ITU Workshop on “Voice and Video over LTE”
Geneva, Switzerland, 1 December 2015

Activities of TTC/HATS and APT interoperability issues

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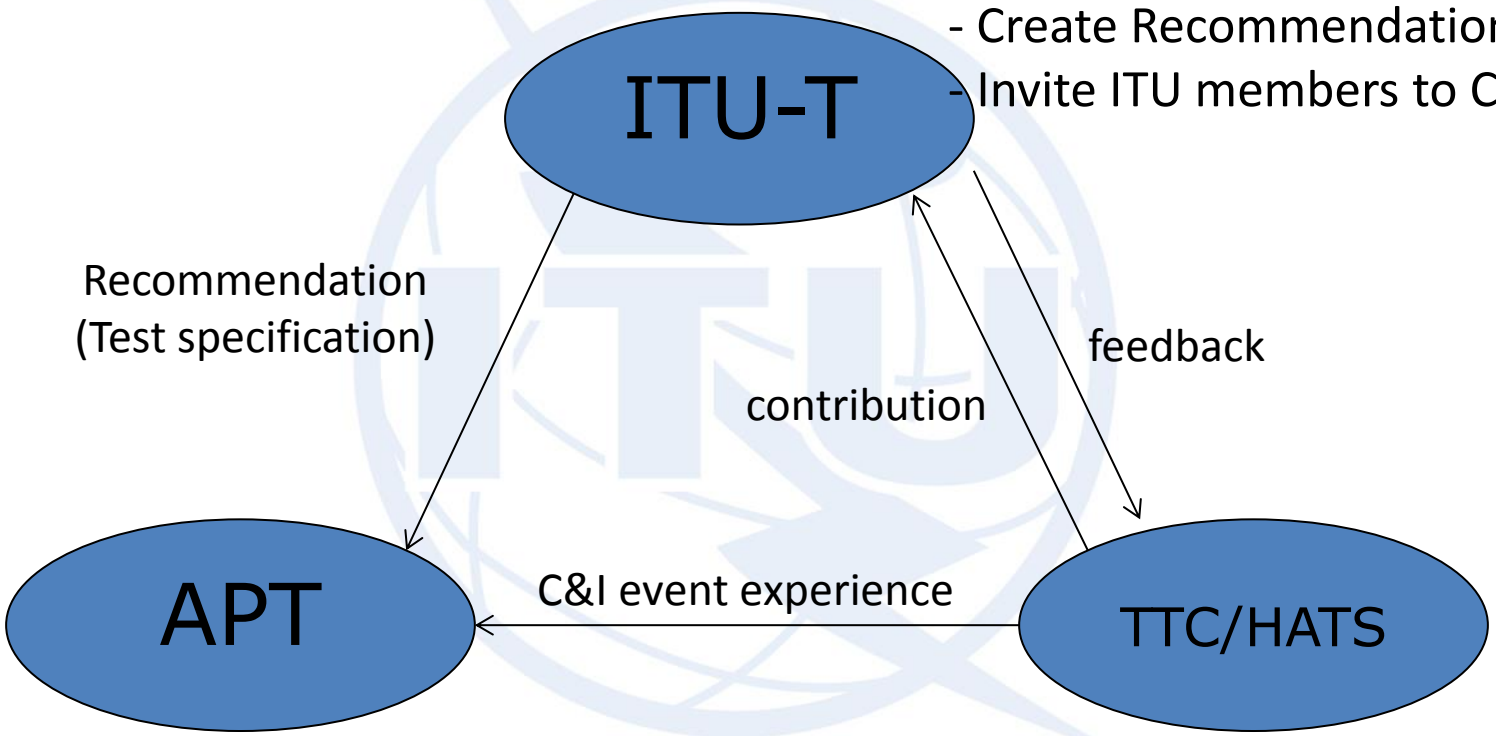
Content

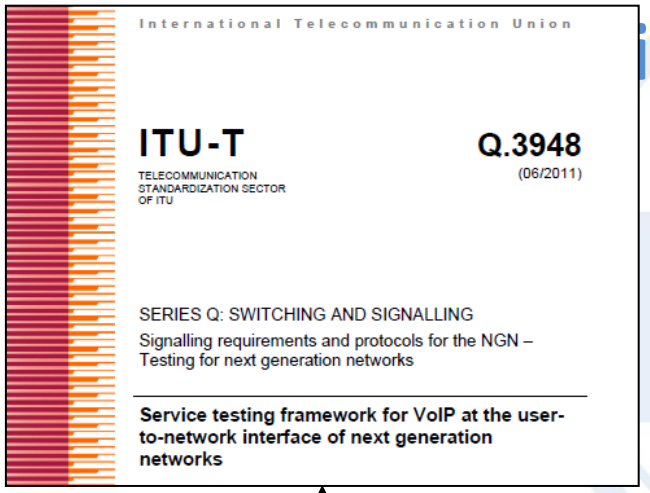
- TTC's approach to VoIP and Video Service interoperability testing
- Introduction of HATS activities
- HATS's VoIP and Visual Communication interoperability testing by using ITU-T test Recommendations
- APT/ITU Conformance and Interoperability event in Bangkok
- Challenge for VoLTE and VoIP interworking testing

Cooperation with ITU-T, TTC/HATS and APT



Test Specifications in ITU-T related with TTC/HATS documents

ITU-T Q.3948
VoIP testing


International Telecommunication Union

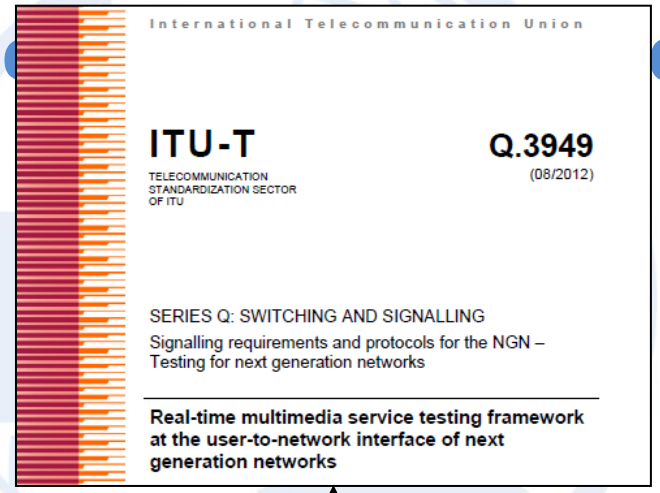
ITU-T
TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

Q.3948
(06/2011)

SERIES Q: SWITCHING AND SIGNALLING
Signalling requirements and protocols for the NGN – Testing for next generation networks

Service testing framework for VoIP at the user-to-network interface of next generation networks

ITU-T Q.3949
Multimedia testing


International Telecommunication Union

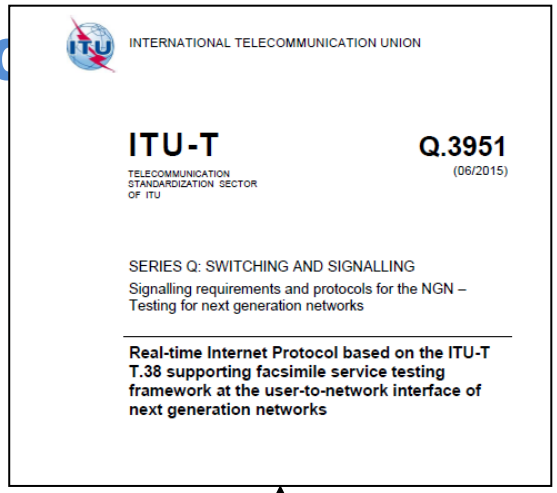
ITU-T
TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

