

Regional Development Forum 2008: Bridging the ICT standardization gap in developing countries

Session 3 – Current ITU standardization hot topics: Multimedia

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Contents

- Multimedia standardization work in ITU-T
 - Scope of the work
 - Service description and requirements
 - Media coding
 - Systems
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 - E-Health
 - Trends

ITU-T SG 16: MM terminals, systems and applications

- SG16 leads ITU-T work on MM terminals, systems and applications including the coordination of the studies among ITU-T Study Groups
- SG16 is also lead Study Group for ubiquitous applications ("e-everything")
- SG16 activities include:
 - Conferencing systems
 - Directory services and other enhanced applications
 - Speech, audio, still picture and video coding
 - Signal processing network equipment & terminals (e.g. PSTN modems and interfaces, facsimile including transport of voiceband data over IP networks)
 - ICT accessibility

Taxonomy of ITU-T multimedia standards

- Service description and requirements
- MM terminals and systems
- System control
- MM multiplexing and synchronization
- Call control
- Media coding (audio, speech, image, video)
- Network signal processing
- Modems and fax (legacy PSTN and IP)
- MM security
- Interworking
- Data conferencing
- Advanced features (metadata, mobility, QoS)
- Media-rich (triple-play, IPTV)
- Accessibility
- E-health

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MM Service descriptions: F-series

- *Videotelephony services (F.720 to F.724)*
- *MM Conference services (F.731 to F.733)*
- *Audiovisual interactive services (F.740)*
- *Audiovisual on demand services (F.741)*
- *Distance learning services (F.742)*
- *Accessibility guidelines (F.790)*
- *Service description and requirements for multimedia information delivery services triggered by tag-based identification (F.771) **NEW!***

Current ITU-T Standardization topics: Multimedia – Video coding (1)

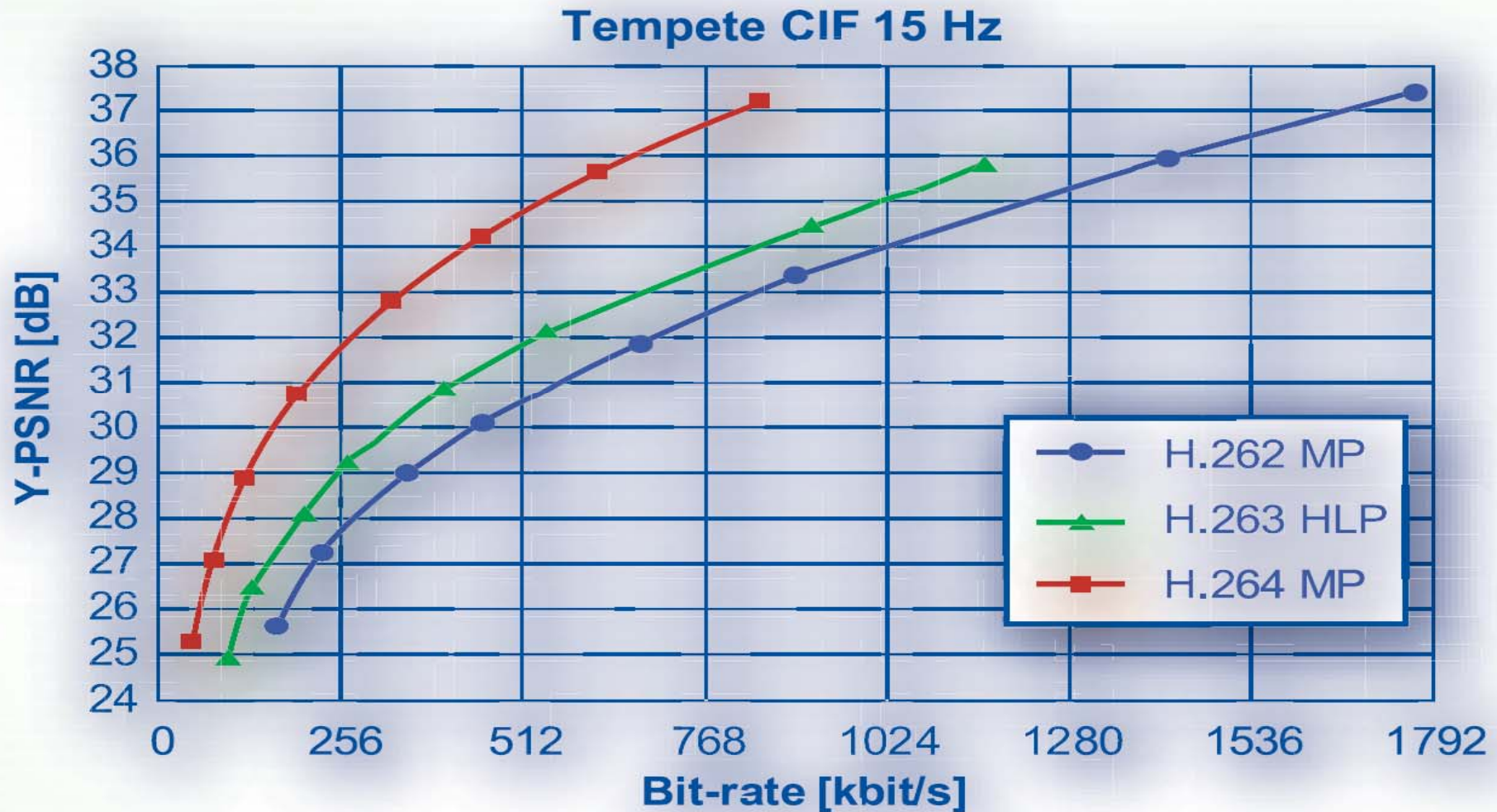
Several generations of ITU-T Video coding standards:

