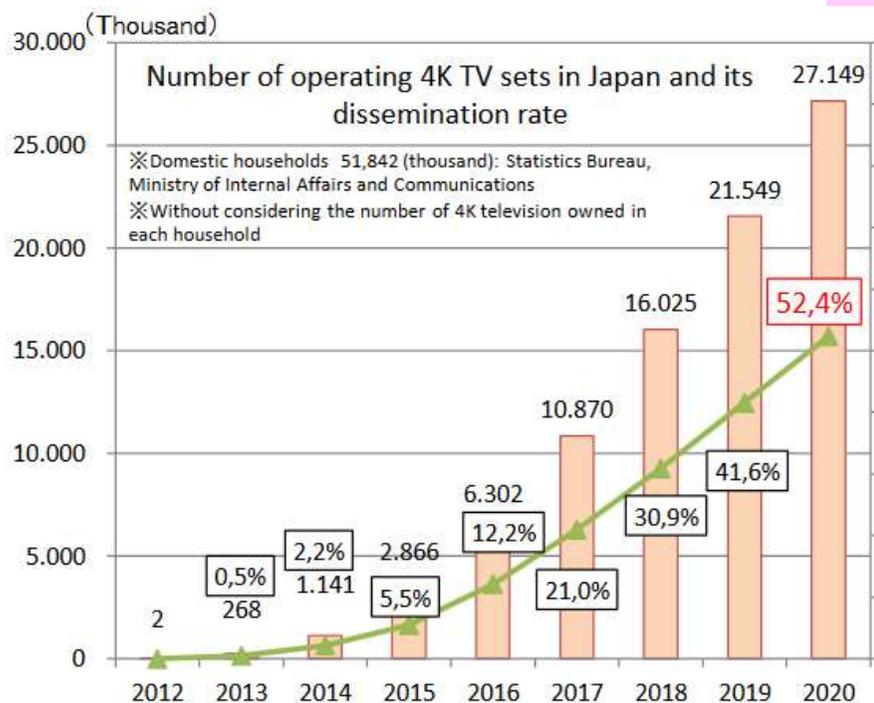


Dissemination Rate of 4K Television (Estimation) and Economic Effects of 4K and 8K

■ Estimation of the dissemination rate of 4K television and economic effects of 4K and 8K as well as embodiment of the roadmap were published in “Interim Report from the Follow-up Meeting on 4K and 8K Roadmap” (September, 2014).

□ The number of 4K TV sets is estimated to be about 27 million in 2020 and its domestic dissemination rate to be about 52%

- Potential domestic market size of 4K and 8K is estimated to be about 4.4 trillion yen (direct effect around 2020).
- Effect on the domestic economy is about 9 trillion yen (direct and indirect effects calculated based on the input-output table).
- Effect on the domestic economy is estimated to be about 36 trillion yen in total from 2013 to 2020.



Source: JEITA “World demand trend of AV and IT devices: Prospect until 2018”
 Data of 2019 to 2020 are estimation data by Mitsubishi Research Institute, Inc. obtained by extrapolating the data until 2018.