Q.3949
(08/2012)

SERIES Q: SWITCHING AND SIGNALLING
Signalling requirements and protocols for the NGN – Testing for next generation networks

Real-time multimedia service testing framework at the user-to-network interface of next generation networks

ITU-T Q.3951
T.38 IP-FAX testing


INTERNATIONAL TELECOMMUNICATION UNION

ITU-T
TELECOMMUNICATION STANDARDIZATION SECTOR OF ITU

Q.3951
(06/2015)

SERIES Q: SWITCHING AND SIGNALLING
Signalling requirements and protocols for the NGN – Testing for next generation networks

Real-time Internet Protocol based on the ITU-T T.38 supporting facsimile service testing framework at the user-to-network interface of next generation networks

contribution

HATS-J-101-V1.0

HATS-J-102-V1.2

HATS-J-103-V1.0

Telecommunication Technology Committee

Harmonization of Advanced Telecommunication Systems HATS

HATS General -What is HATS ?-

HATS Conference: Promotion Conference of
Harmonization of Advanced Telecommunication Systems

HATS is a Non-Profit organization that ensure interconnectivity and interoperability of info-communication equipment developed by various manufacturers

HATS was established in Aug. 1988.

- Members: info-communications manufacturers, vendors, carriers, TTC*1, MIC*2
- Secretariat: Communications and Information network Association of Japan (CIAJ*3)

Note *1 http://www.ttc.or.jp/e/
***2 MIC(Ministry of Internal Affairs and Communication, At that time MPT: Ministry of Posts and Telecommunications**
***3 http://www.ciaj.or.jp/en**
For the details,http://www.ciaj.or.jp/hats/english/about.html

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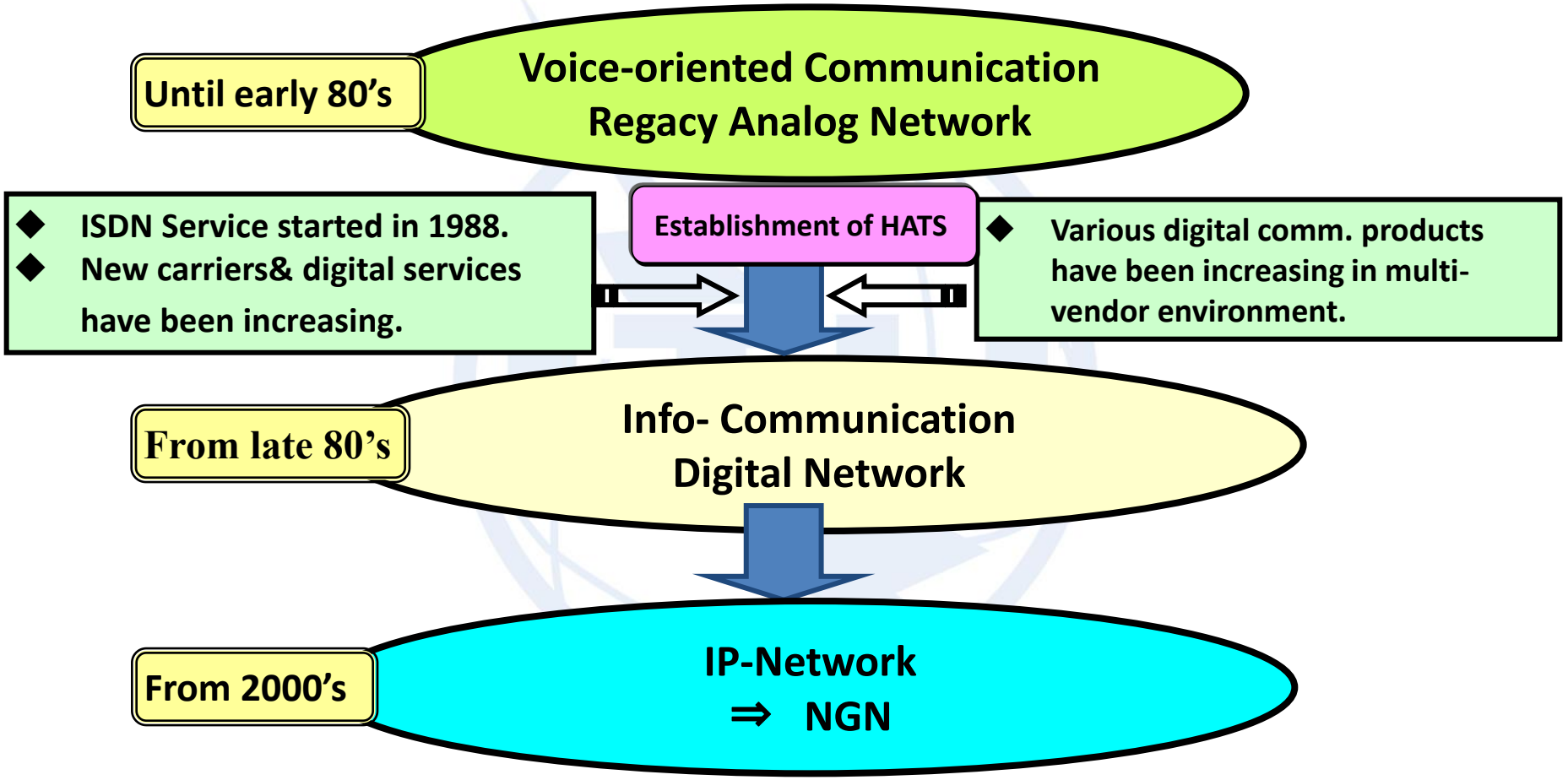
Note *1 http://www.ttc.or.jp/e/

*2 MIC(Ministry of Internal Affairs and Communication

*3 http://www.ciaj.or.jp/en

History of HATS



Interconnectivity in multi-carrier/multi-vendor environment is always required.