- *H.261* for videoconferencing over ISDN with a bit-rate of $p \times 64$ kbit/s ($p=1...30$) [1990]
- *H.262* developed together with ISO/IEC MPEG, well known under MPEG-2 standards used worldwide for digital TV systems, DVD, ... [1995]
- *H.263* for low bit rate audiovisual services [1996]
- *Advanced Video Coding (AVC)* developed by the joint video team between ITU-T SG16 and ISO/IEC MPEG
 - Published as H.264 and MPEG-4/Part 10 [2003]
- Work item for next generation is open for contributions (codenamed “H.265”)
 - Opportunity to get involved!

Video coding – main H.264 features

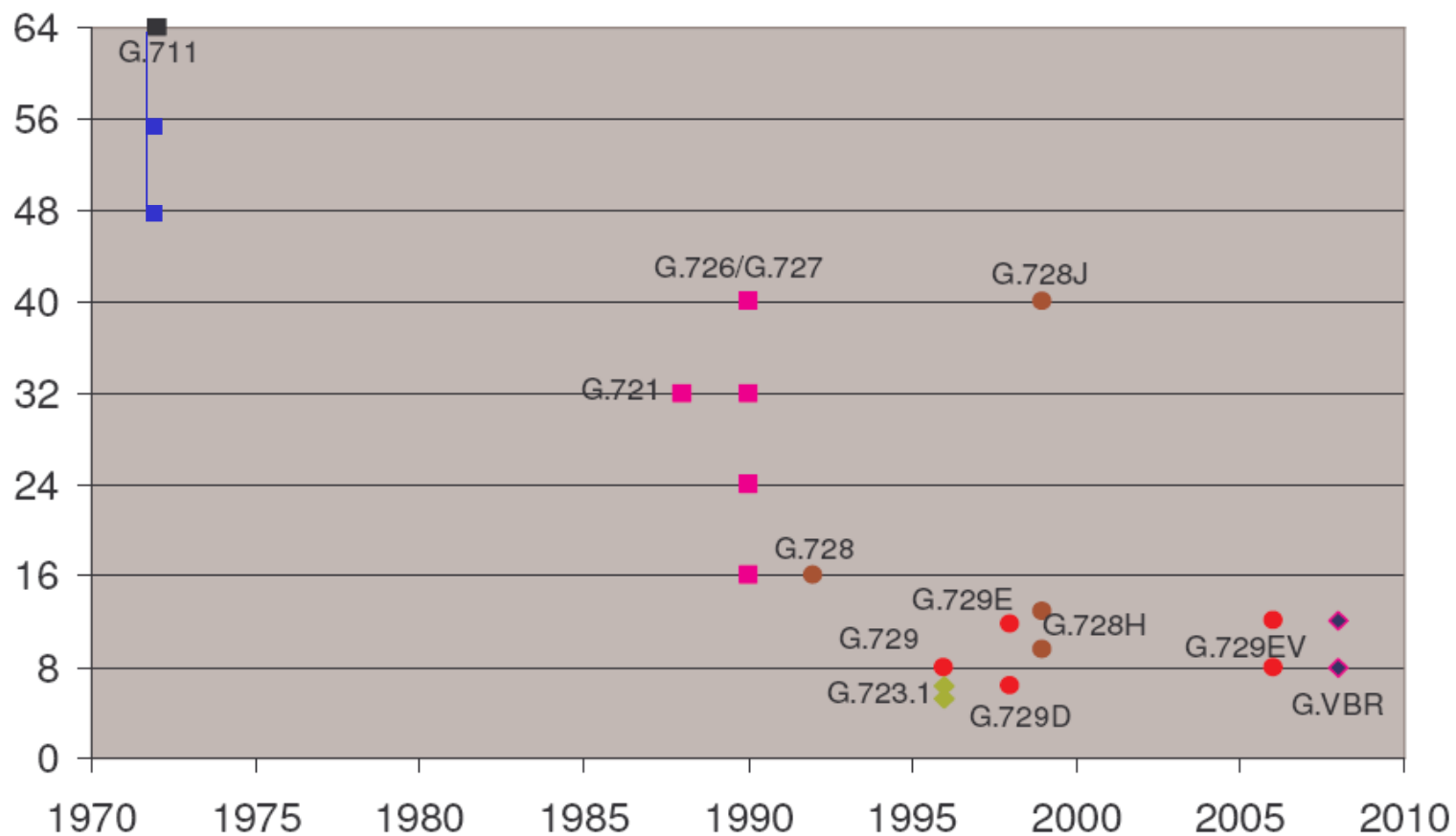
- Latest technology in terms of video compression
- First really scalable video codec
 - Different profiles
 - Bit-rates from 64 kbit/s to 960 Mbit/s
- Now being largely deployed in commercial products (both professional and consumer devices):
 - Videoconferencing systems
 - SD and HDTV Digital TV, IPTV
 - HD DVD, Blue-ray disc formats, ...
- Outperforms prior standards by a factor of more than 2 (bit-rate versus quality)

