BABV

KESIMPULAN

1. Dengan teknik *Voice compression* (kompresi suara) yang dilakukan dengan menggunakan teknologi MFCM, maka *voice* dapat disalurkan dengan kecepatan 8 Kbps.

2. Aplikasi MFCM pada ISDN, dengan teknik TDM (*Time Division Multiplexing*) pada kanal B yang mempunyai kecepatan 64Kbps dapat menyediakan kanal dengan sebanyak 8 buah.

3. MFCM yang mengunakan standar kompresi G.723.1 pada penilaian MOS (Mean Opinion Score) berada pada point sekitar ± 4,08 nilai ini hampir sama dengan waveform coder 64 Kbps yang berarti mempunyai tingkatan kualitas "*baik*".

4. Berdasarkan sebuah asumsi, pengoptimasian kanal *bandwidth* diperlukan 600 Kbyte per 5 menit untuk mendapatkan 10 sambungan telepon dan data transfer sebesar 1800 Kbyte atau berkisar 25%.

5. Apabila dibandingkan dengan jumlah kanal yang tidak dioptimasi, 600 Kbyte tidak dapat membuat sebuah 10 panggilan dalam 1 menit tetapi hanya dapat melakukan 10 panggilan dalam 7,5 detik hal ini dikarenakan kanal yang tidak teroptimasi memerlukan 480 Kbyte/menit (64 Kbps : 8 bit = 8 Kbyte/s x 60 detik = 480 Kbyte).

DAFTAR PUSTAKA

1. Tanenbaum Andrew S., "Jaringan Komputer", Edisi Bahasa Indonesia dari Computer Network Edisi I, tahun 1997.
2. Green. DC, "Komunikasi Data", Penerbit ANDI Yogyakarta, Edisi ke 3, tahun 2000
3. Held Gil, "Voice & Data Internetworking", McGraw-Hill Co, tahun 2000.
4. Minolli.D & Minolli. E, "Delivering Voice Over IP Network". John Wiley & Sons, New York, tahun 1988.
5. ....."J1000 Product" JTEC Pty, www.jtec.com.au

LAMPIRAN

Specifications

Model	J1800	J1700	J1600	J1400	J1200
Module Slots					
Virtual eXchange	14	14	5	3	N/A
Access Controller	14	14	5	3	N/A
Interfaces Supported					
ISDN Primary Rate	Yes	Yes	Yes	Yes	No
ISDN Basic Rate	Yes	Yes	Yes	Yes	Yes
E1 (G.703/704)	Yes	Yes	Yes	Yes	No
Digital V.24, V.35,	Yes	Yes	Yes	Yes	Yes
X.21	Yes	Yes	Yes	Yes	No
Analog 2 wire, 4 wire					
Utilities Supported					
Subrate Multiplexing	Yes	Yes	Yes	Yes	Yes
Voice Compression	Yes	Yes	Yes	Yes	No
B-Channel Aggregation	Yes	Yes	Yes	Yes	Yes
CLI Verification	Yes	Yes	Yes	Yes	No
Power Supplies					
240V AC	Yes	Yes	Yes	Yes	Yes
48VDC	Yes	Yes	No	No	No
Redundancy	Yes	Yes	No	No	No
JUMP Management	Yes	Yes	Yes	Yes	Yes

Operating Environment

J1800 and J1700

Power	240V AC, 50Hz. or 48V DC 310 Watts (maximum configuration)
Temperature	5°C to 50°C (400°F to 122°F)
Humidity	20% to 80% non-condensing
Size	35.6cm High, 48.2cm Wide, 34.5cm Deep
Weight	22.5kg (maximum configuration)
Mounting	19" Rackmount (8 RU). Wall-mount optional

J1600

Power	240V AC, 50Hz. 310 Watts maximum
Temperature	5°C to 50°C
Humidity	20% to 80% non-condensing
Size	34.2cm High, 23.8cm Wide, 35.7cm Deep
Weight	11.5 kg (maximum configuration)
Mounting	Desktop. Wall-mount optional

J1400

Power	240V AC and 110V AC, maximum 60Hz
Temperature	0°C to 50°C
Humidity	5% to 95% non-condensing
Size	12cm High, 42.5cm Wide, 33.5cm Deep
Weight	8kg (maximum configuration)
Mounting	Desktop. Rack-mount optional

J1200

Power	240V AC. 50Hz. 16 Watts maximum

Temperature	0°C to 40°C
Humidity	5% to 95% non-condensing
Size	7.3cm High, 28.1cm Wide, 28.7cm Deep
Weight	2.8kg
Mounting	Desktop and wall-mount standard

