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Original: English

Question(s): E/16 Geneva, 15-25 October 2002
Source: ITU-T Study Group 16
Title: Liaison to multiple SDOs requesting input for “Media Coding Summary Database” project

LIAISON STATEMENT

To: ISO/IEC JTC1 SC 29/WG1 (JPEG), ISO/IEC JTC1 SC 29/WG11 (MPEG), ISO/IEC JTC1 SC 29, ITU-R SG6, ISO/IEC JTC1 SC2, ETSI, TTC, ANSI, T1, TIA, 3GPP, 3GPP2, IETF, IMTC, WAP Forum, SMPTE, W3C

Approval: ITU-T Study Group 16 (Geneva, 15-25 October 2002)

For: Action

Deadline: May 2003

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ITU-T SG16 has begun a project to develop a “Media Coding Summary Database”, which is intended to summarize the key parameters of audio, video, graphic, still-image, and character coding standards around the world. We are interested in media codecs available for general use, from whatever source. This work is taking place within Q.E of SG16.

SG16 requests your help in populating this database, especially with regard to coding standards under your responsibility, both approved and works-in-progress.

The purpose of this database is to identify areas of where additional work may be needed and areas where coordination, cross-referencing, or harmonization may be desirable. A secondary goal is to issue a brochure, web page, or other publication summarizing the available media codecs and their main parameters. SG16 has so far made no decisions regarding which types of information will be published, and at what level of detail.

The spreadsheet accompanying this liaison contains our initial skeleton for the database. In some areas data has been filled in for media codecs under the responsibility of SG16, and in a very few cases for well-known media codecs from other standardization development organizations (SDOs). These data represent the information available at this meeting of SG16, and are not to be taken as

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reviewed or verified as correct. They are present primarily to offer examples of how the fields in the database are intended to be filled out.

For these reasons we request that you do not distribute this skeleton publicly at this time; however it is our expectation that the completed database will be made available to SDOs for their own use, provided ITU-T is credited as the source.

SG16 requests your input by return liaison. Specifically,

- a. Note that the first sheet contains a key giving explanations of headings and terms.
- b. Please add new columns representing media codecs under your responsibility or control. Please fill out the table to the best of your ability (formatting is unimportant at this stage; any necessary adjustments will be made by SG16).
- c. Please make any corrections to existing data as you feel necessary. (In this case, please make such changes prominent, for example by highlighting, and provide explanations if these are not obvious.)
- d. We request also your comments and suggestions on the form, definitions, units, parameters, headings, etc. of the skeleton database – comments on all aspects of the project are welcome. Should the existing database structure seem inappropriate, please suggest alternate structures. Remarks covering missing key parameters or other missing aspects are encouraged. We realize all the information requested may not be readily available; in such cases, please use '?' and include a note.
- e. Regarding annexes or other extensions, please include information covering all portions and features of the standard(s) as currently available. Our focus is on what is available today.
- f. Finally, please suggest other sources or SDOs possessing such information.

Electronic attachment: media coding summary table (Excel format)

Media Coding Summary Table - ITU-T SG16 Q.E

Geneva, 15-25 October 2002

Source: Rapporteur, Q.E/16

Contact: D. Lindbergh, +1 978 292 5366, <lindbergh@92F1.com>

Explanation of terms & units - KEY**GENERAL HEADINGS**

Nickname	The short, informal name by which the standard is most often referred to.
Formal name	The formal identification of the standard - for example, ITU Rec. number, or ISO standard number (not the formal title).
Primary Application	A short list of primary applications for the coding standard. The following codes are used: D Digital Circuit Multiplication Equipment (DCME) DVD DVD-video M Mobile P Packet Circuit Multiplication Equipment (PCME) RN Radio news S Streaming SVD Simultaneous voice & data T Telephony (general) TC Teleconferencing TV Television V Voice on IP VC Video conferencing VT Video telephony W Wireless LAN
Approval Status	A Approved (list date of first approval date) D Draft (list scheduled approval date) NS Non-standardized but public (list date of first issue)
Original Approval	Please list date of first approval (or scheduled first approval), version or revision name (if any) Please use ISO 8601 format, YYYY-MM-DD, as this is sortable (example: 1969-07-20 is 20 July 1969). Prefix with ' in Excel to force text mode.
Latest Approval	Please list date of most recent approval (or scheduled approval), version or revision name (if any) Please use ISO 8601 date format, YYYY-MM-DD, as this is sortable (example: 1969-07-20 is 20 July 1969). Prefix with ' in Excel to force text mode.
IPR Status	0 No known applicable, in-force, patents 1 Equivalent to ITU-T patent policy 2.1 (royalty-free on condition of reciprocity) 2 Equivalent to ITU-T patent policy 2.2 (licensable on Reasonable and Non-Discriminatory terms "RAND") 3 Equivalent to ITU-T patent policy 2.3 (IP not offered as above; "in such case, no Recommendation can be established") unknown Patent status is unknown - please provide as much explanation as possible in this case other Please describe - however this table is a summary; if status falls generally into a numbered category, please use that category.
Contact	Please enter a contact with responsibility for the technical content of the standard (Rapporteur, Convener, Chair, Editor, etc.) Please include international telephone number (in E.164 format: +<country code> <international number> - for example +41 22 730 5111) Please also include an email address Please also include an institutional contact (standardization organization, etc., not only a person, whose responsibilities may change over time) If there is a stable Web address, please also include this.