Structure of HATS Conference

Chairman
Executive Committee
-decides basic policies, overall HATS activities and establishment of new TILC

Management Committee

Steering Committee
-researches on ICT standardization & market trends
- coordinates TILCs activities
- liaises with other organizations

Advisory Committee
- gives advice on overall HATS activities

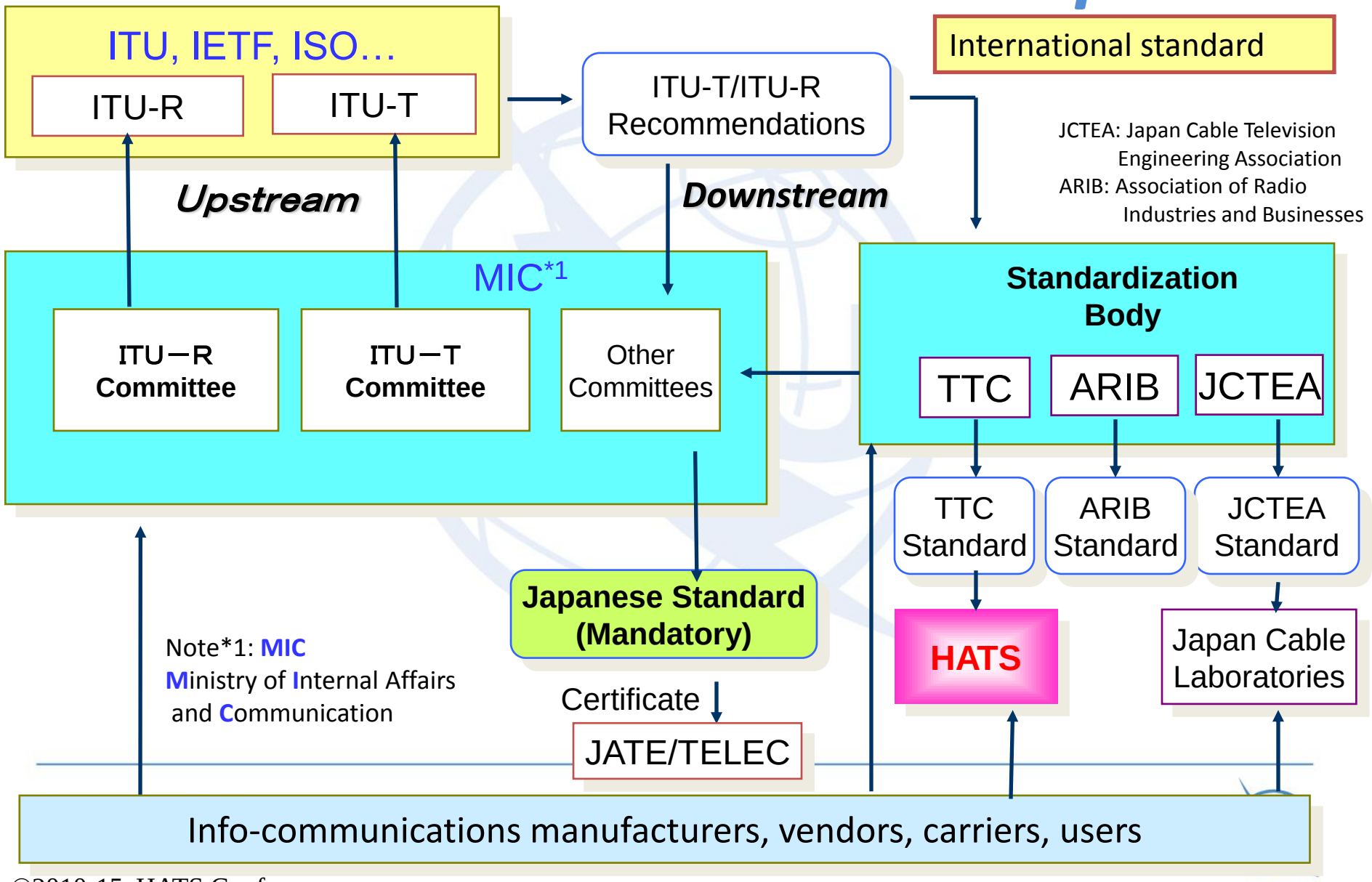
Promotion Committee
& Demonstration Committee
- disseminates HATS activities
- plans/arranges seminars & demonstrations

Test Implementation Liaison Committees(TILCs)
-Plans & implements interconnectivity test
- examines test method/procedure
- reviews & studies test result

- **Optical access network TILC**
- **Facsimile TILC**
- **PBX Telecom Server TILC**
- **Multimedia Comm. TILC**
  - **AV WG**
    - **HDTV Conference SWG**
  - **Home-Network WG**
  - **IP-Camera WG**

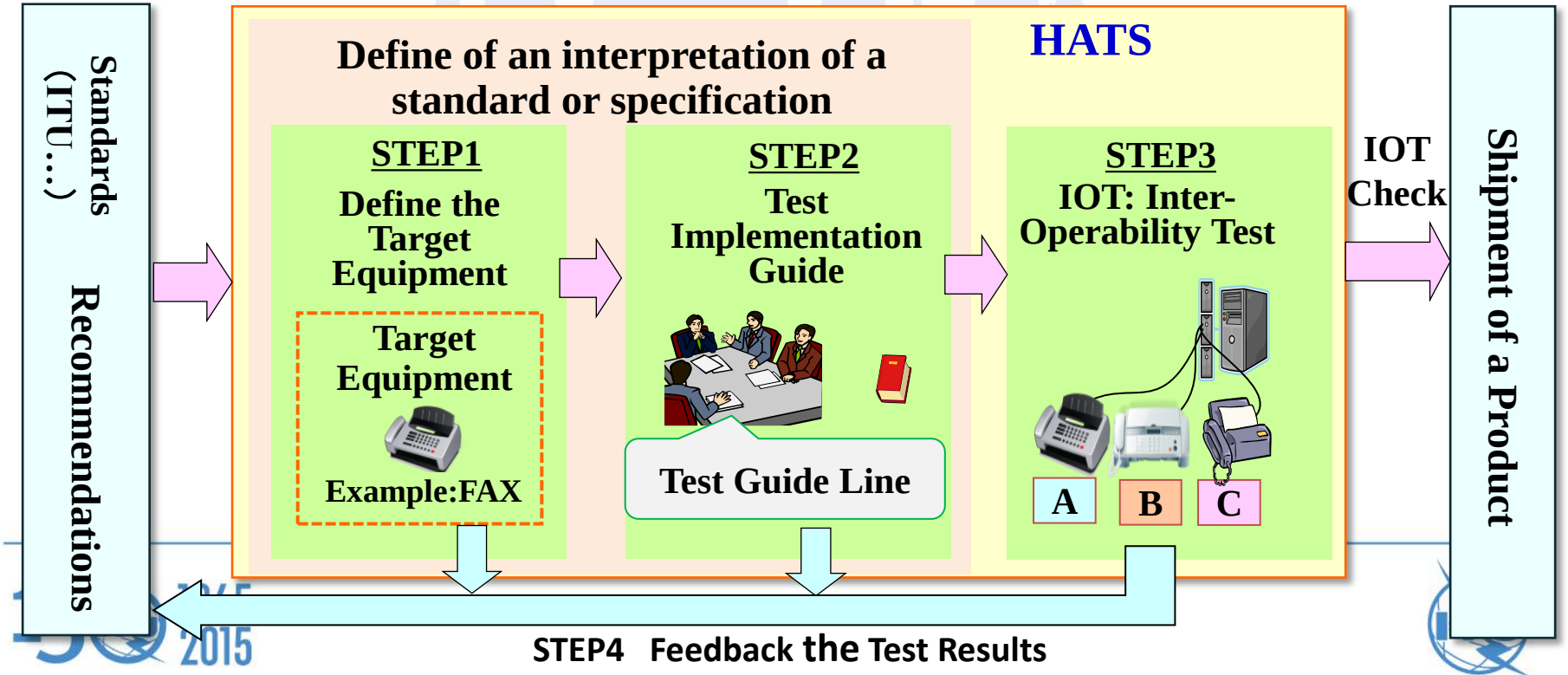
Secretariat: Communications and Information network Association of Japan (CIAJ)

Standardization Flow in Japan



Role of HATS

- When a standardization has been recommended in ITU etc, the various systems and equipments are planned to develop by several companies. The interconnectivity test is the voluntary basis and the is following process.
  - STEP1: Identify the targets of ICT products and standards for interconnectivity test.
  - STEP2: Publish the guideline for the interconnectivity test; decide the method and procedures for the interconnectivity test.
  - STEP3: Carry out the interconnectivity test in accordance with the guideline mentioned in Step 2.
  - STEP4: Analyze the results of the interconnectivity test mentioned in Step 3, get feedback and improve the whole process of interconnectivity test (Feedback to Test Implementation Point, Rule, Standard, Etc.) .