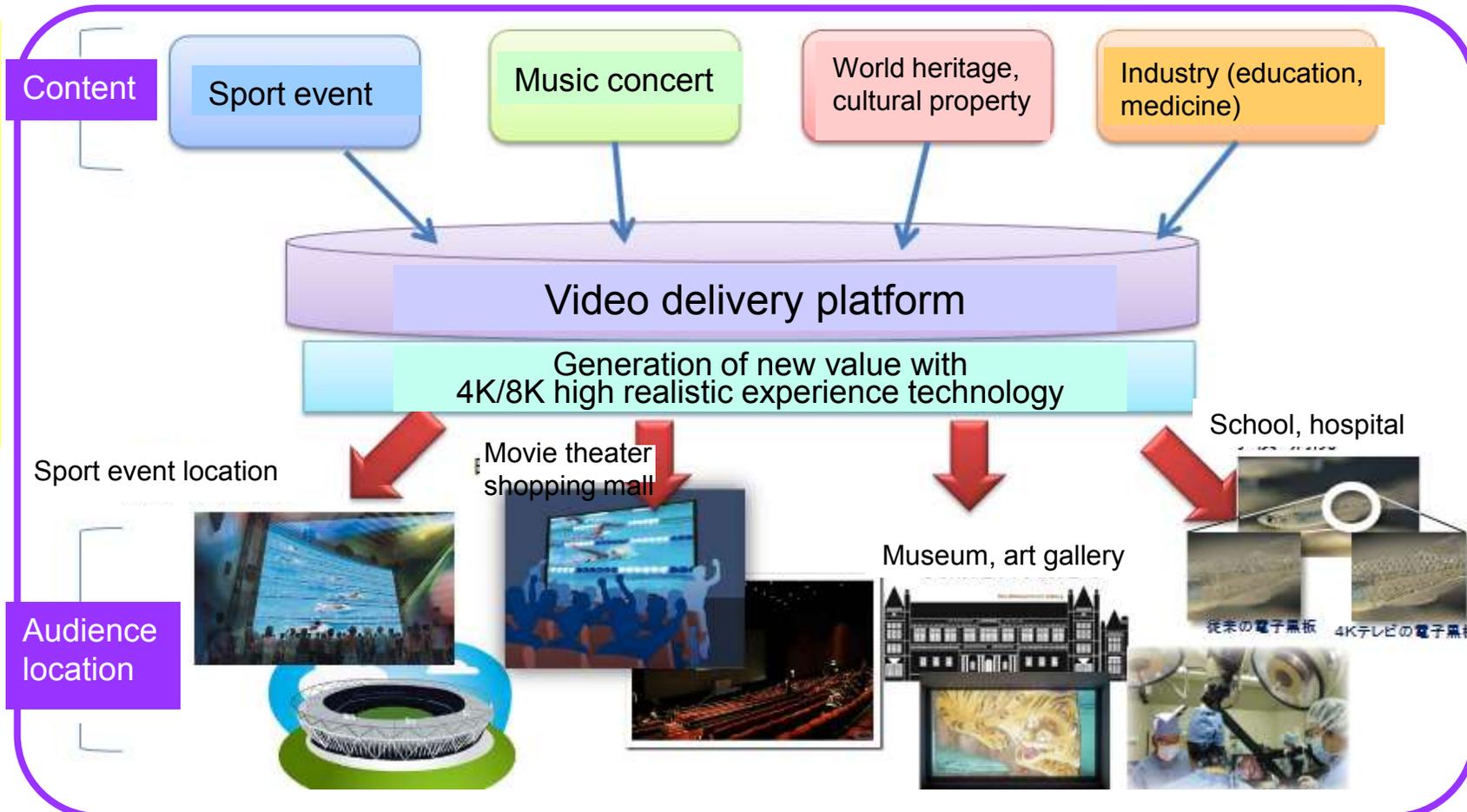
[Estimation by Mitsubishi Research Institute, Inc.]

Vision of High realistic video services

- It is expected that new big market will be generated by 4K/8K digital signage, immersive live experience through new video delivery platform
- New organization for this purpose was established in July, 2016 in Japan.

Desired future image in 2020

Through public viewings nationwide, the impression for the Tokyo Olympic and Paralympic Games is shared nationwide.



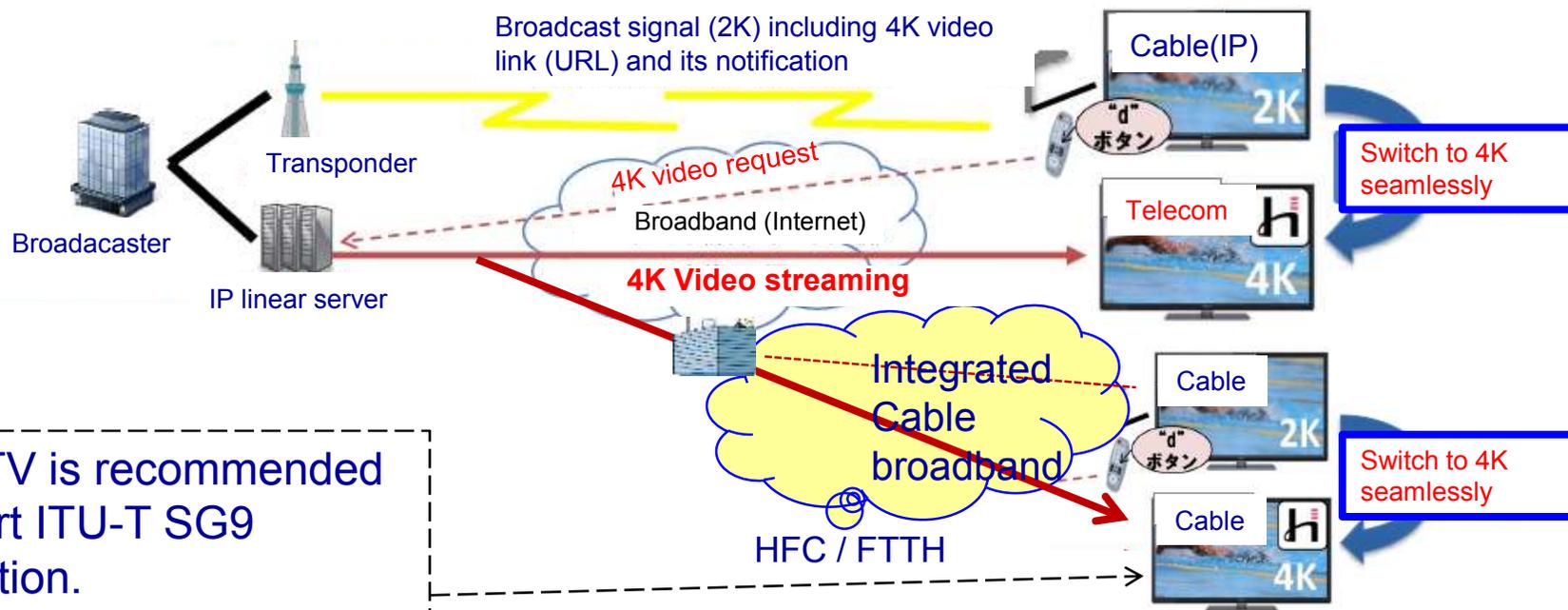
Based on the meeting document for the promotion of ICT to social applications toward 2020 (MIC Japan, 2015.7.27)