AUDIO-SPECIFIC HEADINGS

Speech Model?	Indicates if a speech model is used.
Audio Bandwidth	Indicates range (min-max) of audio passband.
Bitrate(s)	List of 1 or more rates at which codec can operate. If in format (x-y) this indicates the min-max range.
VAD/DTX/CNG	Voice Activity Detection, Discontinuous Transmission, Comfort Noise Generation
Frame loss concealment?	Indicates if a codec actively conceals artifacts cause by frame loss.
Scalable Bitrate?	The codec has the ability to change characteristics such as bitrate, complexity, bandwidth, and delay
Embedded Scalability?	The encoded bitstream can be reduced in bitrate by the network with graceful degradation in quality, without transcoding.
Sample Rate	The frequency at which input samples are acquired.
Frame Length	The length of each set of independently-decodable samples.
Algorithmic Delay	The minimum time between acquisition of a given input sample at the encoder and reconstruction of the same output sample at the decoder. This value assumes instantaneous processing and zero propagation delay between encoder and decoder. Usually calculated as Frame Length + Look-Ahead.
-Fixed point Comp. Complexity	Approximate computational complexity of encoder + decoder. Units vary. This is only a rough approximation, as this value is highly dependent on implementation architecture.
-Floating pt. Comp. Complexity	Approximate computational complexity of encoder + decoder. Units vary. This is only a rough approximation, as this value is highly dependent on implementation architecture.
RAM	Approximate computational complexity of encoder + decoder. Units vary. This is only a rough approximation, as this value is highly dependent on implementation architecture. MIPS = Million instructions per second, WMOPS = Weighted Million Operations per Second (per ITU-T xxx) Random access memory necessary to implement codec.
Program ROM	Program memory necessary to store executable codec to implement codec. This is only a rough approximation, as this value is highly dependent on implementation architecture.
Table ROM	Read-only memory necessary to store tables.

VIDEO-SPECIFIC HEADINGS

Interlace coding?	Indicates if the codec has tools specifically for encoding of interlaced material.
Progressive coding?	Indicates if the codec is capable of encoding progressive frames.
Optimized Bitrate Range	Range of bitrates for which the codec has intended applications.
Min. Picture Size	Smallest picture size (in luminance samples) which can be coded.
Max. Picture Size	Largest picture size (in luminance samples) which can be coded.
Variable aspect ratio?	Indicates if the codec can handle material of a wide range of aspect ratios.
Variable frame rate?	Indicates if the codec can handle frames of irregular capture times.
4:2:0 Chrominance?	Indicates if the codec supports 4:2:0 chrominance (color) format.

4:2:2 Chrominance? Indicates if the codec supports 4:2:2 chrominance (color) format.
4:4:4 Chrominance? Indicates if the codec supports 4:4:4 chrominance (color) format.
Motion Comp. Indicates if the codec uses motion compensation techniques to improve coding performance.
Transform coding Indicates if the codec uses transforms to improve coding performance (for example, DCTs).
Compression capability Subjective and relative measure of overall coding performance. Higher values indicate noticeably better compression efficiency.

STILL-IMAGE SPECIFIC HEADINGS

Color? Indicates if codec supports color (multi spectral channel) material (vs. monochrome).
Color depth Number of bits of accuracy for each color channel.

CHARACTER-SPECIFIC HEADINGS

Bits/character Number of bits used to code each character.
Supported Language(s) A list of written languages which the character set supports (has the necessary characters for).