Video coding – Comparative performance



Current ITU-T Standardization topics: Multimedia – Audio/speech coding

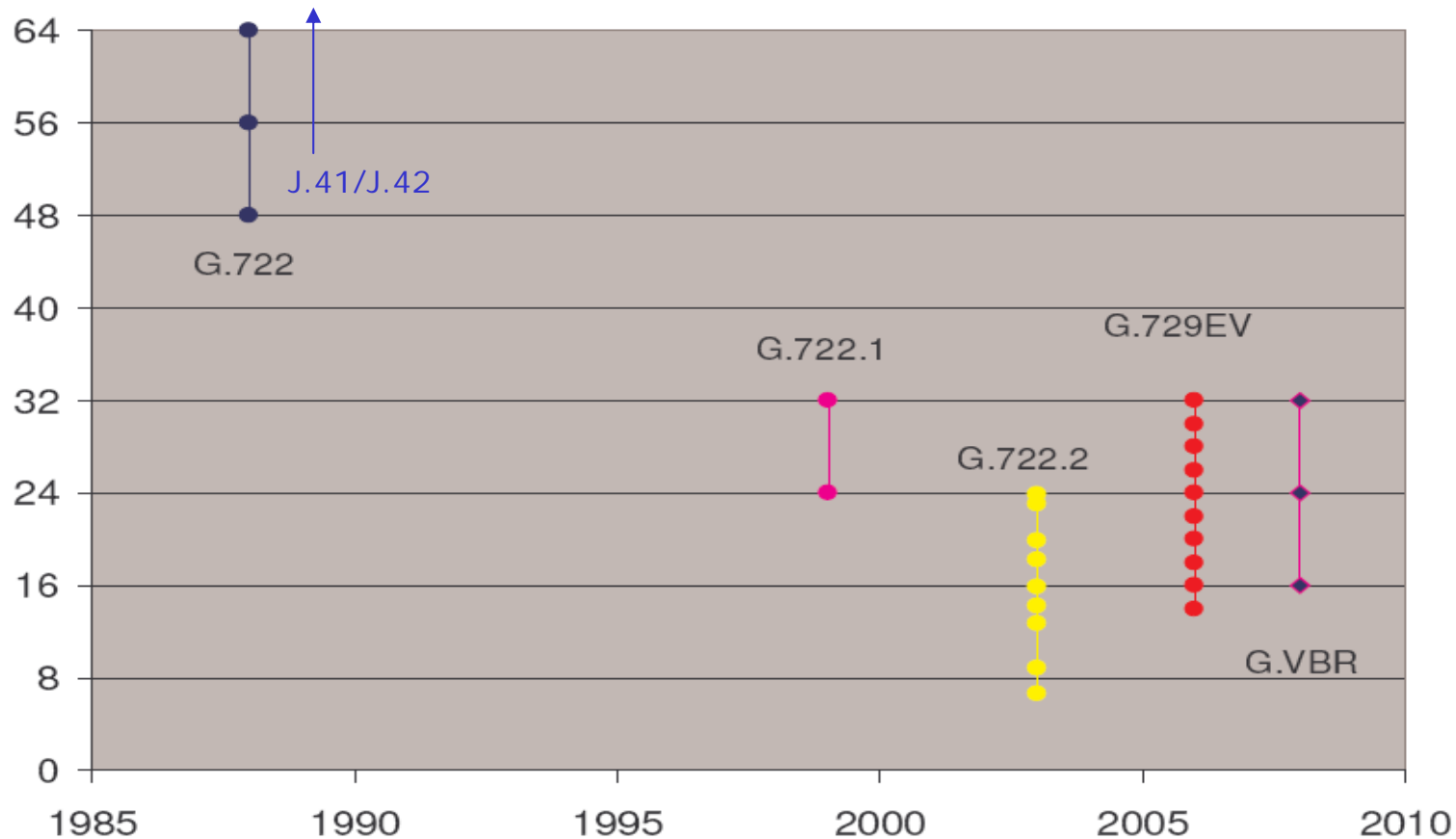
ITU-T narrowband codecs (4 kHz)



Source: Joint ITU-T/IMTC Workshop, San Diego, May 2006

Current ITU-T Standardization topics: Multimedia – Audio/speech coding

ITU-T wideband codecs (7/14 KHz)