Variety of HATS Test

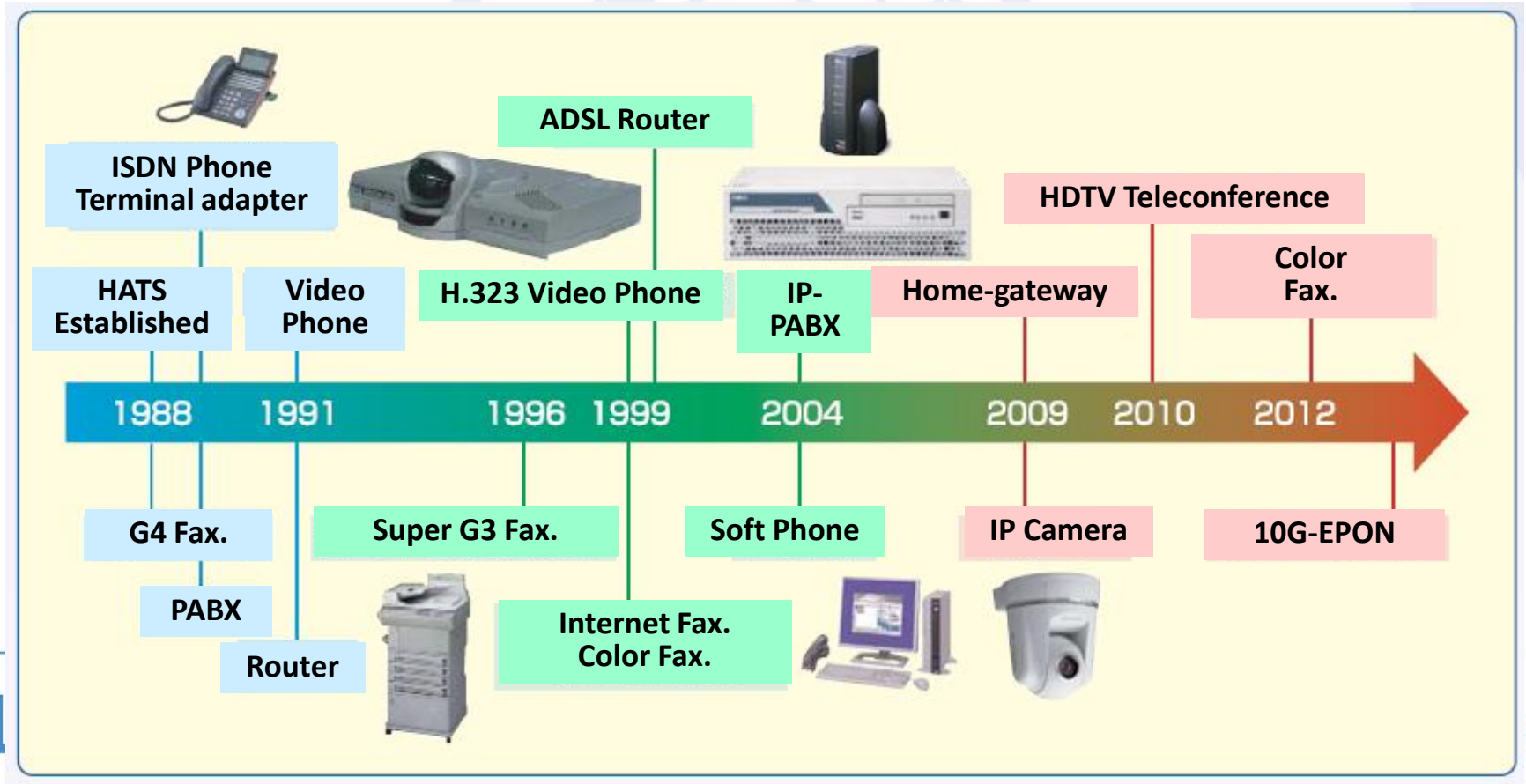
1989-ISDN Terminal Adapter/digital telephone, G4 facsimile, PBX, MHS
1990-Analog videophone
1991-Digital videophone/videoconference, LAN router
1996-Super G3 facsimile
1997-MPEG2(H.262)
1999-LAN router(ATM, IPsec), H.324 videophone, Internet facsimile
2000-H.323 videophone(over IP), Color facsimile
2001-ADSL, LAN router(IPv6), PBX(VoIP:IP-QSIG), SIP(VoIP), Internet-FAX
2002-ADSL(CPE), LAN router(OSPF, PPoE), SIP(VoIP), H.323+, IP-PBX(VoIP:IP-QSIG+), Internet-FAX
2003-ADSL, LAN router(VRRP), sYCC color FAX, H.323, SIP PBX(IP-QSIG)
2004-LAN router (Internet VPN: IPsec-IKE), PBX-SIP , H.323, SIP
2005-PBX-SIP, IP-FAX, SIP, MPEG4
2006-PBX-SIP, IP-FAX, SIP, MPEG4, H.264
2007-2011 Expand the test function of the above-mentioned and established new 2 groups (Home Network and IP Camera) and 1 SWG (HDTV-Teleconference)
2012-Ad-hoc for interoperability of equipment for optical access network
2013-G3-PLC Ad-hoc for narrow band PLC (Terminated on 2014/3)