CONTACTS REFERENCED

Contacts listed:

Chair, 3GPP2 TSG-C1.1 - Mr. Craig Greer, <craig.greer@nokia.com>, +1 972 894 4867
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Organizations listed:

ITU-T, Place des Nations, CH-1211 Geneva 20, Switzerland, Tel: +41 22 730 51 11, Email: itumail@itu.int, http://www.itu.int
ISO, ISO Central Secretariat, 1 rue de Varembe', Case postale 56, CH-1211, Geneva 20, Switzerland, Tel: +41 22 749 01 11, Fax: +41 22 733 34 36, Email: censec@iso.org, http://www.iso.org
3GPP2, Henry Cuschieri - Director, 3GPP2, Telephone: +1 703 907 7497, Fax: +1 703 907 7728, Email: hcuschie@tia.eia.org, http://www.3gpp2.org

Possible liaison partners:

ITU-T (other SGs)
ITU-R SG6
ISO/IEC JTC1 SC2 (character coding), SC29 WG1 (JPEG), SC29 WG11 (MPEG)
ETSI
TTC
ANSI
T1
TIA
3GPP
3GPP2
IETF
IMTC
WAP Forum
SMPTE

Media Coding Summary Table - ITU-T SG16 Q.E

Geneva, 15-25 October 2002

Source: Rapporteur, Q.E/16

Contact: D. Lindbergh, +1 978 292 5366, <lindbergh@92F1.com>

AUDIO CODING

Nickname	log-PCM	G.722	SIREN	AMR-WB	G.723.1	ADPCM	Embedded		G.728	G.729	G.VBR	WB for	
	ITU-T	ITU-T	ITU-T	ITU-T	ITU-T	ITU-T	ITU-T	G.727	ITU-T	ITU-T	G.729	cdma2000	
Formal name	G.711	G.722	G.722.1	G.722.2	G.723.1	G.726	ITU-T	G.727	G.728	ITU-T	G.729	TBD	TBD
Speech Model? (Y/N)	N	N	N	Y	Y	N	N	N	Y	Y	N	N	Y
Audio Bandwidth (Hz)	300-3400	50-7000	50-7000	50-7000	300-3400	300-3400	300-3400	300-3400	300-3400	300-3400	TBD	50-7000	
Primary Application (see key)	T	T, RN, TC	VC	MT, V	VT	D	P	T, D	T, D, SVD, V	TBD	MT		
Approval Status (A, D, NS)	A	A	A	A	A	A	A	A	A	D	D		
Original Approval (date, ver)	1977	1988-11	1999-09	2002-01	1996-03	1990-12	1990-12	1992-09	1996-03	~2004	2003-07		
Latest Approval (date, ver)	1988-11	1988-11	1999-09	2002-01	1996-03	1994-11	1994-11	1992-09	1998-09	~2004	2003-07		
Bitrate(s) (kbits/sec)	48, 56, 64	48, 56, 64	24, 32	6.6, 8.85, 12	5.3, 6.4	6, 24, 32, 40	6, 24, 32, 40	16	6.4, 8, 11.8	TBD	0.8-13.2		
VAD/DTX/CNG (Y/N, Y/N, Y/N)		N/N/N	N/N/N	Y/Y/Y	Y/Y/Y	N/N/N	N/N/N	N/N/N	Y/Y/Y	TBD	?		
Frame loss concealment? (Y/N)			N	Y	Y	Y	Y	Y	Y	TBD	?		
Scalable Bitrate? (Y/N)	N	N	N	N	N	Y	Y	N	N	Y	Y		
Embedded Scalability? (Y/N)	N	Y	N	N	N	N	Y	N	N	TBD	N		
Sample Rate (kHz)	8	16	16	16	8	8	8	8	8	TBD	16		
Frame Length (msec)	0.125	0.125	20	20	30	0.125	0.125	0.625	10	TBD	20		
Algorithmic Delay (msec)	<< 1	1.625	40	25	37.5	0.125	0.125	< 2	15	TBD	35		
-Fixed point Comp. Complexity (give units)	0.01 MIPS	10 MIPS	< 15 MIPS	38 WMOPS	18-20 MIPS	?	?	35-40 MIPS	18 MIPS	TBD	40 MIPS		
-Floating pt. Comp. Complexity (give units)	0.01 MIPS									TBD	40 MIPS		
RAM (kbytes)	~0	10	2	5.3						TBD	?		
Program ROM (kbytes)										TBD	?		
Table ROM (kbytes)	~1									TBD	?		
IPR Status (0,1,2...)	0	0 or 2?	2	2	2	0 or 2?	0 or 2?	2	2	TBD	2		
Contact (see key)	Q.10/16 Ra	Q.10/16 Ra	Q.10/16 Ra	Q.7/16 Rapp	Q.10/16 Rap	Q.10/16 Rap	Q.10/16 Rap	Q.10/16 Rapp	Q.10/16 Ra	Q.10/16 Rapp.,	Q.9/16 Rap	Chair, 3GPP2 TSG-C1.1	

