Question(s):	8, 9, 10/16	Geneva, 10 July 2009

LIAISON STATEMENT

Source:	ITU-T SG 16 – Q8, 9, 10/16
Title:	LS to IESG and IETF-RAI on information on ITU-T Speech and audio coding standardisation

LIAISON STATEMENT

For action to:	**-**
For comment to:	**-**
For information to:	**IESG, IETF-RAI**
Approval:	**ITU-T WP 3/16 meeting (Geneva, 10 July 2009)**
Deadline:	**N/A**

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1.   Introduction

It has been brought to our attention that within IETF, the creation of a new IETF working group to define a wideband audio codec specifically for use with the Internet has been recently proposed. We observed that the initial proposal was followed by discussions on the IETF email reflector codec@ietf.org and that during these discussions, references to ITU-T speech and audio coding work were often made.

Despite the intervention of some individuals familiar with ITU-T standardisation work, we regrettably observe that there are still several misconceptions and out-of-date understanding of the current state of the speech and audio coding work in ITU-T. We see as paramount that any decisions to be taken in the upcoming IETF meeting be taken on a sound basis, therefore ITU-T WP3/16 would like to offer the following information on ITU-T speech and audio coders and its standardization process, in order to help allay some of the observed misconceptions.

2.   Speech and Audio Coding Standards

The ITU-T audio/speech codecs portfolio (see table below) is quite significant covering a wide range of audio bandwidths and bit rates, offering different trade-offs to address various applications with different requirements (on quality, bit rates, complexity, robustness, delay).

Audio Bandwidth [kHz]	Sampling frequency [Hz]	Bit rates [kbit/s]	ITU-T G.7xx-series
300-3400 (narrowband)	8000	5.3 → 80	G.711, G.726, G.727, G.728, G.729, G.723.1, G.729.1, G.711.1, G.718
50-7000 (wideband)	16000	6.6 → 96	G.722, G.722.1, G.722.2, G.729.1, G.711.1, G.718
50-14000 (superwideband)	32000	24 → 48	G.722.1C
20-20000 (fullband)	48000	32 → 128	G.719

Conversational applications are the primary applications and there has been an evolution from circuit-switched voice applications (e.g. PSTN and circuit multiplication equipment) to packet-based multimedia (notably IP).

ITU-T coders are extensively deployed and their modern applications go beyond the constraints for which the codecs were initially targeted. Therefore, ITU-T has extended these coders with new features to provide quick responses to customer demands and to cope with new constraints of those modern applications. For instance, Appendices to G.711 and G.722 – coders initially designed for PSTN and ISDN, respectively, provide Packet Loss Concealment (PLC) procedures to cope with packet losses that can occur during transmission over IP and other packet networks. Other functionalities have been and are being developed such as wider audio bandwidth and stereo rendering capability.

As the collection of speech and audio coding standards – from ITU and other standards development organizations (SDOs) – is considerable, before launching the standardization of a new codec leading to interoperability problems, ITU-T WP3/16 checks whether the desired codec requirements are not met by existing standards. ITU-T WP3/16 regularly updates a Media Coding Summary Data base (MCSD) which provides an authoritative summary of media coding standards of ITU-T and of other SDOs such as 3GPP, 3GPP2, ISO/IEC MPEG, ETSI, etc.

3. ITU-T Standardization Process

If market needs for a new codec *are* identified, the ITU-T speech and audio coding standardisation process has several well-defined stages from the specification of the Terms of Reference until the approval of the Recommendation. We have found over the years that this phased approach is necessary to ensure a transparent process and the best possible choice of technology for a particular purpose. The Terms of Reference contain the targeted applications, their associated design constraints and required performance (delay, complexity, audio bandwidth, bit rate, quality, etc). The approval of the Recommendation is based on the review of a list of deliverables: text of the proposed recommendation and C-code, performance in terms of quality, complexity, delay, and IPR policy (RAND or RF, see below).

In the meantime, there are several stages to thoroughly assess the performance of the candidates, the quality performance being performed in close collaboration with SG 12, which selects the best suitable testing methodologies, designs the test plan and analyses the results from the international labs appointed by SG 12 to run the quality tests. Currently, the experts in SG12 consider that subjective quality assessment based upon formal listening tests in at least two languages remains the most appropriate manner in which to evaluate codec performance and to guarantee suitability of codecs to international use. Objective quality assessment methodologies are only considered appropriate to compare alternative implementations of the same codec.

Besides rigorous testing, since the standardization of G.729 and G.723.1, ITU-T speech and audio codec Recommendation specifications use C-source code in fixed point arithmetic as the normative algorithm description method (alternative floating point implementations are also provided). For older standards, reference C-source code can be found in the ITU-T Software tool library (G.191 Annex A). This specification applies not only to the encoder <u>and</u> decoder but also to example solutions (e.g. Appendices describing packet loss concealment procedures).

Once published, ITU-T speech and audio coding Recommendations with integrated C-source code are freely downloadable.

4. IPR Aspects

With regard to the presence of intellectual property rights in our standards, the IPR policy adopted is consistent with those of other SDOs, where one must ensure that the standards can be implemented under either royalty free (RF) or reasonable and non-discriminatory terms (RAND). Extensively deployed ITU-T codecs encompass both RF and RAND policies. When the preference is RF there are ITU-T codecs to address this some of which are already used in Internet.

5. Participation in ITU-T Work

As a final observation, we would like to inform you that 191 countries (Member States) and over 700 companies of all sizes are members of ITU. There are many means to enable participation of non-ITU members in our standardization work. One tool is the participation sponsored by existing members, such as a Member State; we could cite the example of a university and later its spin-off company in North-America that for many years used that mechanism before becoming a member, and was able to successfully contribute to the development of various existing Recommendations. Another possibility commonly used is participation at meetings as invited experts. The secretariat at tsbsg16@itu.int is available to provide details to interested parties.

6. Proposal

In conclusion, we would be very happy to work with you, we will be glad to review any requirements you might develop for an "Internet wideband codec" and discuss possible ways to meet them.

Attachment:

−   MCSD version 2008-10-03

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