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TCP/IP

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- VOIP (Voice Over Internet Protocol)
- IP Telephony (Internet Protocol Telephony)

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┌─────────────────────────────┐
│                             │
│   Real Time Applications    │
│                             │
└─────────────────────────────┘
              │
      ┌───────┴───────────────────┐
      ▼                           ▼
┌──────────────────┐   ┌──────────────────────┐
│                  │   │                      │
│ With Teleconfer- │   │ Without Teleconfer-  │
│ encing           │   │ encing               │
└──────────────────┘   └──────────────────────┘
      │
  ┌───┼──────────┐
  ▼   ▼          ▼
┌────┐┌──────┐┌───────┐
│Data││Sound ││ Video │
└────┘└──────┘└───────┘
         │
         ▼
   ┌──────────────────────┐
   │        VOIP          │
   └──────────────────────┘
              │
   ┌──────────┼──────────────┐
   ▼          ▼              ▼
┌──────────┐┌──────────┐┌──────────────┐
│ Internet ││Multimedia││ IP Telephony │
│Teleconfer││ calling  ││              │
│encing    ││          ││              │
└──────────┘└──────────┘└──────────────┘
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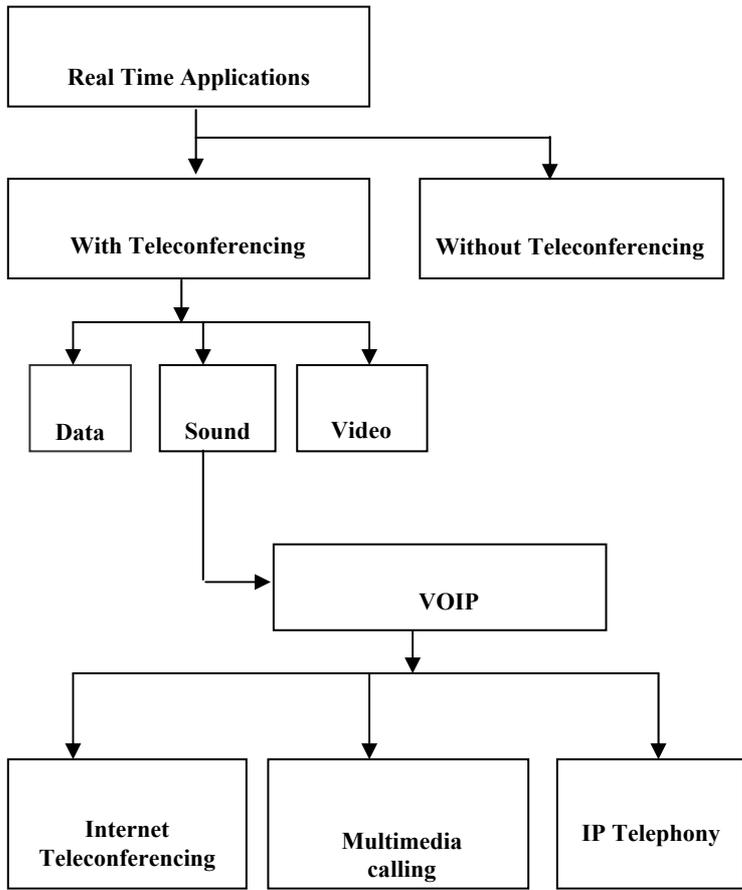
(١)   **VOIP** وَ **IP Telephony**

(Video)   (Data)

.(Video conferencing)

[٢].(TCP/IP)
(Transmission Control Protocol / Internet Protocol).
.(RTP)
(Real-time Transport Protocol).

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(IP Phone To IP Phone)

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Asymmetric Digital Subscriber Line.: ADSL

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SDSL: symmetric Digital Subscriber Line.

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HDLC: High-level Data Link Control.

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ATM (Type ALL°): Asynchronous Transfer mode.