Recent Activity

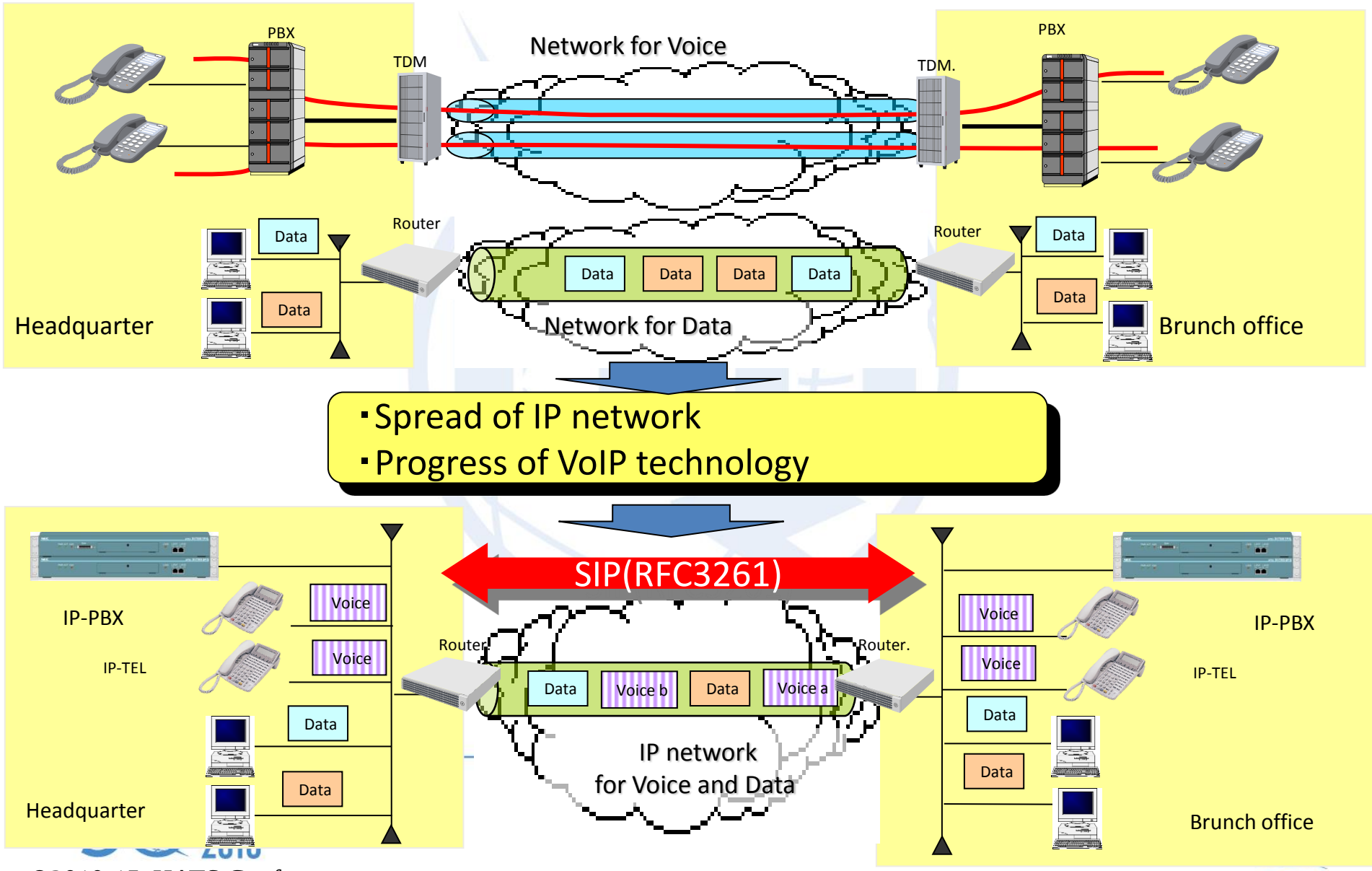
2012 Established Ad-hoc for interoperability for optical access.
Merge the VoIP WG and TV phone/conference WG to AV WG.

2013 Established G3-PLC Ad-hoc SWG.

2014 Changed “Optical access Ad-hoc” to “Optical access network TILC”.
Closed “G3-PLC Ad-hoc SWG” and “NAT traversal SWG” in Home Network WG.



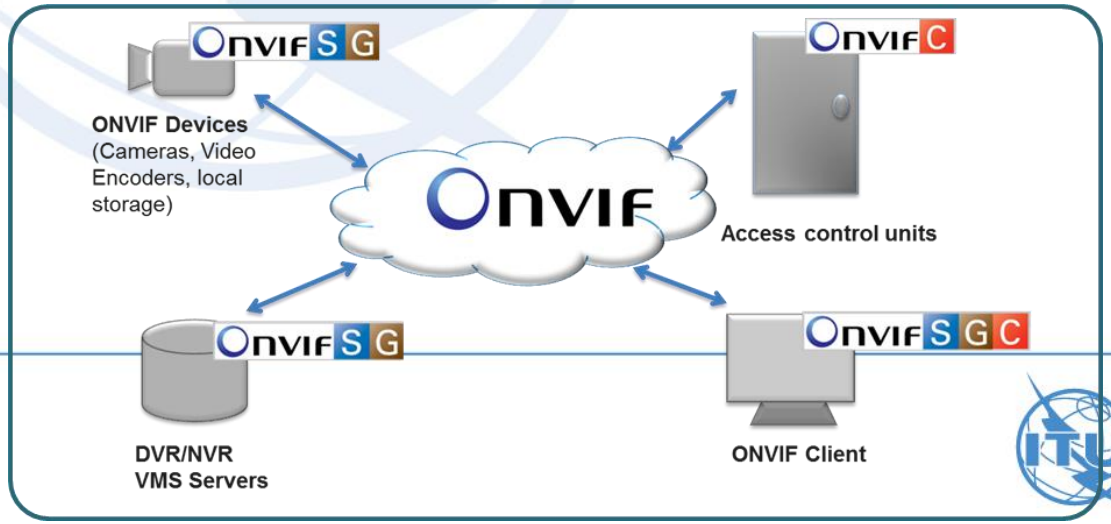
Activity of TILCs (PBX Telecom Server)



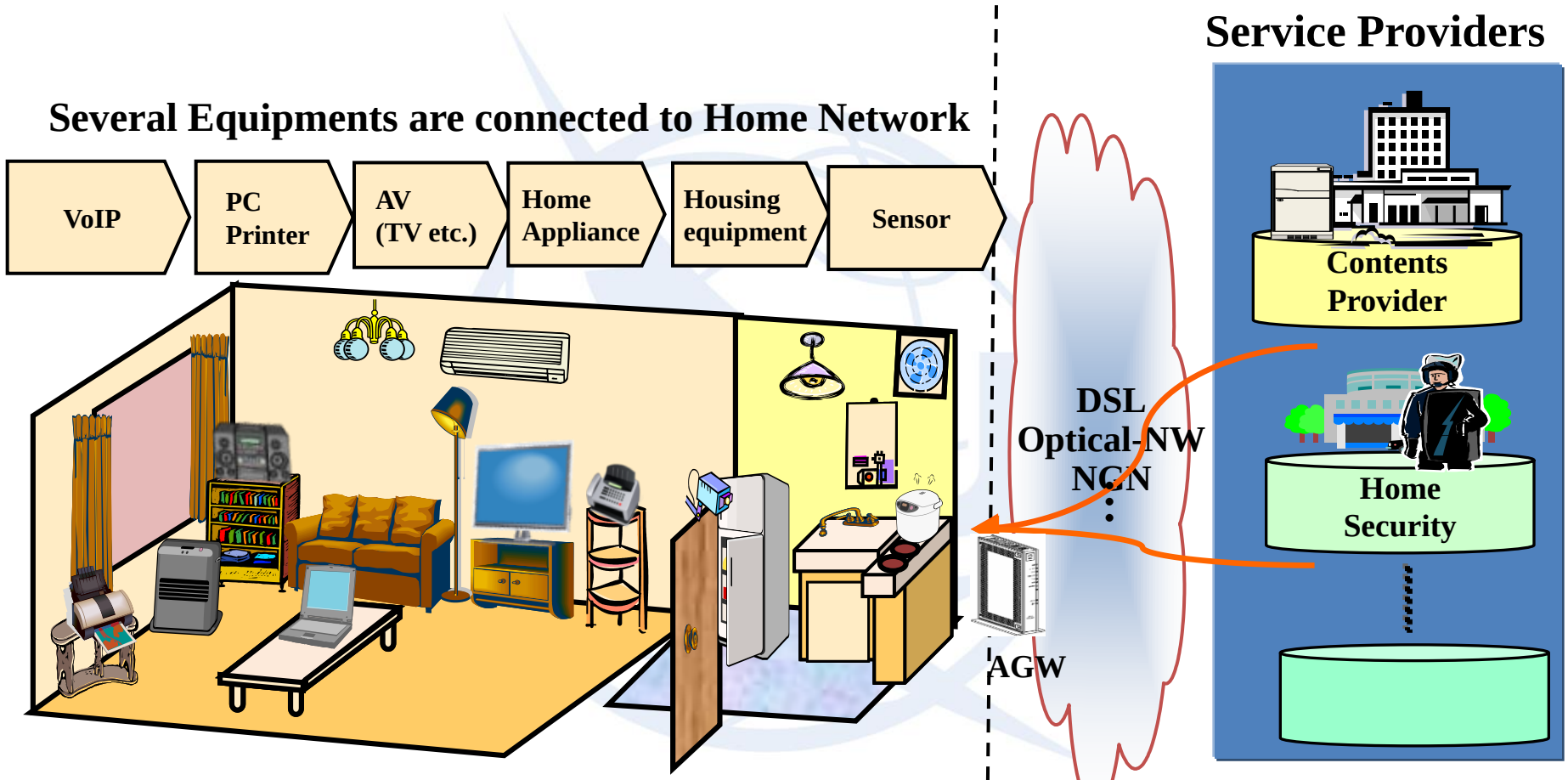
Activity of TILCs (IP Camera)