ALPM Specifications

Interface	Analog voice, 4 ports
Connector	RJ11 female (ALEM & ALPM) RJ45 female (EMM & EMM-2)
Port protocol	Loop-in, ring-out (ALEM) Ring-in, loop-out (ALPM) C2 signalling, earth on or earth off idle (EMM) Type 1, 2, 3, 5 (or C2), earth on or off idle (EMM-2)
Dialling	Pulse or tone
Applicable standards	Austel TS003
Call types	Switched or semipermanent (Semipermanent circuits are currently only available in Australia)
Call establishment modes	Normal dialling Indial access (ALPM, EMM & EMM-2) Hotline dialling Switched via JUMP

BRM Specifications

		BRMN BRMT	DBRM	QBRM
Connector	RJ45 modular jack female			
Applicable standards	ITU-T Q.921 and Q.931	✓	✓	✓
	ETSI (S itf)	✓	✓	✓
	BTNR 191 (Sitf)	✓		
	ACA TS013 (S itf)	✓	✓	✓
	US N1-1 (S itf)		✓	✓
	US N1-1 (U its)		✓*	✓

Call types	Switched and semipermanent (Semipermanent circuits are currently only available in Australia)
BRA Ports	1 (BRMN & BRMT) 2 (DBRM & DBRM-U) 4 (QBRM & QBRM-U)
Data rate	192 kbit/s per BRA port (two B-channels and one D-channel)

MFCM Spesification

Voice compression Algoritm	MP-MLQ
Aplicable standard	ITU-T G.723.1
Data rate	6,3 kbit/s voice bit rate encapsulated in 8 kbit/s (provided to support the 9600 bps fax transmission) communication channel.
G3 Fax relay speed	2400, 4800, 7200,9600 bps
Channels per card	8

SDLM Specifications

Call types	Switched and semipermanent†		
SDLM			
Interfaces	X.21	V.35	V.24
Call establishment modes	C lead X.21 Manual	RS lead Manual	DTR lead Manual

†Semipermanent circuits are currently only available in Australia.

Data rates

User Rate (kbit/s)	*Module Type*	*Channel Bandwidth (kbit/s)*	*Rate Adaption Standard*
0.6	SDLM	8	V.110/X.30
1.2	SDLM	8	V.110/X.30
2.4	SDLM	8	V.110/X.30
4.8	SDLM	8	V.110/X.30
8	SDLM	8	I.460
9.6	SDLM	16	V.110/X.30
16	SDLM	16	I.460
19.2	SDLM	32	V.110/X.30
24	SDLM	32	proprietary
32	SDLM	32	I.460
48	SDLM	64	V.110/I.464
56	SDLM	64	V.110/I.464
64	SDLM	64	none

Annex I—G.723.1 MP-MLQ Dual Rate Speech Coder

I.1 Reference Document

[1] ITU G.723.1 Dual Rate Speech Coder for Multimedia Communications Transmitting at 5.3 & 6.3 kbit/s, March 1996

I.2 Transfer Structure

Voice samples that are compressed using the 6.3 kbit/s MP-MLQ algorithm (G.723.1 high rate) and 5.3 kbit/s ACELP algorithm (G.723.1 low rate) yield a frame of packed parameters for every 240 samples of input speech from a 8000 sample/sec stream. Some of these parameters are based on an analysis of the entire frame; others are based on the analyses of each of the four component 60 sample sub-frames. Figure I-1 shows of list of transmitted parameters for both MP-MLQ and ACELP.

For MP-MLQ, the resulting 191-bit frame is formatted to fit within the 24 octet structure of the Voice Information Field (one bit is unused) as defined in Figure I-2. For ACELP, the resulting 160-bit frame is formatted to fit within the 20 octet structure of the Voice Information Field as defined in Figure I-1. In Figure I-2 and Figure I-3, each bit of transmitted

Figure I-1
List of transmitted parameters.

Name	Transmitted parameters	high rate	low rate # bits
LPC	LSP VQ index	24	24
ACL0	Adaptive Code-Book Lag	7	7
ACL1	Differential Adaptive Code-Book Lag	2	2
ACL2	Adaptive Code-Book Lag	7	7
ACL3	Differential Adaptive Code-Book Lag	2	2
GAIN0	Combination of adaptive and fixed gains	12	12
GAIN1	Combination of adaptive and fixed gains	12	12
GAIN2	Combination of adaptive and fixed gains	12	12
GAIN3	Combination of adaptive and fixed gains	12	12
POS0	Pulse positions index	20*	12
POS1	Pulse positions index	18*	12
POS2	Pulse positions index	20*	12
POS3	Pulse positions index	18*	12
PSIG0	Pulse sign index	6	4
PSIG1	Pulse sign index	5	4
PSIG2	Pulse sign index	6	4
PSIG3	Pulse sign index	5	4
GRID0	Grid index	1	1
GRID1	Grid index	1	1
GRID2	Grid index	1	1
GRID3	Grid index	1	1

*Note: The 4 msb of these code-words are combined to form a 13 bit index, msb Position

Figure 1-2 Figu
Octet Packing for the 6.3 kbps MP-MLQ codec.