■ 4K linear TV over Integrated Broadband Cable Networks

Consideration of 4K IP linear TV services through Hybridcast

- Due to lack of RF bandwidth for Ultra High Definition TV, it is difficult for all broadcasters to start 4K broadcasting services in Japan.
- Task force of 4K content distribution technology promoted by MIC in Japan submitted a report on a 4K IP linear TV service simultaneously delivered with 2K digital terrestrial in April 2017.
- In the report, this 4K IP linear services are provided by using of an IBB technology (Hybridcast) on both telecommunication network and cable network through multicast.

System image for 4K video distribution using Hybrid cast



(*) This TV is recommended to support ITU-T SG9 specification.

Based on the report by MIC Japan, April 2017 (http://www.soumu.go.jp/main_content/000480976.pdf (in Japanese))

■ The related topics

- ITU-T SG16 standardizations toward 8K applications (CATV is one of the targets)

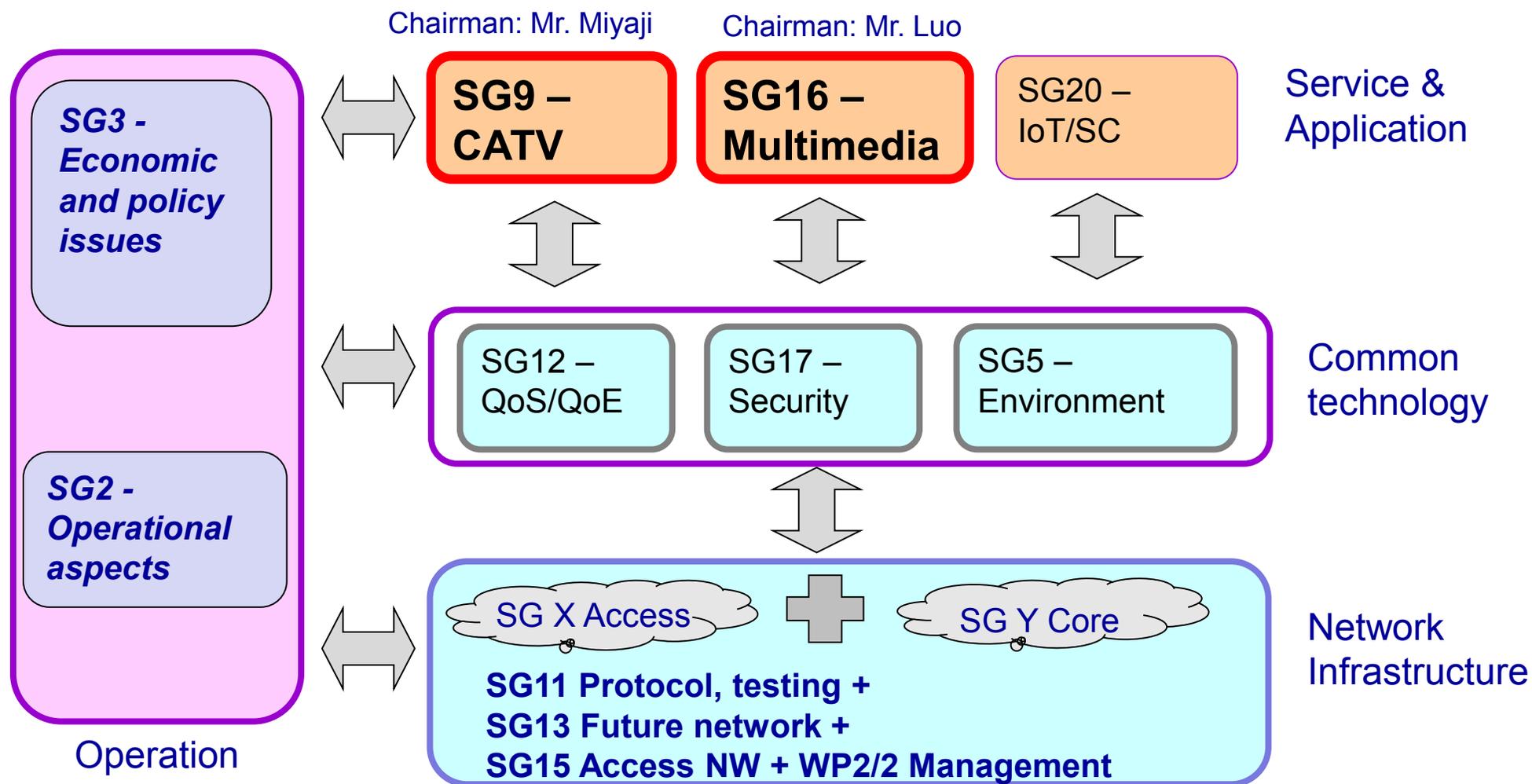
Cable

- OKI's activities for IPTV (for CATV)

- the 5th APT Conformance & Interoperability in 2017.

ITU-T Study Group Structure

- SG16 is located in service and application category.



SG16 lead study group

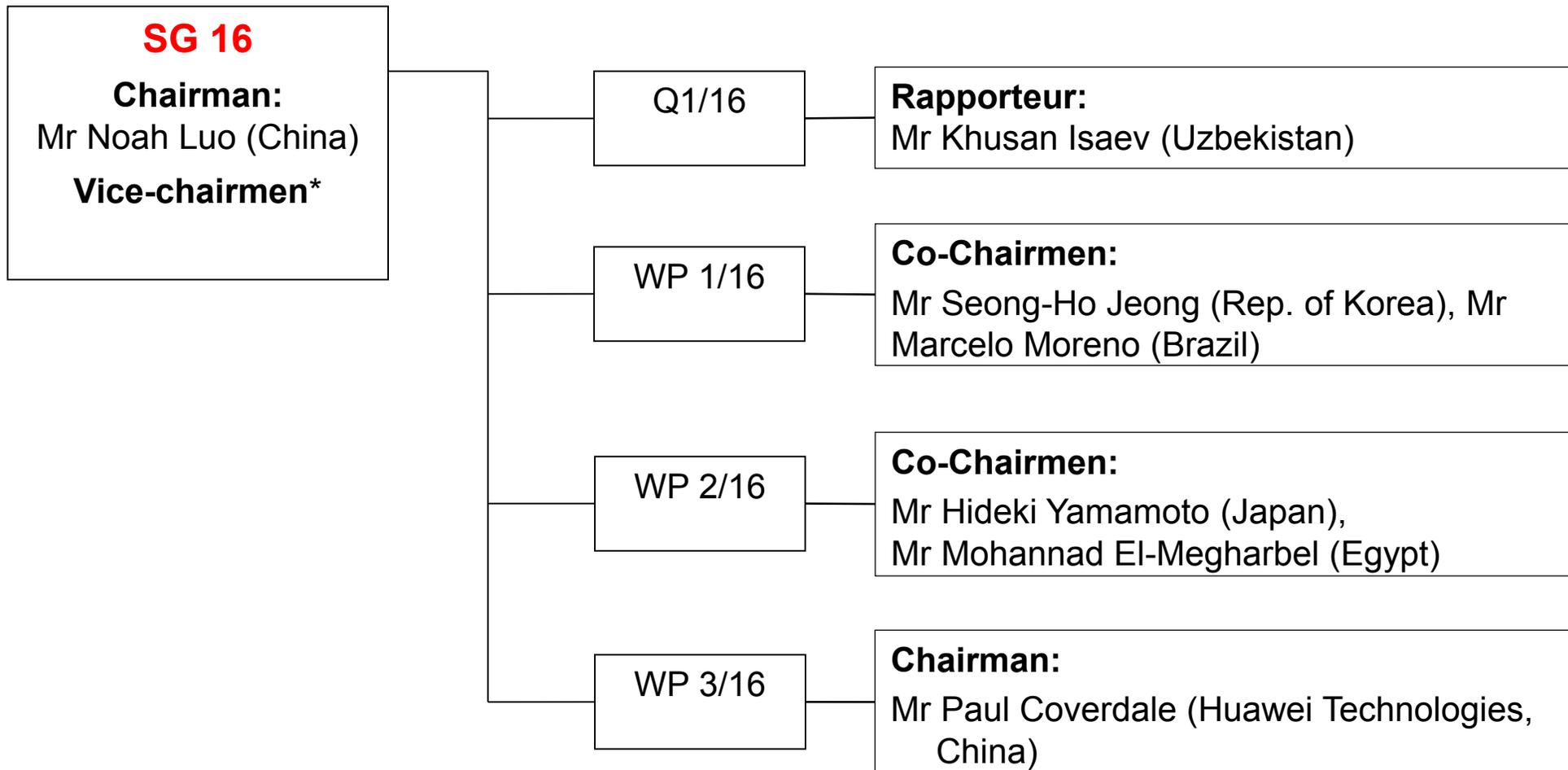
■ Lead SG on:

- Multimedia coding, systems and applications
- Ubiquitous multimedia applications
- Telecom/ICT Accessibility for PwD and human factors
- Intelligent transportation systems (ITS)
- IPTV and Digital Signage
- Multimedia e-services

■ Organization

- **Q1/16:** Multimedia coordination
- **WP1/16:** Multimedia content delivery
- **WP2/16:** Multimedia e-services
- **WP3/16:** Media coding and immersive environments

SG16 top level structure

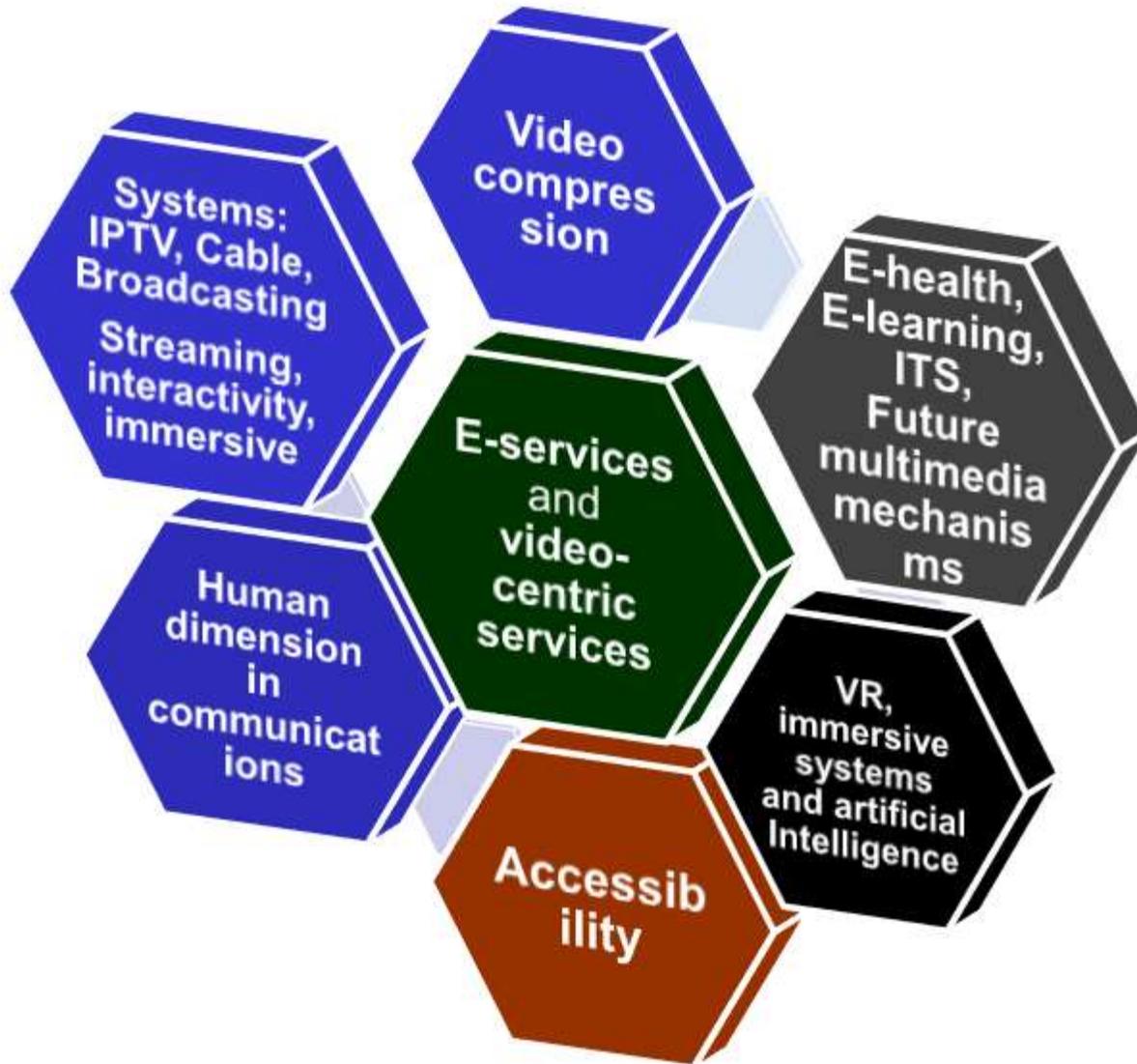


*Charles Zoé BANGA (Central African Rep.); Mohannad EL-MEGHARBEL (Egypt); Mohsen GHOMMAM MALEK (Tunisia); Khusan ISAEV (Uzbekistan); Heber MARTINEZ (Argentina); Marcelo MORENO (Brazil); Hideki YAMAMOTO (Japan)

Questions and Working Party in SG16

WP	Question	Title
	Q1/16	Multimedia coordination
WP1	Multimedia applications and content delivery	
	Q11/16	Multimedia systems, terminals, gateways and data conferencing
	Q13/16	Multimedia application platforms and end systems for IPTV
	Q14/16	Digital signage systems and services
	Q21/16	Multimedia framework, applications and services
WP2	Multimedia e-services	
	Q24/16	Human factors related issues for improvement of the quality of life through international telecommunications
	Q26/16	Accessibility to multimedia systems and services
	Q27/16	Vehicle gateway platform for telecommunication/ITS services and applications
	Q28/16	Multimedia framework for e-health applications
WP3	Media coding and immersive environments	
	Q6/16	Visual coding
	Q7/16	Speech/audio coding, voiceband modems, facsimile terminals and network-based signal processing
	Q8/16	Immersive live experience systems and services

SG16 application domain



Major accomplishments of 1st SG16 meeting in Jan. 2017

- SG16 established a **JCA on multimedia aspects of e-services** (JCA-MMeS), chaired by SG16 vice-chairman Mr Mohannad El-Megharbel (Egypt). It was agreed in TSAG 2017.
 - **Experts in SG9 are expected to participate in JCA-MMeS (Oct. 2017)**

- SG16 agreed to establish an **IPTV Testing Team** composed of interested SG16 experts.