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.VOIP   -
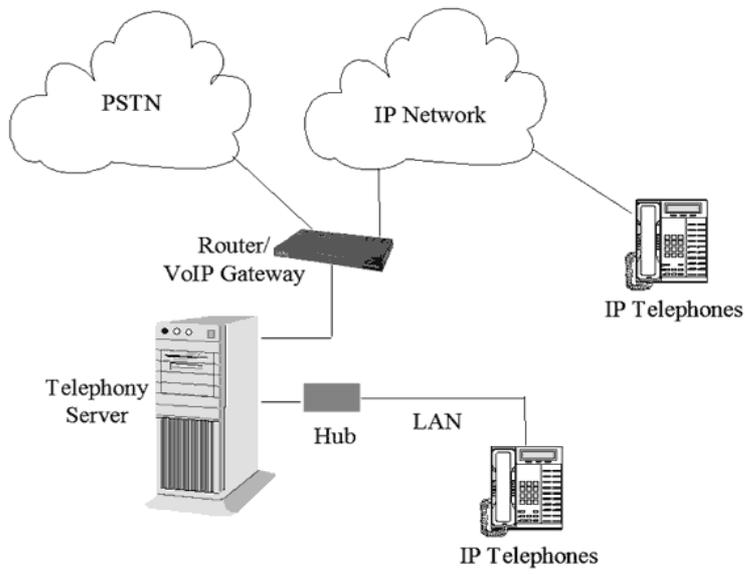
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:VOIP

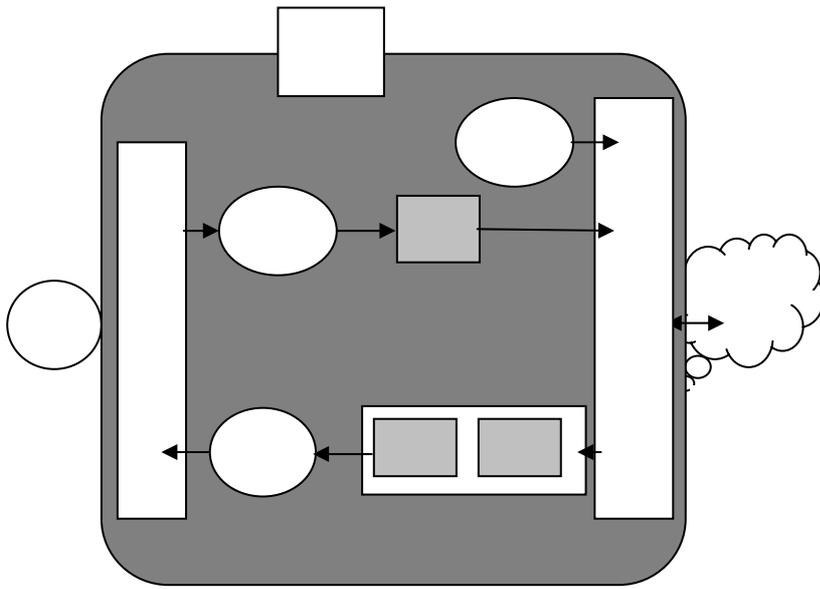IP   Phone

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IP

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IP

(PSTN)   (Gateway)

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VOIP

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VOIP

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(٢) IP Phone

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IP   IP
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VOIP

(IP Telephone   )

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VOIP

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:(Echo)

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:(Conversational interaction)

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:(Interconnection between networks)

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금	Encoding:A/D

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금	:Packetization

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금	:Packet Queuing	VOIP

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금	:Digital Subscriber Line (DSL)

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금	:Network Delay

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금	:Decoding

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금 :Dejittering Buffer

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■ : **PCM**

Pulse Code Modulation (٦٤ /).

■ ٤٠ [٨]

(IP Internet Protocol

UDP User Datagram Protocol

RTP Rial time Transort Protocol).

■ Payload .

■ :

○ HDLC .

○ .

○ ATM AAL .

■ ADSL

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■ SDSL (

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■ ١٥٠٠ .