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VIDEO CODING

	<u>Compression Coding</u>							<u>Non-Compression Coding</u>
Nickname	H.120	H.261	MPEG-1	MPEG-2	H.263	MPEG-4	H.264/AVC	CCIR 601
Formal name	ITU-T	ITU-T	ISO/IEC	ITU-T	ITU-T	ISO/IEC	ITU-T H.264,	ITU-R
Interlace coding? (Y/N)	H.120	H.261	11172-?	H.262,	H.263	14496-2	ISO/IEC	BT.601
Progressive coding? (Y/N)	Y	N	N	Y	Y	Y	Y	Y
Optimized Bitrate Range (bits/sec)	N	Y	Y	Y	Y	Y	Y	N
Primary Applications (see key)	1.5M-2M	64k+	1M-2M	4M-20M	>= 10k	>= 10k	>= 10k	216M, 288M
Approval Status (A, D, NS)					VC, VT, S,		VC, VT, TV,	
Original Approval (date, ver)	obsolete	VC	VCD	TV, DVD	M	S, W, M	DVD, W, M	TV
Latest Approval (date, ver)	A	A	A	A	A	A	D	A
Min. Picture Size (width, height)	1984	1991	1992	1994	1996	1999	2003-02	1982
Max. Picture Size (width, height)	1988	199?	?	?	2000	2001?	2003-03	1995
Variable aspect ratio? (Y/N)	128x143	172x144	16x16	16x16	16x16	16x16	16x16	720x480
Variable frame rate? (Y/N)	256x143	352x288	4kx4k	64kx64k	2048x1152	64kx64k	4096x2048	720x576
4:2:0 Chrominance? (Y/N)	N	N	Y	Y	Y	Y	Y	N
4:2:2 Chrominance? (Y/N)	N	Y	N	difficult	Y	Y	Y	N
4:4:4 Chrominance? (Y/N)	Y	Y	Y	Y	Y	Y	Y	N
Motion Comp. (Y/N)	N	N	N	Y	N	Y	N	Y
Transform coding (Y/N)	Y	Y	Y	Y	Y	Y	Y	N
Compression capability (subjective)	N	Y	Y	Y	Y	Y	Y	N
Scalable Bitrate? (Y/N)	1	2	3	3	4	4	5	0
Embedded Scalability? (Y/N)	N	Y	Y	Y	Y	Y	Y	N
-Fixed point Comp. (give units)	N	N	N	Y	Y	Y	Y	N
RAM (kbytes)			?	?	?	?	?	216-288 MIPS
Program ROM (kbytes)			?	?	?	?	?	?
Table ROM (kbytes)			?	?	?	?	?	?
IPR Status (0,1,2...)	2	1	1	2	1	2	1, 2	0
Contact	VCEG	VCEG	MPEG	MPEG, VCEG	MPEG	MPEG	VCEG, MPEG	Chair SG6, ITU-

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STILL IMAGE CODING

STILL IMAGE CODING

Nickname	FAX	JPEG ISO/IEC	JPEG-LS ISO/IEC	JPEG-2000 ISO/IEC xxx,	GIF	PNG	TIFF
Formal name	ITU-T T.4	xxx, ITU-	xxx, ITU-T	ITU-T T.8xx			
Color? (Y/N)							
Color depth (bits/channel)							
Primary Application (see key)							
Approval Status (A, D, NS)							
Original Approval (date, ver)							
Latest Approval (date, ver)							
Embedded Scalability? (Y/N)							
-Fixed point Comp. Complexity (give units)							
-Floating pt. Comp. Complexity (give units)							
RAM (kbytes)							
Program ROM (kbytes)							
Table ROM (kbytes)							
IPR Status (0,1,2...)							
Contact (see key)							

Media Coding Summary Table - ITU-T SG16 Q.E

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Contact: D. Lindbergh, +1 978 292 5366, <lindbergh@92F1.com>

GRAPHIC CODING

Nickname	T.12x
Formal name	ITU-T T.12x
Primary Application (see key)	
Approval Status (A, D, NS)	
Original Approval (date, ver)	
Latest Approval (date, ver)	
Embedded Scalability? (Y/N)	
~Fixed point Comp. Complexity (give units)	
~Floating pt. Comp. Complexity (give units)	
RAM (kbytes)	
Program ROM (kbytes)	
Table ROM (kbytes)	
IPR Status (0,1,2...)	
Contact (see key)	

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CHARACTER CODING

Nickname	ASCII	Latin-1	EBCDIC	Unicode
Formal name	ISO 646?	ISO xx	?	ISO xx
Bits/character (bits)				
Supported Language(s) (list)	English...	?	English...	All
Primary Application (see key)				
Approval Status (A, D, NS)				
Original Approval (date, ver)				
Latest Approval (date, ver)				
IPR Status (0,1,2...)				
Contact (see key)				