Source: Joint ITU-T/IMTC Workshop, San Diego, May 2006

Current ITU-T Standardization topics: Multimedia – Audio/Speech coding

■ **Trends:**

- Enhance quality, flexibility, robustness
- Backward compatibility

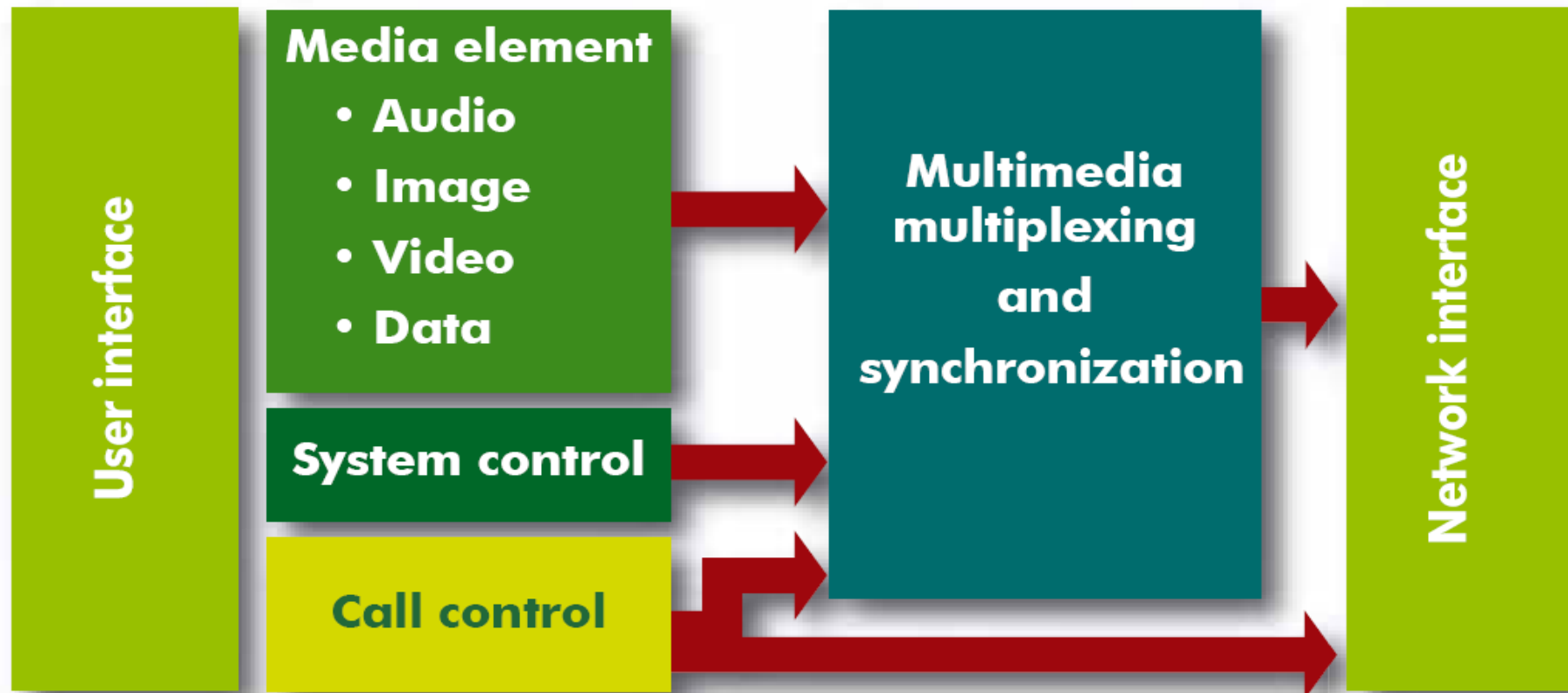
■ **New standards:**

- G.718 (ex G.VBR-EV) - Variable bit-rate embedded coding of speech signals **NEW!**
- G.718 superwideband extension - scheduled for 2009

■ **Extensions to existing standards:**

- **G.711.1:**
 - Embedded wideband extension to G.711
- **G.729.1:**
 - Low delay and silence removal (DTX/CNG) extensions
 - Floating point implementation
 - Superwideband extension
- **G.722:**
 - Packet Loss Concealment (PLC)
- **G.722.1:**
 - Floating point version
 - Fullband extension → G.719 **NEW!**
- **G.722.2:**
 - Embedded VBR extension

SG 16 Generic model for multimedia terminals



Multimedia – Various generations of Conferencing Systems in use

■ ***First Generation (ISDN)***

- H.320-Series (H.321/H322) – Narrowband visual telephone systems and terminal equipment [1992]

■ ***Second Generation***

- **IP-based networks:** H.323-Packet-based multimedia communications systems [1996]
 - packet-switched networks
 - LANs, WLANs
 - VoIP
 - Similar to SIP developed by IETF
- **Mobile networks:** H.324-Terminals for low bit-rate MM communications
 - H.324 is now implemented in many mobile phone terminals for video-telephony applications (adopted by 3GPP)

