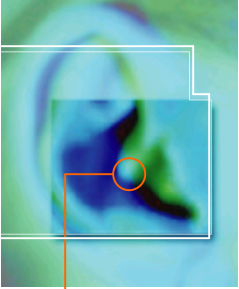


draft-ietf-avt-ilbc-codec-01
draft-ietf-avt-rtp-ilbc-01

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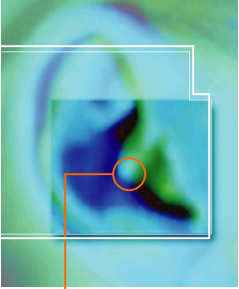




iLBC – IETF work

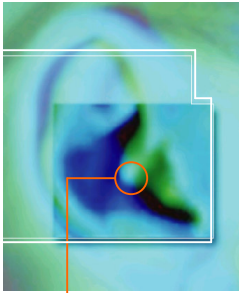
IETF deliverables (first drafts submitted during Feb-02)

- iLBC codec specification draft
 - draft-ietf-avt-ilbc-codec-01
- iLBC RTP payload format draft
 - draft-ietf-avt-rtp-ilbc-01
- Statement about IPRs in iLBC and its freeware nature

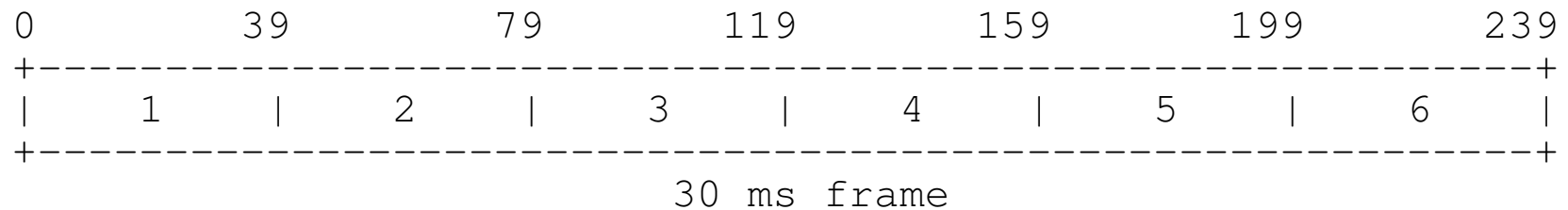
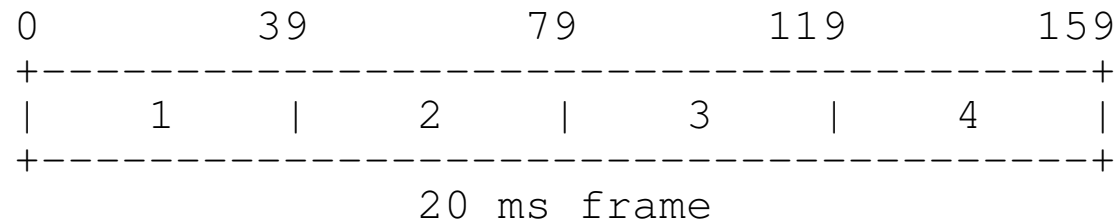


... since the last version

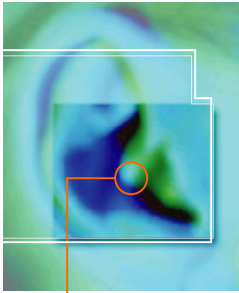
- At the SIPit 12 interop event (Stockholm, Feb 2003), verified (succesfull) interoperability of the following iLBC implementations: Pingtel, Hotsip and Kphone
- 20 ms frame size mode introduced
 - 303 bits per 20 ms frame, which are packetized within 38 bytes
 - Bitrate 15.2 kbps
- Further enhanced PLC
 - New signal re-regeneration strategy.
 - New voicing measure for noise mixing.
 - Better mixing into signal after packet loss as part of enhancer.
- Change in the SDP part of RTP payload format draft



Changes since the last version – 20 ms mode

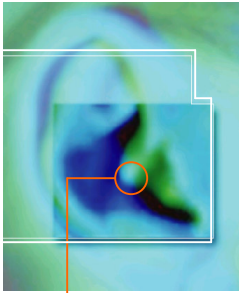


- 20 ms frame size - 4 blocks with length of 160 samples vs 6 blocks with length of 240 samples as it is the case with 30 ms mode



