Voice Over IP: Next Generation Consumer Telephony Services

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Outline

- Introduction
- Drivers
- Technology
- Outlook

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Voice Over IP: Next Generation Consumer Telephony Services

Abstract:

Although the internet was not designed to carry voice and other delay sensitive streaming media, the combination of: wide bandwidth residential access, technical standards that facilitate low cost economies of scale, forbearance from taxing and government regulation, and some unique features is driving the migration of Voice Over IP (VoIP) from enterprise to consumer applications. Already the small startup pioneers are facing competition from brand name providers such as Verizon and AT&T. Poised for entry into the VoIP space are all the cable TV providers who are now moving beyond beta rollouts into expanded geographic offerings.

While there are several variations on service features and a range of costs what nearly all these VoIP services share is a cost less than 1/2 of basic circuit switched services. In addition most service providers provide the full set of class services (e.g. call waiting, conference calling, caller ID, etc) and unlimited domestic local and long distance calling for the same low flat rate.

By taking advantage of the intrinsic portability of the signaling schemes used in Session Initiation Protocol (SIP) these services typically go beyond "me-too" voice telephony and allow such expanded capabilities as multiple off premise extensions, unified messaging, presence, and multimedia support beyond just voice. In the early stages of development are hybrid combinations of wide area wireless cellular telephony together with local area wireless VoIP.

This presentation will review the recent history and current state of the art in VoIP as applied to residential public network telecommunications services. An overview of the key foundation technologies will be provided along with a look at the likely future evolution of the technology and services.

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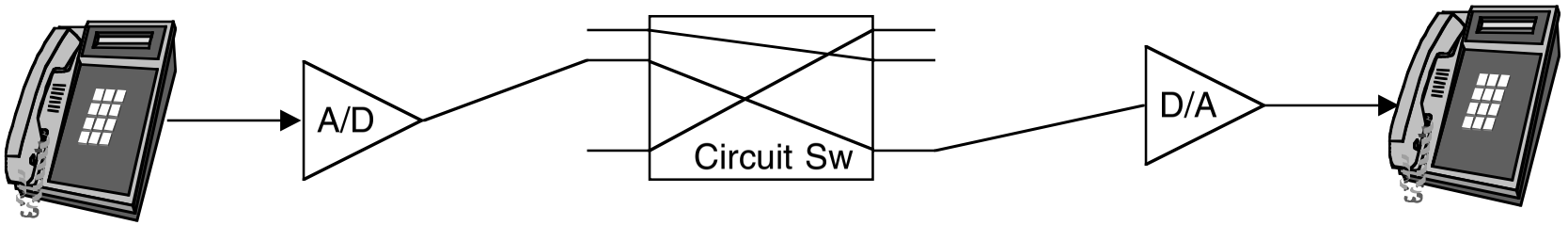
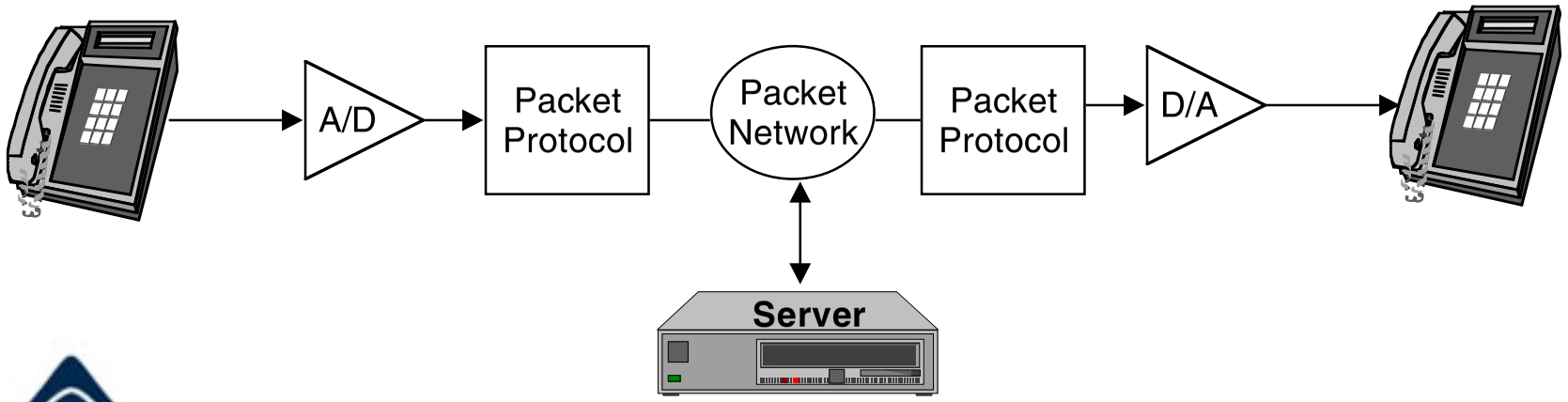
Although modern public network telephony incorporates digital technology the switching fabric is circuit versus packet switched.