Multimedia – Next generation of conferencing systems: AMS

- Third Generation (NGN and beyond) – Advanced Multimedia System (aka “H.325”)
 - New project initiated by SG16, gaining momentum
 - Flexible, user-centric and scalable approach to support multi modes communications (e.g. audio, voice, electronic whiteboard) on NGN and non-NGN packet-based platforms.
 - **Change in paradigm:** from “monolithic applications” to a “plug in” based system (e.g. downloadable codecs)
 - Based on the experiences with H.323 and SIP
 - Currently discussing requirements and applications that will shape the system → a good moment to get involved
- New Question 12/16: “Advanced MM systems (AMS) for next generation and other packet-switched networks”:
 - Downloadable codecs
 - Discovery of services
 - Support for transcoding functionality (e.g. text to speech)
 - Application plug in
 - Support of various business models

MM Interworking

ITU-T Rec. H.246:

- Defines how the different existing generations of conferencing protocols can interwork

*Next study
period*

ITU-T Rec. H.248.1 (originally H.248) → Q3/16 [QB6/16]

- Started evolving H.246 by decomposing its H.323 Gateway function into functional subcomponents to specify the protocols these components use to communicate [[Diagram](#)]
- Base protocol expanded via add-on, need-based modules called “packages”
 - Highly scalable implementations and interconnection of IP (H.323 and SIP) and/or non-IP systems (PSTN, 3G mobile, etc)
 - e.g. Facsimile, text conversation and call discrimination packages; RTP streaming via RTSP (used for IPTV)
- Consequence 1: encourages leverage of widely deployed Switched Circuit Network (SCN) capabilities such as SS7 switches
- Consequence 2: exposure of interfaces that were hidden in various switching and PBX systems
- Consequence 3: adoption of H.248 beyond the H.323 context, in particular for NGN

New MM systems aspects being addressed

■ IPTV

- New Question 13/16
- Coordination with SG 9 in the context of IPTV-GSI, in particular Q4/9 and 5/9
- Developed initial list of target Recommendations to be developed

■ Home networking

- IPTV and multimedia architecture aspects (New H.622, ex H.GHNA)

■ Vehicular gateway

- Identify global Vehicle Gateway standards needed to allow plug-and-play of consumer devices working in vehicles to support global, seamless services/applications using Intelligent Transportation Systems
- New Question proposed by SG 16 to WTSA-08 ... but ...
- Ad hoc group already working to progress the issue

Current ITU-T Standardization topics: Multimedia – Accessibility (1)

- Q26/16: Accessibility to MM Services and Systems
 - At present focus on the needs of non-signing deaf and hard-of-hearing communities
 - Need in future to address standards to support other types of disabilities
 - Text telephony is evolving towards accessible mainstream multimedia (NGN, IPTV,...)
 - Several Recs of the F-, H-, T- and V-series describe accessibility features (V.18, V.151, T.134, H.323, H.324, H.248.2, Supplement 1 to the H-Series)
- Cooperation with Human Factors work in ITU-T SG 2
 - JCA-Accessibility and Human Factors (JCA-AHF)
- Coordination with the development sector

Current ITU-T Standardization topics: Multimedia – Accessibility (2)

- ITU-T Rec F.790 “Telecommunications accessibility guidelines for older persons and persons with disabilities”:
 - General guidelines for standardizing, planning, developing, designing and distributing all forms of telecommunications equipment, software and services
 - Guidance on understanding the topic of accessibility and the ways that accessibility may be incorporated in products and services.
- Technical Paper: “Telecommunications Accessibility Checklist”
 - To ensure that accessibility needs are taken into account from the beginning
 - “Design for all” = “Inclusive design”
 - Aligned with the new UN Convention on the rights of persons with disabilities (Dec 2006 → May 2008)

Multimedia – e-Health

- MM Framework for e-health applications (Q28/16):
 - Standardization of MM systems to support e-health applications (e.g. telemedecine):
 - Main objectives:
 - interoperability
 - cost savings
 - promote the use of MM for e-health
 - Coordination within ITU and with other SDOs
- Main achievements:
 - Technical Paper: “Roadmap for Telemedicine”
 - Creation of the e-health Standardization Coordination Group (eHSCG) with WHO, ISO/TC 215, CEN/TC 251, IEEE/1073, IEC/TC 62, DICOM, HL7 and
 - Compilation of standards in e-health (www.ehscg.org)
- Challenges:
 - Members need to share their experiences and requirements
 - Need to increase experts base, users