- Established Aug. 2009
  - First ONVIF/HATS Joint plug fest held at Sep. in Tokyo HATS office
- 2010/1: 1st HATS plug fest
- 2010/8: 2nd , 3rd HATS plug fest
- Liaison between ONVIF and HATS from 2012
  - 7th ONVIF Plug Fest*(2012/9) in Japan
- 2013/1: 5th HATS plug fest
- Next Step to ONVIF New Profiles
  - Profile S: Streaming (2012)
  - Profile G: Storage (2013)
  - Profile C: Access Control (2013)

- **CGI (Common Gateway Interface) command mismatch**
- **Difference Streaming protocol**
  RTP？ HTTP？ RTSP？ HTTP？
- **CODEC issue（type, profile, level …）**
  - **JPEG/MPEG4/H.264？**
  - **G.711/G.726/AAC？**
- **Discovery protocol**



Activity of TILCs (Home-Network)



TTC Activity => http://www.itu.int/ITU-T/gsc/index.html

GTSC7-27 (TTC: Kenji Koro, "Home Networking activities in TTC")

Actual results of HATS test

ITEMS	2003	2004	2005	2006	2007	2008	2009	2010	2011	ITEMS	2012	2013	2014
PBX	7	5	5	5	5	5	5	5	5	⇒	5	5	4
Facsimile	5	0	11	10	22	1				⇒	3	3	
LAN	11	6							NGN	FAX	3	3	3
H. 323	13	6								CONTENT	4	4	
SIP	32	23	18	20	10	12	10	3		VoIP	1	5	
MPEG4		4	5	4	2	5	0			TV Conf.	4	5	
H. 264				3	4		2			HDTV	7	7	6
H-NW									3				
IP-Camera							11	10	13	⇒	7	7	6
10G-EPON										⇒	15	15	4
Total	68	44	39	42	43	23	28	18	21	-	49	54	23

Number of Info-communication Equipment Tested Under HATS Scheme（JFY2014）⇒ 23
(TOTAL : JFY1988-2014)
⇒1,491

1989- ISDN Terminal Adapter/digital telephone, G4 facsimile, PBX, MHS
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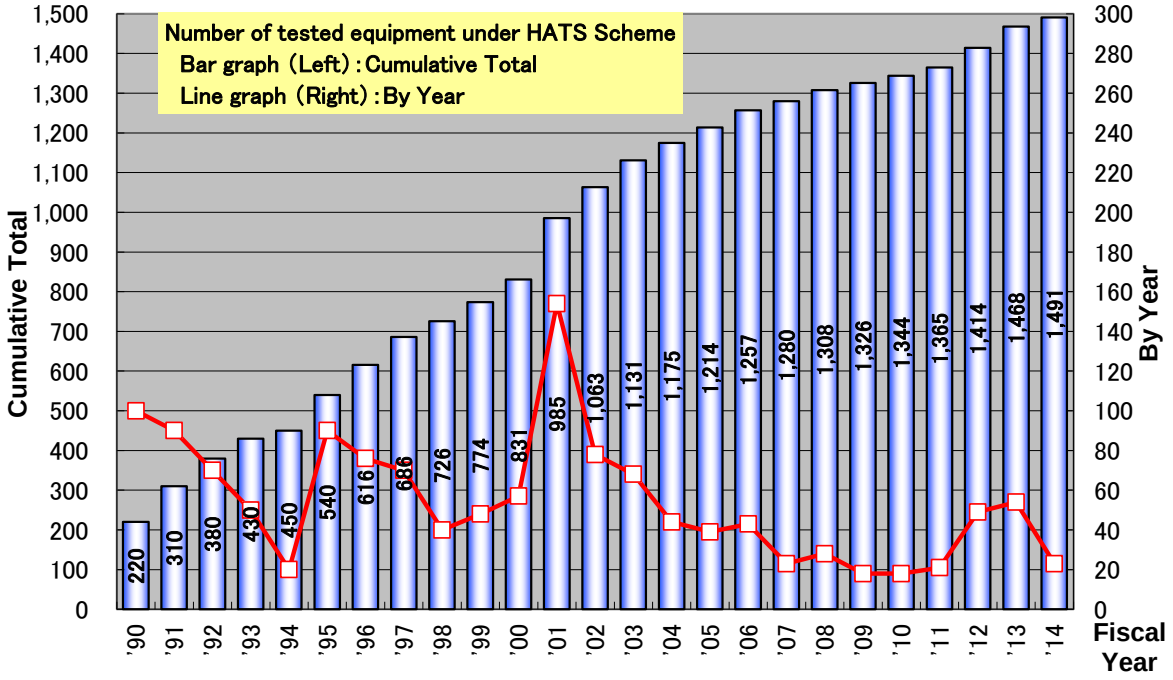


Recent Activity on HATS

Although HATS has performed the interconnection examination of apparatus based on the existing advice as mentioned above, only by apparatus, we will spread ranges, not only services but also network.
For the future, Business solution of NGN or 0AB-J will consider and the problem in a relevant market should be prevented at the same time reservation of the interconnection nature of service etc.

<An example>
As the latest examination, there will be the problems of a telephone etc. on ALL-IP network as following items.

① Quality and a function ② Safety and reliability
③ Interconnection and network operation ④ Others(wireless, number portability, etc.)