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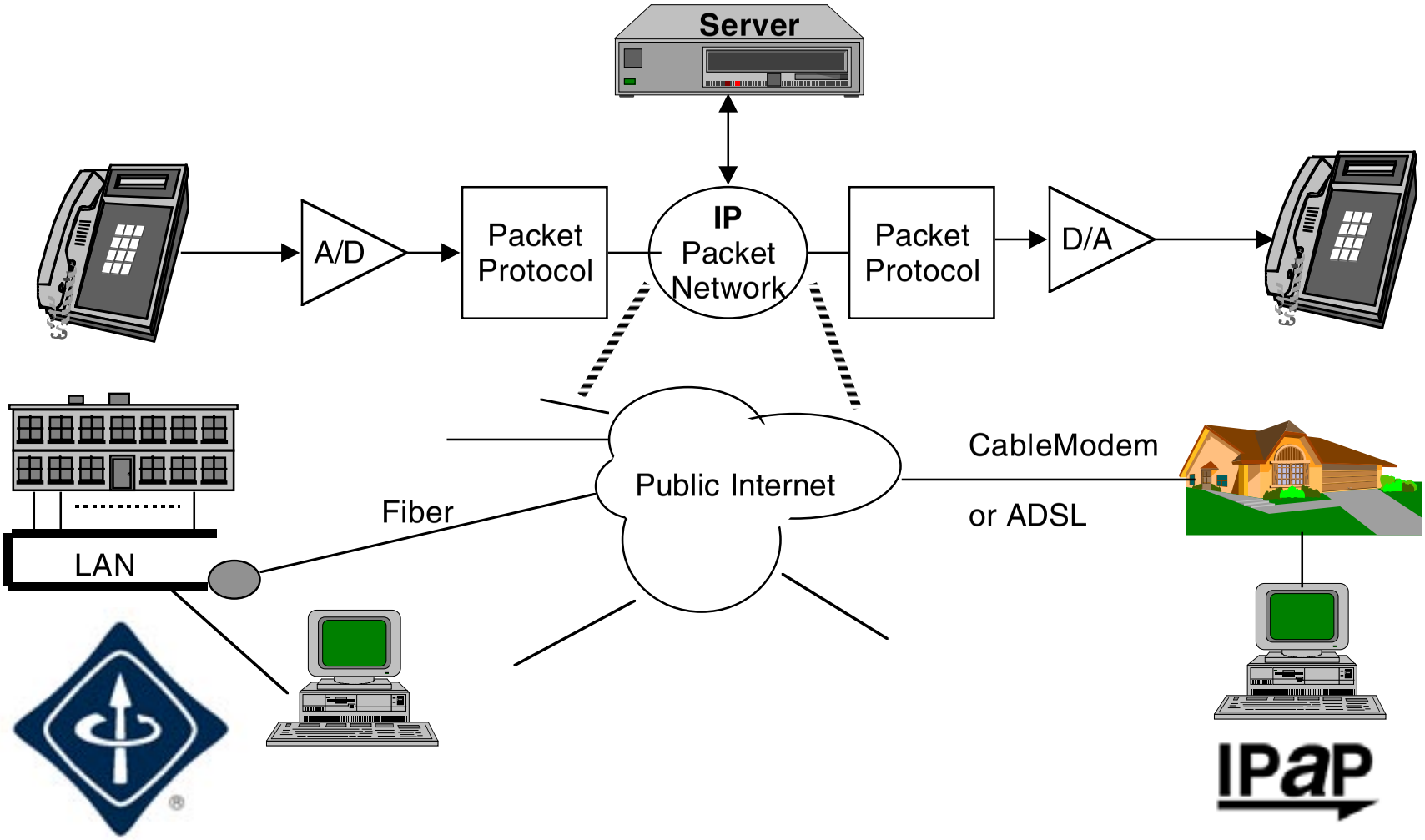

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There are several factors in both the enterprise and consumer space driving interest and adoption of VoIP

- Cost
  - — CapEx
  - — OpEx
- Flexibility
- Features
- Integration
- Regulation
- Technology
- Open Standards
- Competition

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There are also several issues which pace adoption

- Uncertain future regulation
- QoS
- Broadband residential adoption
- Open and Immature Standards

FWD TellMe Sample
Without QoS Mgt

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VoIP offers on the order of 20X increase in BW efficiency which will improve as low bit rate codecs continue to improve

	G.711 Circuit Switched	G.723.1 Packet Switched
Rate (kb/s)	64	5.6
Overhead	0%	14%
Effective Rate (kb/s)	64	6.384
Voice Activity Factor	100%	42%
Effective Rate (kb/s)	64	2.7
Contention Headroom	0%	30%
Effective Rate (kb/s)	64	3.5
Efficiency (times)	REF	18.4