Present trends in Multimedia

- Great development potential for MM and multi-mode Services and applications towards AAA (Ubiquitous Services and Applications):
 - Conversational services
 - User-defined / customized services
 - Multicast/broadcast
 - Object-to-people / object-to-object communications
- New conferencing systems with greater user friendliness
- Media coding
- Network aspects of ID systems (including RFID, USN, tag-based MM info retrieval)
- IPTV
- Home networking
- Mobile office and mobile extensions (e.g. fully networked cars)

Future work

- Trends within SG (*apart from restructuring discussions*)
- Improve speech, audio and video coding algorithms: new codecs or extended features
- Advanced multimedia communication system
- Vehicular gateway studies
- Media-rich content delivery (e.g. tag-based MM retrieval, home networking, IPTV, video surveillance)
- Expand media gateway control protocol suite to respond to MM interoperability needs
- Tender to legacy systems and their interoperation with packet-based networks (e.g. modem over IP, conferencing, codec transcoding, etc)

Conclusions

- Many new technology developments happening in SG 16
- Response to trends and market needs
- Increase in contributions *and* participation indicate interest of members in this field of work
- Opportunities for contribution from developing countries as new system and technology standards are defined
- SG 16 has been a pragmatic, efficient, high-productivity study group over its 12-years of existence
 - Proposed set of Questions reflect that philosophy

Resources (1/2)

- SG16 flyers: → <http://itu.int/ITU-T/lighthouse/tflyers.html>
 - Multimedia
 - H.264
 - Accessibility
- SG16 webpage:
→ <http://itu.int/ITU-T/studygroups/com16>
- Workshops: → <http://itu.int/ITU-T/worksem>
 - Special session in EUSIPCO on advances in speech and audio coding – Lausanne, CH, 25-29 Aug 2008
 - Joint ITU and G3ict forum – Geneva, 21 Apr 2008
 - ITU-T Workshop “MM in NGN” – Geneva, 10-11 Sep 2007
 - Joint ITU-T and IMTC Forum 2006 on “H.323, SIP: is H.325 next?” - San Diego, CA, US, 9-11 May 2006
 - Workshop on “Video and Image Coding and Applications” (VICA) - Geneva, 22 - 23 July 2005

Resources (2/2)

- AMS – H.325
→ <http://itu.int/ITU-T/studygroups/com16/ams>
- Accessibility:
→ <http://itu.int/ITU-T/studygroups/com16/accessibility>
- E-Health:
 - SG16 Special projects
→ <http://itu.int/ITU-T/studygroups/com16/e-health>
 - eHSCG website
→ <http://www.ehscg.org>
- Last meeting results:
→ <http://itu.int/ITU-T/studygroups/com16/results.html>
- Contacts for more information:
→ probst-pa@bluewin.ch, simao.campos@itu.int

Supplemental slides

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H.248/MEGACO Media Gate Control Protocol

- Used in a decomposed gateway architecture linking the Media Gateway Controller (Server) and Media Gateway (Client).
- Developed in a joint effort by ITU-T SG16 and the IETF MEGACO working group. ITU-T SG16 is now the lead.
- Used for many types of gateways: traditional TDM gateways through to VoIP gateways. Small residential gateways to large operator gateways.
- Used for various media function driven scenarios: Trunking, Transcoding, Transframing, Media Server Resources, Conferencing, NAT and Firewall.
- Adopted by many standards bodies: ETSI Tispan, 3GPP, ITU-T SG11, MSF, ATIS and others.
- The core protocol H.248.1 is now version 3. H.248 "Packages" extend the functionality of the protocol. For a list see: <http://itu.int/ITU-T/recommendations/index.aspx?parent=1305>

H.248 Network usage sample

H.248 provides the “glue” between Session/Control signalling and the media resources