- **ILE**: Work progressed for **immersive live environments**, in addition to a mini-workshop and three new work items (planned completion in 2018):
 - H.ILE-SS "*ILE service scenarios*"
 - H.ILE-Reqs "*ILE requirements*"
 - H.ILE-FW "*ILE architectural framework*"
 - **SG16 expects to collaborate with SG9/9 experts on this topics.**

Overview of IPTV standards in ITU-T and high quality video

- ITU-T standards covers from video codec to IPTV applications.
- **New H.721(2018?)** will cover high realistic video streaming with 8K,HDR,and MMT.

Home network

H.622.1: Req & Arch for IPTV Home networks

Application and terminal devices

H.701: Content Error Recovery

H.721: IPTV Terminal (Basic)

H.722: IPTV Terminal (full-fledged)

H.750: Metadata for IPTV Services

H.770 : IPTV Service discovery

H.761: Ginga-NCL

H.741: Audience Measurement

H.762: LIME

H.722: IPTV Terminal (full fledged)

H.763.1: Cascading style sheets for IPTV

H.264: video

H.703: Enhanced UI framework for IPTV services

H.265: video

Architecture, network, and requirement.

Y.2007: NGN Capability Set 2

Y.Sup 5: IPTV Service use cases

Y.Sup 7: NGN Release 2 Scope

Y.1910: IPTV Functional Architecture

Y.1901: IPTV Service Requirements

Q.3010: Authentication protocol

Quality of service and experience

H.701: Content Error-Recovery

G.1080: IPTV QoE

G.1081: Performance Monitoring

G.1082: Improving robustness of IPTV performance

Security and content protection

X.1191: Req & arch for IPTV security

Digital signage

H.780 : Digital Signage

H.785.0: Digital signage: Requirements of disaster information services

Spreading ITU-T IPTV standards to developing countries

- ITU IPTV IPv6 Global Testbed (I3GT) (*1) is a testbed for the parties that are interested in ITU IPTV standards and IPv6 network.
- I3GT was developed by OKI and HTB(*2) in October, 2012 in the cloud environment of NICT(*3).
- I3GT was demonstrated in WTSA-12 and Sapporo Snow Festival experiment 2013
- **At SG16 in 2015, 4K video streaming was exhibited.**
- **It will be extended to support 8K in near future.**

Show casing was held in countries including Rwanda and South Africa.