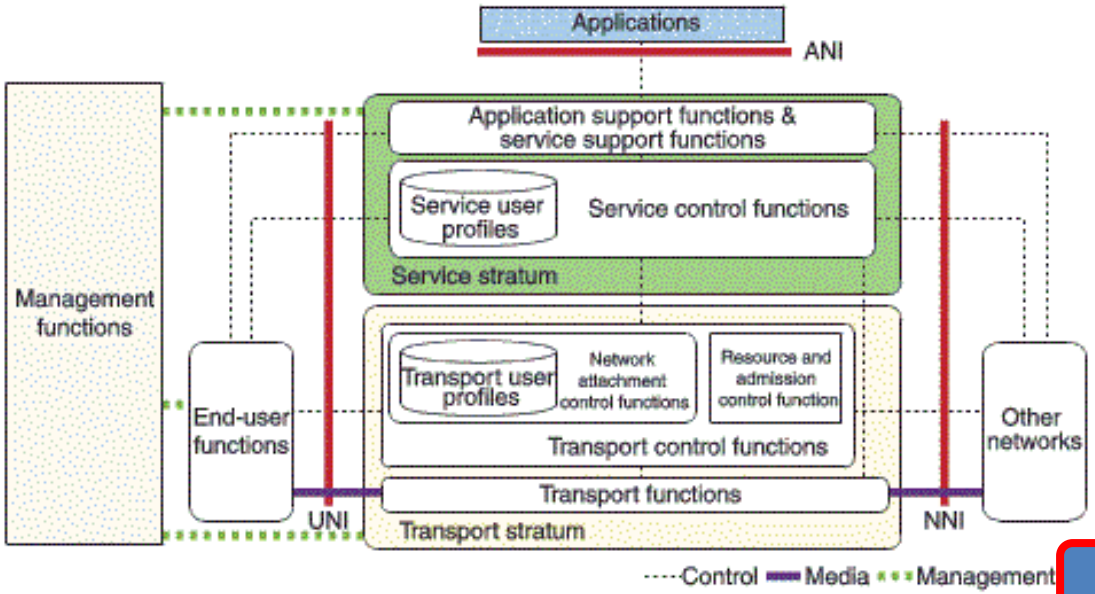
＜Our output＞
We will propose an industry standard, required industry regulation, etc. relevant to the above.

- **"Secured of facsimile communication in IP phone of 0AB-J" => guideline creation**
  VoIP-TA /at the time of accommodating a facsimile terminal in IP-PBX via VoIP-TA Facsimile terminal guideline
  http://www.ciaj.or.jp/content/info/kikaku/CES-Q006-1.pdf
- **0AB-J IP phone terminal safety and reliability functional guideline**
  http://www.ciaj.or.jp/content/info/kikaku/CES-I001-1.pdf
- **Contribute to ITU-T**
  - **✓Contribute to ITU Mark-Discussion**
  - **✓Contribute to SG11**
    （Q.3948：VoIP service testing framework at NGN UNI, Q.3949 multimedia tesitng at NGN UNI）

NGN E2E Interoperability testing

- HATS is pleased to inform you of the 4th HATS Interoperability event on NGN supported by ITU and APT. This event is held following HATS Interoperability Event on NGN supported by ITU-T and last year's 2nd APT/ITU Conformance and Interoperability event . This event aims to assure the interoperability of the NGN equipment which complies with ITU-T Recommendations and TTC standards. This interoperability event will be organized by HATS and use the HATS test specifications which are developed based on the ITU-T Q.3900 Recommendation series. This event will be held under the sponsorship of TTC and CIAJ.
- EVENT DATE : 14th July 2015
- TEST Location : CIAJ in Tokyo, Japan
- TEST Members : NTT, NEC Engineering, neix, SONY,OKI, ITRC

Introduce NGN services



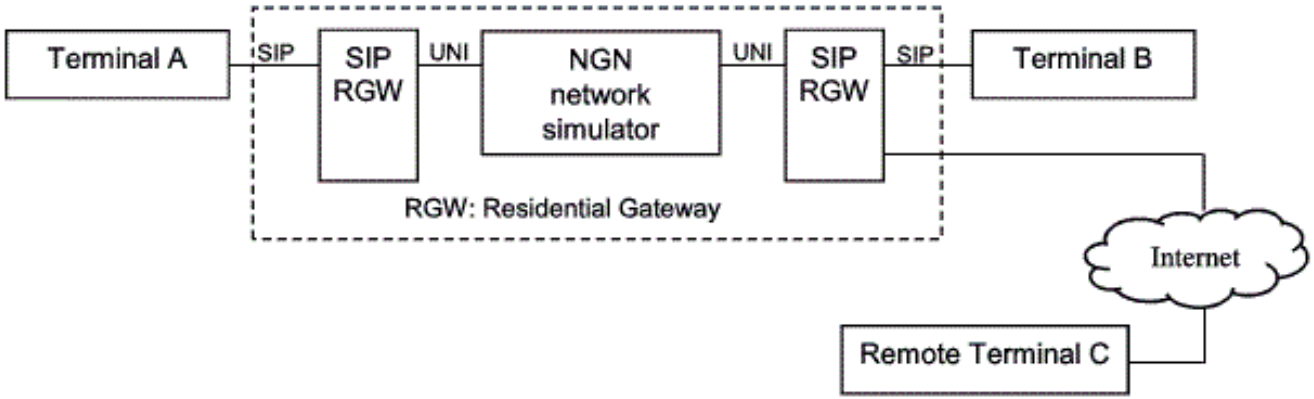
HATS Testing Items

Communication functions	Applied service examples		
	Service category	QoS class	Bandwidth of use (codec)
Interactive (unicast) communication (bidirectional communication) functions	IP telephony (with 0AB-J phone number)	Highest priority	• Wideband speech: 7 kHz (G.722, etc.) • Narrowband speech: 3.4 kHz (G.711, etc.)
	Video telephony (with 0AB-J phone number)	Highest priority	• SDTV class (MPEG4): 2 Mbit/s • HDTV class (MPEG2): 30 Mbit/s
Interactive (unicast) communication (unidirectional communication) functions	Video delivery (VoD) Video delivery (IP broadcast)	High priority	• SDTV class (H.264, MPEG2): 6 Mbit/s • HDTV class (H.264): 10 Mbit/s
Multicast communication (unidirectional communication) functions		Best effort	
PPPoE connection functions	ISP connection	Best effort	

Configuration on test environment

- **Baseline standard**
  - Q.3402 as requirements to NGN UNI signalling profile
  - Q.3948 Annex C as requirements to NGN registration procedure

- **Interoperability test suites**
  - Q.3948 as a service testing framework for **VoIP** at the UNI of NGN
  - Q.3949 as a service testing framework for **Visual communications** at the UNI of NGN