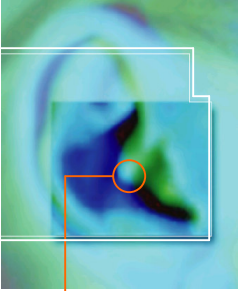
... since the last version – 20 ms mode

Parameter		Bits Class <1,2,3>		
		20 ms frame	30 ms frame	
LSF	LSF 1	Split 1	6 <6,0,0>	6 <6,0,0>
		Split 2	7 <7,0,0>	7 <7,0,0>
		Split 3	7 <7,0,0>	7 <7,0,0>
LSF 2		Split 1	NA (Not Appl.)	6 <6,0,0>
		Split 2	NA	7 <7,0,0>
		Split 3	NA	7 <7,0,0>
Sum			20 <20,0,0>	40 <40,0,0>
Block Class.			2 <2,0,0>	3 <3,0,0>
Position 22 sample segment			1 <1,0,0>	1 <1,0,0>
Scale Factor State Coder			6 <6,0,0>	6 <6,0,0>
Quantized Residual State Samples	Sample 0		3 <0,1,2>	3 <0,1,2>
	Sample 1		3 <0,1,2>	3 <0,1,2>
	:		:	:
	:		:	:
	:		:	:
	Sample 56		3 <0,1,2>	3 <0,1,2>
	Sample 57		NA	3 <0,1,2>
Sum			171 <0,57,114>	174 <0,58,116>
CB for 22/23 sample block		Stage 1	7 <6,0,1>	7 <4,2,1>
		Stage 2	7 <0,0,7>	7 <0,0,7>
		Stage 3	7 <0,0,7>	7 <0,0,7>
Sum			21 <6,0,15>	21 <4,2,15>
Gain for 22/23 sample block		Stage 1	5 <2,0,3>	5 <1,1,3>
		Stage 2	4 <1,1,2>	4 <1,1,2>
		Stage 3	3 <0,0,3>	3 <0,0,3>
Sum			12 <3,1,8>	12 <2,2,8>



... since the last version – 20 ms mode

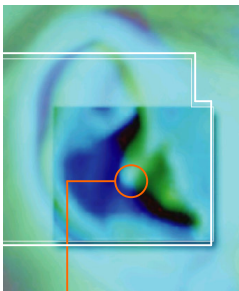
Indices for CB sub-blocks	sub-block 1	Stage 1	8 <7, 0, 1>	8 <6, 1, 1>
		Stage 2	7 <0, 0, 7>	7 <0, 0, 7>
		Stage 3	7 <0, 0, 7>	7 <0, 0, 7>
	sub-block 2	Stage 1	8 <0, 0, 8>	8 <0, 7, 1>
		Stage 2	8 <0, 0, 8>	8 <0, 0, 8>
		Stage 3	8 <0, 0, 8>	8 <0, 0, 8>
	sub-block 3	Stage 1	NA	8 <0, 7, 1>
		Stage 2	NA	8 <0, 0, 8>
		Stage 3	NA	8 <0, 0, 8>
	sub-block 4	Stage 1	NA	8 <0, 7, 1>
		Stage 2	NA	8 <0, 0, 8>
		Stage 3	NA	8 <0, 0, 8>
	Sum			46 <7, 0, 39>
Gains for sub-blocks	sub-block 1	Stage 1	5 <1, 2, 2>	5 <1, 2, 2>
		Stage 2	4 <1, 1, 2>	4 <1, 2, 1>
		Stage 3	3 <0, 0, 3>	3 <0, 0, 3>
	sub-block 2	Stage 1	5 <1, 1, 3>	5 <0, 2, 3>
		Stage 2	4 <0, 2, 2>	4 <0, 2, 2>
		Stage 3	3 <0, 0, 3>	3 <0, 0, 3>
	sub-block 3	Stage 1	NA	5 <0, 1, 4>
		Stage 2	NA	4 <0, 1, 3>
		Stage 3	NA	3 <0, 0, 3>
	sub-block 4	Stage 1	NA	5 <0, 1, 4>
		Stage 2	NA	4 <0, 1, 3>
		Stage 3	NA	3 <0, 0, 3>
	Sum			24 <3, 6, 15>
SUM			303 <48, 64, 191>	399 <64, 96, 239>



Mapping to SDP parameters

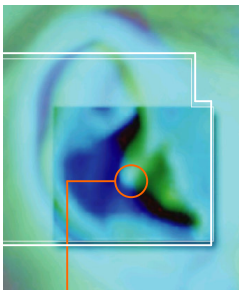
- If 20 ms frame size mode is about to be used, remote iLBC encoder SHALL receive “mode” parameter in the SDP “a=fmtp” attribute
- Parameter “mode” values are 0, 20 or 30 (0 - support of both frame size modes; 20 - preferred 20 ms frame size, etc.).
- An example of the media representation in SDP, describing iLBC when 20 ms frame size mode is used, might be:

```
m= audio 49120 RTP/AVP 97  
a= rtpmap:97 iLBC/8000  
a= fmtp:97 mode= 20
```



Open Issues (coming features)

- ✓ • Reduction to (52) 50 bytes of payload per 30 ms
- ✓ • Bit packing prepared i optimized for ULP
- ✓ • Complexity optimization related work
- ✓ • 20 ms frame option
- Voice activity detection and comfort noise generation



The Way Forward

- Qualification Criteria Draft
- Advance towards the WGLC

*For demo SIP client with iLBC contact:
email/ sip: alan.duric@globalipsound.com*

*More information on iLBC, source code, implementations, ...
www.iLBCfreeware.org*