Official Web

<http://www.itu.int/en/ITU-T/C-I/interop/I3GT/Pages/default.aspx>



(*1) <http://www.oki.com/en/press/2012/11/z12096e.html>

(*2) HTB: Hokkaido Television Broadcasting Co., Ltd., <http://www.htb.co.jp/en/>

(*3) NICT: National Institute of Information and Communications Technologies, <http://www.nict.go.jp/en/>

(*4) JGN-X (Japan Gigabit Network -eXtreme), <http://www.jgn.nict.go.jp/english/index.html>

ITU IPTV Streaming server by OKI

■ Integrated IPTV Platform

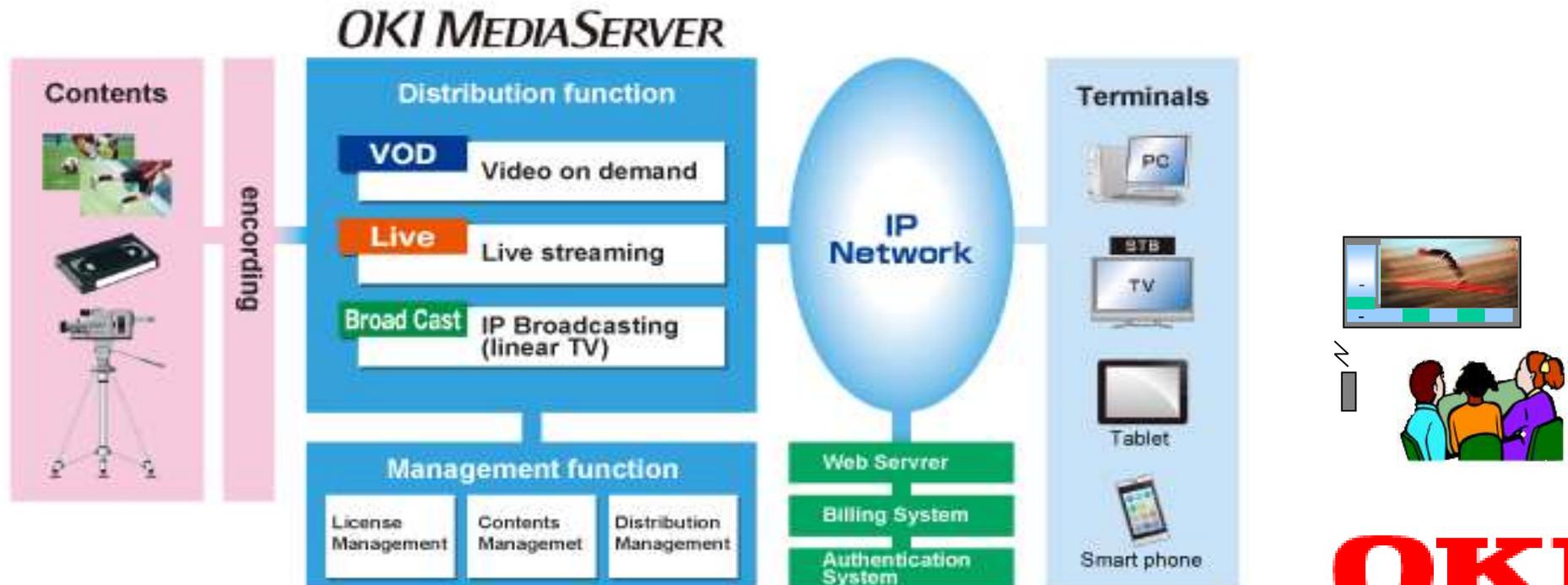
- VOD, live streaming, IP broadcasting (linear TV) and their combined services

■ Standard based system

- ITU-T IPTV standards and de-facto standard, IETF HLS, compliant

■ Large scale system

- It supports distributed VOD system for large scale system



(*1) <http://www.oki.com/en/streaming/>

APT/ITU joint C&I event

- ITU and APT (Asia Pacific Telecommunity) confirmed: Organizing the APT C&I event in the ITU telecom world.
- APT(Asia Pacific Telecommunity) will provide general secretary service and ITU will provide space in ITU pavilion for **testing and showcasing**.
- The event announced on the APT and ITU website and invitation letter issued by APT and ITU.
- We expect CATV vendors and operators will participate in this event.

- Venue: Busan Exhibition & Conference Center
- Date: 25-28 September 2017
- Cost estimation : TBD



<http://www.apr.int/>

ITU Telecom world

Confirmed: Organizing the APT C&I event in the ITU telecom world.

