ITU-T SG16
Leader in multimedia

Study Group 16 leads the ITU-T work on multimedia (MM) terminals, systems and applications, including the coordination of the studies among the various ITU-T SGs. It is also the lead study group for ubiquitous applications (“e-everything”, such as e-health and e-business).

SG16 is active in all aspects of MM standardization, including terminals, architecture, protocols, security, mobility, interworking and quality of service. It focuses its studies on conferencing systems, directory services, speech, audio and visual coding, PSTN modems and interfaces, facsimile terminals, ICT accessibility, etc.

SG16 developed a generic functional model for MM terminals which allows reuse of elements to create terminals and services that ensure interoperability across a range of different networks. The figure below illustrates that the higher-layer elements (media, systems and call control) are multiplexed according to the special requirements of the different underlying network interfaces (PSTN, IP, mobile, etc.)

**Multimedia over IP**

- H.323 is widely deployed in IP telephony networks worldwide. Carrying billions of minutes of voice traffic per month, H.323 is a market leading and an extremely scalable solution that meets the needs of both service providers and enterprises.
- H.248 has been developed in close cooperation with the IETF and defines the protocols used by media gateways, a vital component in VoIP networks and NGN.
- SG16 is also active in the field of telecommunications for disaster relief. H.460.21, for example, provides a message broadcast mechanism in H.323 systems. This ability to multicast in VoIP is especially useful in order to provide early warnings in disaster scenarios.

**Speech coding**

G.729 speech coding standard is widely used in VoIP systems. Fully interoperable with it, G.729.1 is an embedded wideband extension allowing smooth transition from narrow band to wideband VoIP telephony. Its flexible bit-rate adaptation avoids network congestion and overall quality impairment.

**Accessibility in ICTs**

With its work on the telecommunication accessibility checklist and F.790’s accessibility guidelines for standards writers, SG16 will ensure that standard makers and the telecommunication industry take into account the needs of those whose accessibility to ICTs is restricted (the deaf or hard-of-hearing for example).

**E-health**

The evolution of advanced digital telecommunication techniques has enabled the development of multimedia systems to support e-health applications, in particular in the area of telemedicine. SG16 developed a roadmap that aims at defining the areas in which open global standards for e-health applications are currently needed.

**Moving forward**

SG16 continues its tradition to innovate MM communications. Work includes defining the requirements for the H.325 next generation of MM conferencing systems and media coding (here including audio, speech, video and image). SG16 will also address MM aspects of networked identification (NDI). Why not join us and be part of all that?
Multimedia terminals and systems
H.310 – Broadband audiovisual communication
H.320 – Narrowband visual telephone systems and terminal equipment
H.321 – Adaptation of H.320 visual telephone terminals to B ISDN environments
H.322 – MM communications in LANs with guaranteed QoS
H.323 – Packet-based MM communications systems
H.324 – Terminal for low bit-rate MM communication
H.610 – VDSL triple-play – architecture and customer premises
H.611 – VDSL triple-play – OAM&P
Multimedia multiplexing and synchronization
H.221 – Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices
H.222.0 – MPEG2 system specification
H.222.1 – MM multiplexing for MM communication over ATM
H.223 – Multiplexing for low bit-rate MM communication

Service descriptions and requirements
F.700 – Framework for multimedia services
F.701 – Guideline for identifying MM service requirements
F.702 – MM conference services
F.703 – MM conversational services
F.720 – Videotelephony services – General
F.721 – Videotelephony teleservice for ISDN
F.723 – Videophone service in the PSTN
F.724 – Videotelephony service over IP networks
F.731 – MM conference services in the ISDN
F.732 – MM conference services in the B-ISDN
F.733 – MM conference services over IP networks
F.740 – Audiovisual interactive services
F.741 – Audiovisual on-demand services
F.742 – Distance learning services

Data conferencing
T.120 and T.130 series – Data protocols for multimedia conferencing

Speech and audio coding
G.191 – Software tools library for speech coding
G.711 – Pulse code modulation (PCM)
G.723.1 – 5.3 and 6.3 kbit/s speech coder for MM communications
G.726 – 40, 32, 24, 16 kbit/s ADPCM speech coding
G.727 – 5, 4, 3- and 2-bit/sample embedded ADPCM
G.728 – Coder of speech at 16 kbit/s using low-delay CELP
G.729 – Coding of speech at 8 kbit/s using CS-ACELP

Wideband (7 kHz bandwidth - 16 kHz sampling frequency)
G.722 – 7 kHz audio-coding within 64 kbit/s
G.722.1 – Coding at 24 and 32 kbit/s for hands-free operation in systems with low frame loss
G.722.2 – Wideband coding of speech at around 16 kbit/s using adaptive multi-rate wideband (AMR-WB)
G.729.1 – 8-32 kbit/s scalable wideband coder bitstream interoperable with G.729

Superwideband (14 kHz bandwidth - 32 kHz sampling frequency)
G.722.2 – Wideband coding of speech at around 16 kbit/s using adaptive multi-rate wideband (AMR-WB)

Voiceband (2 kHz bandwidth)
G.711 – Pulse code modulation (PCM)
G.723.1 – 5.3 and 6.3 kbit/s speech coder for MM communications
G.726 – 40, 32, 24, 16 kbit/s ADPCM speech coding
G.727 – 5, 4, 3- and 2-bit/sample embedded ADPCM
G.728 – Coder of speech at 16 kbit/s using low-delay CELP
G.729 – Coding of speech at 8 kbit/s using CS-ACELP

Image and video coding
H.261 – Video coder for audiovisual services p x 64 kbit/s
H.262 – (MPEG-2) video coding
H.263 – Video coding for low bit-rate communication
H.264 – Advanced video coding for generic audiovisual services
H.272 – Video gamma compensation in MM systems
T.800 series – JPEG image compression
T.860 series – JPEG 2000 image compression
T.871 – Image coding based on JPEG-1 with alternative arithmetic coder

Advanced features
F.750 – Metadata framework
H.350 series – Directory services architecture for MM conferencing
H.450 series – Supplementary services for H.323 systems
H.460 series – H.323 Generic Extensible Framework
H.501 – Protocol for mobility management and intra/inter-domain communication in MM systems

Call control
H.225.0 – Call signalling and media stream packetization for packet-based MM communication
H.450 series – Supplementary services for H.323 systems
H.501 – Protocol for mobility management and intra/inter-domain communication in MM systems

Network signal processing
G.161 – Interaction aspects of signal processing network equipment
G.168 – Digital network echo cancellers
G.169 – Automatic level control devices
G.763 – Digital circuit multiplexing equipment (DCME) using G.726 ADPCM and digital speech interpolation
G.766 – Facsimile demodulation/remodulation for DCME
G.767 – DCME using 16 kbit/s LD-CELP, digital speech interpolation and facsimile demodulation/remodulation
G.768 – DCME using 8 kbit/s CS-ACELP
G.769 – Circuit multiplexing equipment over IP networks
G.799.1 – PSTN functionality and interface specifications to interconnect PSTN and IP networks
Q.115 series – Network signal processing control

Multiplexing
H.251 – Frame structure for a 64 to 1920 kbit/s channel in audiovisual teleservices
H.222.0 – MPEG2 system specification
H.222.1 – MM multiplexing for MM communication over ATM
H.223 – Multiplexing for low bit-rate MM communication

For more information on the work of Study Group 16 visit the ITU-T website at: www.itu.int/ITU-T/studygroups/com16