TRANSMITTED	PARx_By, ...
1	LPC_B5...LPC_B0, VADFLAG_B0, RATEFLAG_B0
2	LPC_B13...LPC_B6
3	LPC_B21...LPC_B14
4	ACL0_B5...ACL0_B0, LPC_B23, LPC_B22
5	ACL2_B4...ACL2_B0, ACL1_B1, ACL1_B0, ACL0_B6
6	GAIN0_B3...GAIN0_B0, ACL3_B1, ACL3_B0, ACL2_B6, ACL2_B5
7	GAIN0_B11...GAIN0_B4
8	GAIN1_B7...GAIN1_B0
9	GAIN2_B3...GAIN2_B0, GAIN1_B11...GAIN1_B8
10	GAIN2_B11...GAIN2_B4
11	GAIN3_B7...GAIN3_B0
12	GRID3_B0, GRID2_B0, GRID1_B0, GRID0_B0, GAIN3_B11...GAIN3_B8
13	MSBPOS_B6...MSBPOS_B0, UB
14	POS0_B1, POS0_B0, MSBPOS_B12...MSBPOS_B7
15	POS0_B9...POS0_B2
16	POS1_B2, POS1_B0, POS0_B15...POS0_B10
17	POS1_B10...POS1_B3
18	POS2_B3...POS2_B0, POS1_B13...POS1_B11
19	POS2_B11...POS2_B4
20	POS3_B3...POS3_B0, POS2_B15...POS2_B12
21	POS3_B11...POS3_B4
22	PSIG0_B5...PSIG0_B0, POS3_B13...POS3_B12
23	PSIG2_B2...PSIG2_B0, PSIG1_B4...PSIG1_B0
24	PSIG3_B4...PSIG3_B0, PSIG2_B5...PSIG2_B3

Figure 1-3
Octet Packing for the 5.3 kbps ACELP codec.

TRANSMITTED OCTETS	PARx_By, ...
1	LPC_B5...LPC_B0, VADFLAG_B0, RATEFLAG_B0
2	LPC_B13...LPC_B6
3	LPC_B21...LPC_B14
4	ACL0_B5...ACL0_B0, LPC_B23, LPC_B22
5	ACL2_B4...ACL2_B0, ACL1_B1, ACL1_B0, ACL0_B6
6	GAIN0_B3...GAIN0_B0, ACL3_B1, ACL3_B0, ACL2_B6, ACL2_B5
7	GAIN0_B11...GAIN0_B4
8	GAIN1_B7...GAIN1_B0
9	GAIN2_B3...GAIN2_B0, GAIN1_B11...GAIN1_B8
10	GAIN2_B11...GAIN2_B4
11	GAIN3_B7...GAIN3_B0
12	GRID3_B0, GRID2_B0, GRID1_B0, GRID0_B0, GAIN3_B11...GAIN3_B8
13	POS0_B7...POS0_B0
14	POS1_B3...POS1_B0, POS0_B11...POS0_B8
15	POS1_B11...POS1_B4
16	POS2_B7...POS2_B0
17	POS3_B3...POS3_B0, POS2_B11...POS2_B8
18	POS3_B11...POS3_B4
19	PSIG1_B3...PSIG1_B0, PSIG0_B3...PSIG0_B0
20	PSIG3_B3...PSIG3_B0, PSIG2_B3...PSIG2_B0

parameters is named PAR(x)_By: where PAR is the name of the parameter and x indicates the G.721 sub-frame index if relevant and y stands for the bit position starting from 0 (lsb) to the msb.

The expression PARx_By PARx_Bz stands for the range of transmitted bits from bit y to bit z. The unused bit is named UB (value = 0). RATE-

FLAG_B0 tells whether the high rate (0) or the low rate (1) is used for the current frame. VADFLAG_B0 tells whether the current frame is active speech (0) or non-speech (1). The combination of RATEFLAG and VADFLAG both being set to 1 is reserved for future use. Octets are transmitted in the order in which they are listed in Figure I-2 and Figure I-3. Within each octet shown, the bits are ordered with the most significant bit on the left.

I.3 Transfer Protocol

When the VoFR service user offers a frame of sampled speech it is immediately transmitted using the transfer structure described above in Section I.2.

I.4 Transfer Characteristics

Packetization Time: 30 ms

Other Capabilities:

In-Band Tone Handling—Can pass DTMF

Figure I-4 MP-MLQ and ACELP transfer characteristics.

Algorithm Name	Reference Document	Compression Rate	Frame Size
MP-MLQ	ITUG.723.1	6.3 kbit/s	24 octets
ACELP	ITUG.723.1	5.3kbit/s	20 octets

I.5 Optional Sequence Number

Transmission of sequence numbers may be configured on a sub-channel basis. When enabled, the voice transfer syntax defined in Section I.2 is encapsulated in the Voice Transfer Structure field of the Active Voice Payload shown in Figure F-2. The Sequnce Number of Figure F-2 shall be incremented every 10 msec. The Coding Type field of Figure F-2 shall be set to 0000.