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	/ ATM		HDLC		
	SDSL	ADSL	SDSL	ADSL	
	٤٠	٤٠	٤٠	٤٠	( )
	١٠٦	١٠٦	٨٥	٨٥	( )
	٠,٧	٠,٧	٠,٧	٠,٧	( )
	٥	٥	٥	٥	( )
	٠,٢	٠,٤	٠,٢	٠,٣	( )
	١,٧	٣,٣	١,٣	٢,٧	( )
	٣	٦	٣	٦	( )
	٢٣,٨	٤٧,٧	٢٣,٨	٤٧,٧	( )
	١,٧	٣,٣	١,٣	٢,٧	( )
	١,٢	٤	١,٢	٤	DSL( )
	٥	٥	٥	٥	( )
	٢	٢	٢	٢	( )
	٠,٧	٠,٧	٠,٧	٠,٧	( )
	٤٥	٧٨,١	٤٤,٢	٧٦,٨	( )
	٢,٥	٥٣	٢٧,١	٥٢,٤	( )
	١٧٠	١٧٠	١٣٦	١٣٦	/ Kbit/S

الجدول (١) مخطط نقل الصوت الأولي

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ATM				HDLC		
SDSL	ADSL	SDSL	ADSL	SDSL	ADSL	
١٦٠	١٦٠	١٦٠	١٦٠	١٦٠	١٦٠	( )
٢٦٥	٢٦٥	٢٢٦	٢٢٦	٢٠٥	٢٠٥	( )
٠,٧	٠,٧	٠,٧	٠,٧	٠,٧	٠,٧	( )
٢٠	٢٠	٢٠	٢٠	٢٠	٢٠	
٠,٥	١	٠,٤	٠,٩	٠,٤	٠,٦	
٤,١	٨,٣	٣,٥	٧,١	٣,٢	٦,٤	
٤,١	٨,٣	٣,٥	٧,١	٣,٢	٦,٤	
١,٢	٤	١,٢	٤	١,٢	٤	DSL
٥	٥	٥	٥	٥	٥	
٢	٢	٢	٢	٢	٢	
٠,٧	٠,٧	٠,٧	٠,٧	٠,٧	٠,٧	
٣٨,٣	٥٠	٣٧	٤٧,٥	٣٦,٤	٤٣,٤	
٦,١	١٠,٣	٥,٥	٩,١	٥,٢	٤,٨	

١٠٦	١٠٦	٩٠,٤	٩٠,٤	٨٢	٨٢	/ Kbit/S

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ATM

ATM

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DSL

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ATM				HDLC		
SDSL	ADSL	SDSL	ADSL	SDSL	ADSL	
٨٠	٨٠	٨٠	٨٠	٨٠	٨٠	( )
١٥٩	١٥٩	١٤٦	١٤٦	١٢٥	١٢٥	
١	١	١	١	١	١	
٢٠	٢٠	٢٠	٢٠	٢٠	٢٠	
٠,٣	٠,٦	٠,٣	٠,٦	٠,٢	٠,٥	
٢,٥	٥	٢,٣	٤,٦	٢	٣,٩	
٢,٥	٥	٢,٣	٤,٦	٢	٣,٩	
١	١	١	١	١	١	

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٢٧,٣	٣٢,٦	٢٦,٩	٣١,٨	٢٦,٢	٣٠,٣	
٦٣,٦	٦٣,٦	٥٨,٤	٥٨,٤	٥٠	٥٠	/ Kbit/S

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(ADSL)   (٢٥٦ /)   (٥٠   ).

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VOIP

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IP

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G.٧١١ [١٠]

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VOIP

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KHZ

ITU
International Telecommunication Union
Kbit/s

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	(Kbit/s)	
(PCM)	٦٤	G.٧١١
(ADPCM)	٤٠ – ١٦	G.٧٢٦
(LD-CELP)	١٦	G.٧٢٨
(ACELP)	٨	G.٧٢٩
(MP-	٦,٣ – ٥,٣	G.٧٢٣,١

		MLQ)
GSMFR	١٣	(RPE-LTP)
GSMEFR	١٢،٢	(ACELP)

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■ G.