- Venue: Busan Exhibition & Conference Center
- Date: 25-28 September 2017
- Cost estimation
TBD



IPTV Testing Photo in 2015

- Testing was conducted in the same venue but in the closed room.
- The report was created by participants



IPTV server

Measurement PC



IPTV showcasing photo in 2015

- *4K displays connecting with 4K STB showed 4K (30Mbps) and 2K (8Mbps) linear TV contents.*
- *Audiences could distinguish the difference between 2K and 4K.*

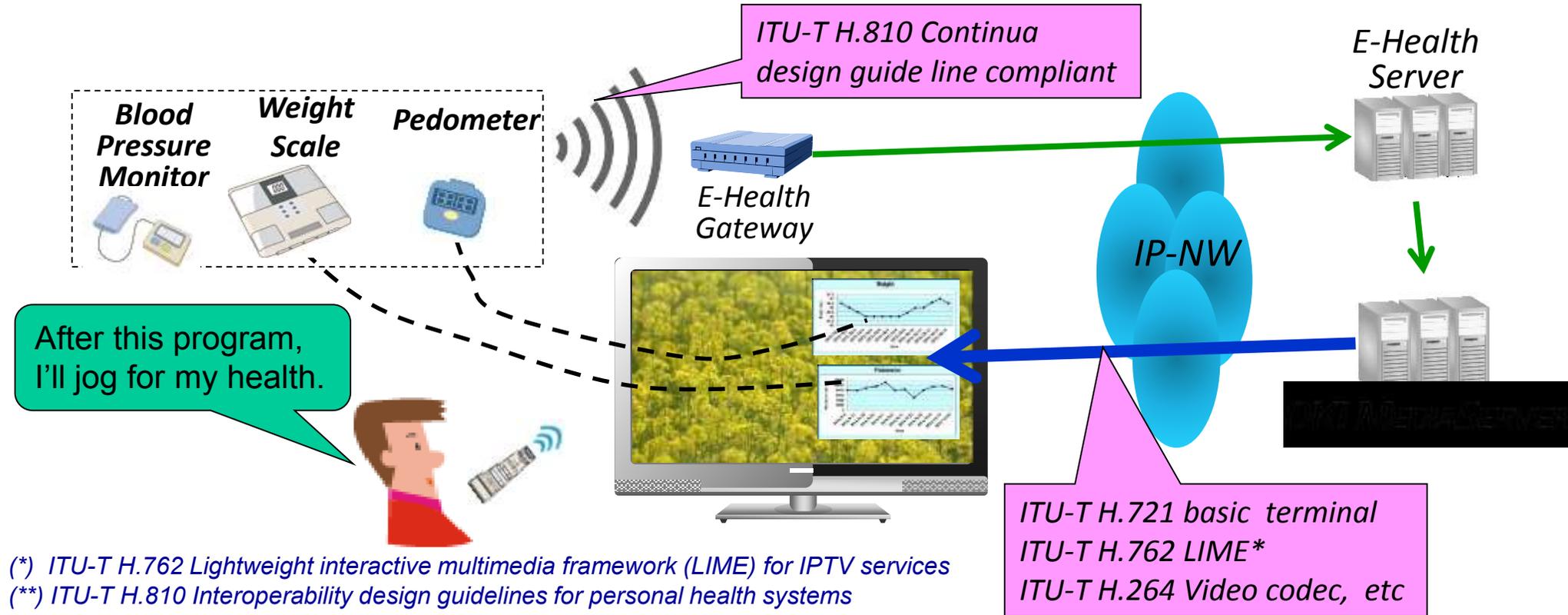


Video contents were provided by HTB

Visualization of your health condition on IPTV

E-Health

- ◆ Audience can see their personal health data such as weight, blood pressure and distance walked on their IPTV screen.
- ◆ Visualization of health condition will encourage audience to control their health condition.
- ◆ Global standard technologies such as ITU IPTV (**LIME***) and E-health (**personal health systems****) are used to extend services more cost effectively and easily.



(*) ITU-T H.762 Lightweight interactive multimedia framework (LIME) for IPTV services
 (**) ITU-T H.810 Interoperability design guidelines for personal health systems

Conclusions

- NHK in Japan will present highly realistic broadcasts of the 2020 Olympic Games in Tokyo via 8K Super Hi-Vision, the world's most sophisticated broadcasting system. The 8K test broadcasting via satellite started in August, 2016.
- In order to realize high realistic video services, visions are shared in Japan and new organization was established.
- 4K linear TV service linked with IBB over Cable network and telecom network are reported as future service.
- ITU-T IPTV standards is/will be extended to cover high quality video service now.
- OKI MediaServer is an IPTV head end system supporting ITU-T IPTV standards.
- APT/ITU C&I events are introduced. Next event will be held in Busan during Telecom 2017.
- *OKI will open up your dream to the better quality of life by high quality IPTV*

Thank you for your attention



Open up your dreams