Configuration on test environment

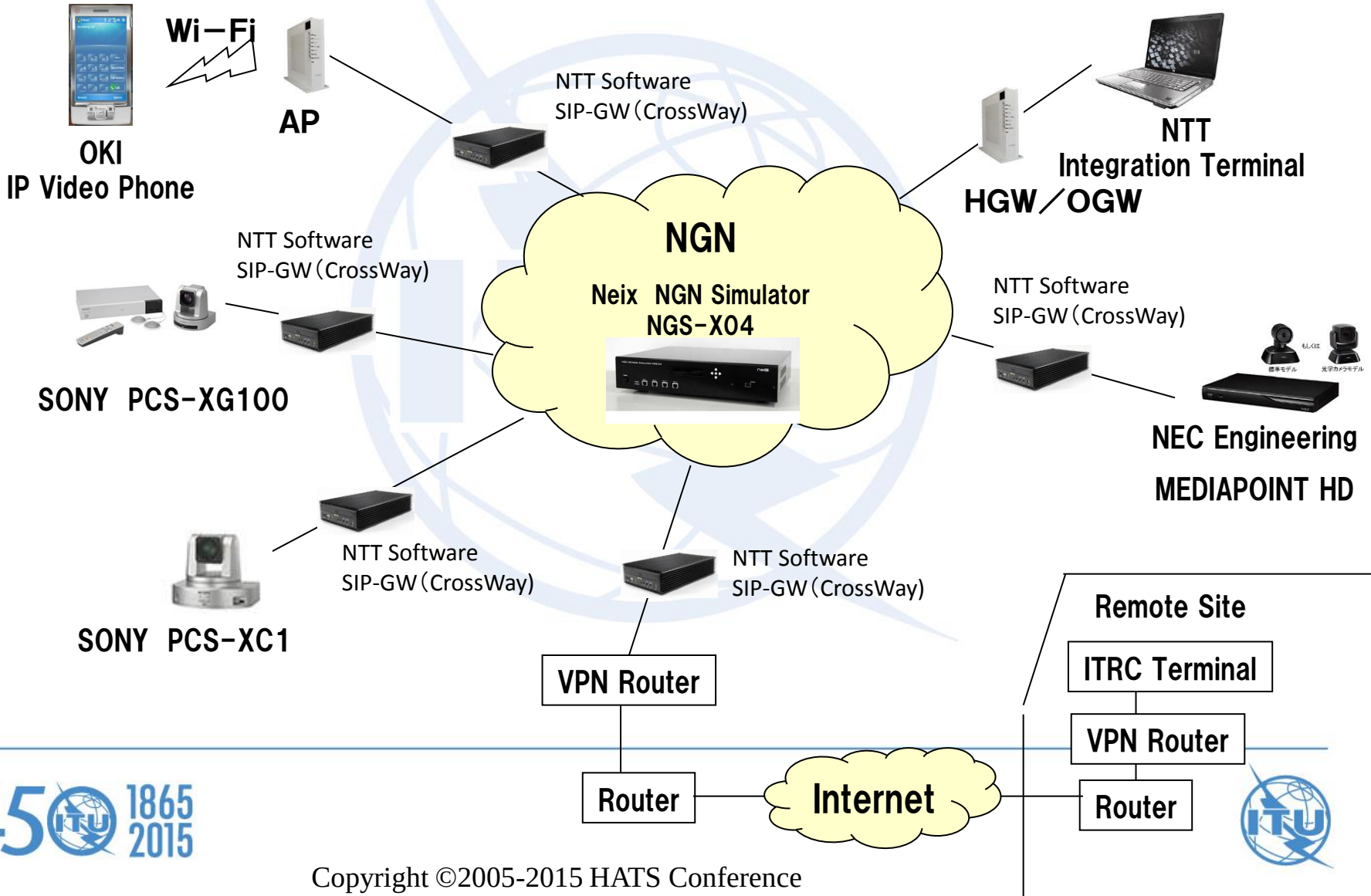


Photo in Testing

Result of Interoperability testing

- VoIP : No Problem
- Visual Communication（H.264(720p-HD)）
  - Via NGN
    - Error 503（Service Un-available)
    - Frozen Video Picture（Packet Loss）
  - Via SIP
    - Frozen Video Picture（Packet Loss）

APT/ITU Conformance and Interoperability event

HTTP://WWW.ITU.INT/EN/ITU-T/C-I/INTEROP/PAGES/DEFAULT.ASPX

APT/ITU C&I event

The purpose of this event was to promote activities to deepen the understanding of C&I throughout countries in the Asia-Pacific region, and to improve the capabilities of each APT member nation and resolve their problems.

1st event: September 2013

2nd event: August 2014

3rd event: September 2015

3rd APT/ITU C&I event, 2015

- The 3rd APT/ITU C&I event was held in Bangkok :
  - Workshop (AM & PM on 8th September 2015)
  - Interoperability testing (7th AM September 2015)
    - a) NGN E2E Service (VoIP, Visual Communication)
    - b) IPTV(including IPTV-MAFR (Multimedia Application Framework))
  - Showcasing (from 7th to 9th September 2015)
    - a) NGN E2E Service (VoIP, Video conference)
    - b) IPTV(including IPTV-MAFR (Multimedia Application Framework))
    - c) M2M/IoT/e-health
    - d) Speech to Speech Translation
    - e) FTTH (GPON and GEPON)
- Participants
  - Testing and Showcasing: 9
  - Presentations in the workshop: 16
  - Visitors and audience : 114

Testing and Showcasing

- Key component for Broadband Access Network (NTT electronics)
- Smart City (Fujikura Ltd)
- Optical Sensor and OSP products (Furukawa Electric)
- IPTV (Oki Electric)
- SDN/NFV (NEC Corporation)
- NGN E2E service (HATS, ITRC)
- Automated Mobile Accessibility Checkers solution (SCE Inc)
- BAN portable health clinic (NICT)
- Seamless network (NICT)

Workshop

- Presentations
  - Session 1: Presentations from APT member (MIC of Vietnam, Global Plan)
  - Session 2: Presentations from exhibitors (NTT, Fujikura, Furukawa, Oki, NEC, HATS, ITRC, SCE, NICT)
  - Session 3: Presentations from SDOs (ITU C&I, SG11, SG16)
  - Session 4: Conclusion & Wrap-up
- Discussion for the future event
  - In the 3rd APT/ITU C&I event, NGN E2E service testing and IPTV testing were successfully performed.
  - Support APT member countries based on ITU's C&I Pillar 3 Capability building and Pillar 4 Establishing C&I test center. It is proposed that APT provides C&I training supported by ITU regional office.
  - ASTAP would create C&I coordination committee to discuss the detailed plan of the next action on APT C&I at the ASTAP-27 in March 2016.

Conclusions & Challenges

- To resolve interoperability issues raised by developing countries , it is effective to have interoperability events including tests and workshops.
- The interoperability tests should be based on ITU-T Recommendations, and it is a pragmatic way to achieve by regional SDOs. Such a global interoperability event provides good opportunities to resolve the issues for both of developed and developing countries in APT region.
- This new collaboration framework such as the interoperability events will foster mutual understanding and cooperation among regional/national SDOs .
- TTC and HATS will be able to take a certain role in the framework through its experiences.

Challenge for VoLTE and VoIP interworking testing

- TTC and HATS are considering interoperability of IMS/NGN and holding test events of VoIP.
- In case of Asia Pacific region, VoIP interoperability event was launched within three years. It seems to take more time to reach the discussion of VoLTE and VoIP interworking. However it is possible to start considering if we can find suddenly strong demand from real market.
- It is most important that more than one telecom operator s gather to start discussing the real problems and requirements. On the Basis of the requirements from telecom operators, it is needed to feedback to currents interworking specifications and future test specifications.
- TTC and HATS have potential to join to discuss this interworking problems and to provide discussion place.

Thank you for your attention!