● CELP

△ GSM-
EFR

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G.٧٢٦

[٩] GSM-EFR   [١٢]   ٣٢Kbit/s

١٢,٢Kbit/s .

VOIP   (PCM)،

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[٩] GSM-EFR   [١٢]   ٣٢Kbit/s

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VOIP

(G. ,GSM-EFR)

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IP

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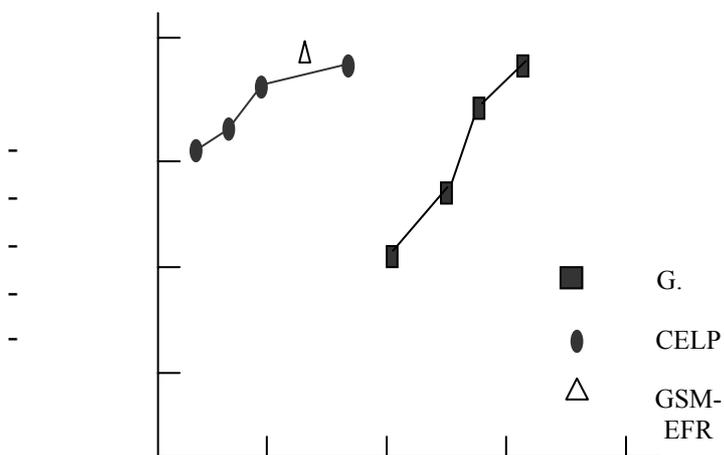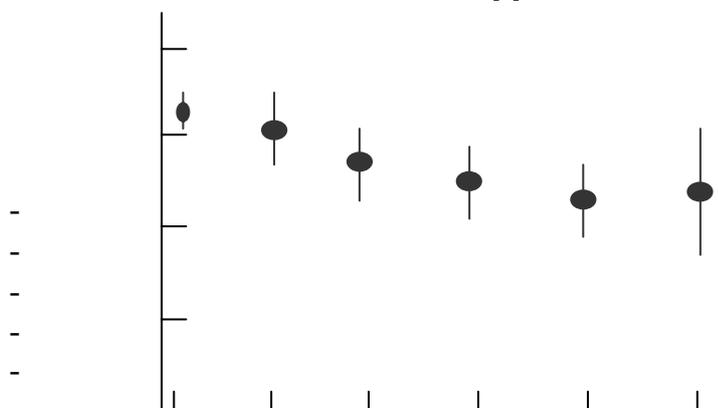
VOIP

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(Subjective Tests)

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PCM ٦٤Kbit/S

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G.٧٢٩   EFR   EFR   G.٧٢٩

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٣٠٠ms   VOIP   [٩]

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G.١١٤   ITU

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	(ms)
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G.١١٤   (٥)

QoS   TIPHON   VOIP

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:Perceptual Evaluation of Speech Quality (PESQ)

ITU   .

:Perceptual Analysis Measurement System (PAMS)

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VOIP

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- VOIP: Voice Over Internet Protocol
- DSL: Digital Subscriber Line
- ADSL: Asymmetric DSL
- SDSL: Symmetric DSL
- HDLC: High-level Data Link Control
- IP: internet Protocol
- UDP: Unix Data-gram Protocol
- RTP: Real Time Transport Protocol
- ATM(type ALL٥): Asynchronous Transfer Mode type   ATM
                        Adaptation Layer٥
- PSTN: Public Switched Telephone Network
- PCM: Pulse Code Modulation
- ITU: International Telecommunication Union
- GSM: Global System for Mobile communication
- GSM-EFR: GSM Enhanced Full Rate
- QoS: Quality of Service
- CELP: Code-Excited Linear Prediction
- PESQ: Perceptual Evaluation of Speech Quality
- PAMS: Perceptual Analysis Measurement System

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