Illustrative figures

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Voice Over IP Market

Network Equipment **Revenue in $ Millions**

Year	2000	2001	2002	2003	2004	2005	2006	2007
Network Eqpmt.	$2,112	$1,781	$1,403	$2,103	$2,734	$3,554	$4,620	$6,006
% Growth		-15.70%	-21.20%	49.90%	30.00%	30.00%	30.00%	30.00%
IP PBX	$313	$500	$800	$1,300	$1,800	$2,600	$3,300	$4,000
% Growth		60.00%	60.00%	62.50%	38.50%	44.40%	26.90%	21.20%
IP Phones	$100	$200	$400	$600	$1,300	$1,300	$1,300	$1,100
% Growth		100.00%	100.00%	50.00%	116.70%	0.00%	0.00%	-15.40%
Total	**$2,525**	**$2,481**	**$2,603**	**$4,003**	**$5,834**	**$7,454**	**$9,220**	**$11,106**

Service Providers **Revenue in $ Millions**

Year	2000	2001	2002	2003	2004	2005	2006	2007
Telcos & Wholesalers	$1,058	$1,462	$2,282	$3,508	$5,311	$6,187	$7,044	$9,080
% Growth		38.20%	56.10%	53.70%	51.40%	16.50%	13.80%	28.90%
Alt. Voice Providers	$1	$3	$12	$49	$197	$442	$786	$1,032
% Growth		300.00%	300.00%	300.00%	300.00%	125.00%	77.80%	31.30%
Cable MSOs	$0	$0	$0	$0	$429	$1,200	$2,878	$4,543
% Growth					180.00%	139.80%	57.90%	
Total	**$1,059**	**$1,465**	**$2,294**	**$3,557**	**$5,937**	**$7,829**	**$10,708**	**$14,655**

Source: Analysis Group, Inc.

We already have multiple service providers in the market

- Verizon VoiceWing
- AT&T CallVantage
- Net2Phone
- Vonage
- Lingo
- Free World Dialup
- 8x8
- and many others

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- FAQs
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- Sign Up Now!

Already a VoiceWing Customer? Log In Here!

User ID

Password

Forgot Your User ID?
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(For authorized Verizon customers only)

Verizon VoiceWing

Broadband Phone Service

VoiceWing℠ is a powerful new way to get unlimited calling and great calling features. Using Voice Over IP (VoIP) technology, VoiceWing allows you to make calls over a DSL or cable Internet connection. Learn more

With VoiceWing you can:

- Make unlimited calls across town or the U.S. for one low monthly rate - including calls to Puerto Rico.
- Take your phone number with you when you travel.
- Access a full set of calling features from anywhere using your Personal Account Manager.

Take a VoiceWing tour now!

How Much?

Order VoiceWing for just **$34.95/month**

Plus, order online and we'll **waive the set-up fee!**

package pricing

Great Features

- Caller ID
- Simultaneous Ring
- Do Not Disturb
- Enhanced Call Forwarding
- VoiceMail with E-mail Notification
- Address Book with MS® Outlook Integration
- Call Logs

learn more

Low International Rates

Canada	1¢
UK	3¢
India	18.5¢
Jamaica	12¢
Italy	3¢
Brazil	12¢

see more rates

Usage must be consistent with normal residential use for one household. Verizon reserves the right to monitor the usage rates of accounts for possible abuse of service. More than 5,000 minutes a month is considered beyond normal residential

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RETAIL ACTIVATION

Have you already purchased a Lingo compatible router?

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CLICK HERE

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New!
Unlimited Calling to Asia
Only $34.95/mo

New!
Lingo Link
Start a calling circle with other Lingo subscribers
Only $7.95/mo

International Rates

Australia 3¢	Hong Kong 2¢
Israel 4¢	India 18¢

Click for More Countries!

Home Plans

UNLIMITED PLAN
$19.95/mo
PLUS 1 MONTH FREE!

1 MONTH FREE

You get unlimited minutes each month to speak with anyone in the U.S., Canada, and Western Europe plus a lot of great calling features. Subscribe now and save big with Lingo's special 1 Month Free Offer!

Plans

Lingo Link $7.95/mo	Basic $14.95/mo	Unlimited $19.95/mo
▪ Unlimited calling to Lingo subscribers ▪ Call Forwarding, Call Waiting, 411, Voicemail, more ...	▪ 500 U.S., Canada, Western Europe and In-Network minutes ▪ Voicemail, Call Forwarding, Call Waiting, Return Call, Caller ID, 411, Emergency Service calling, more ...	▪ Unlimited U.S., Canada, Western Europe and In-Network minutes ▪ Voicemail, Call Forwarding, Call Waiting, Return Call, Caller ID, 411, Emergency Service calling, more ...
more ORDER NOW	more ORDER NOW	more ORDER NOW

↑ Features

Get even more use out of your high-speed Internet phone service with Lingo Home Plans. No matter who you call, how long you talk or where they are, Lingo has a calling plan that connects with your lifestyle.

Lingo Link Plan

Create your own calling circle! Get unlimited In-Network calling to other Lingo subscribers. Have your friends and family sign up for Lingo Link too, and call each other for FREE. Find out more »

Basic Plan

You get 500 minutes each month to speak with anyone in the U.S., Canada and Western Europe plus FREE unlimited In-Network calls. Find out more »

Unlimited Calling Plan

You get unlimited minutes each month to speak with anyone in the U.S., Canada and Western Europe plus low rates to many International countries. Subscribe now and save big with Lingo's special Introductory Offer. Find out more »

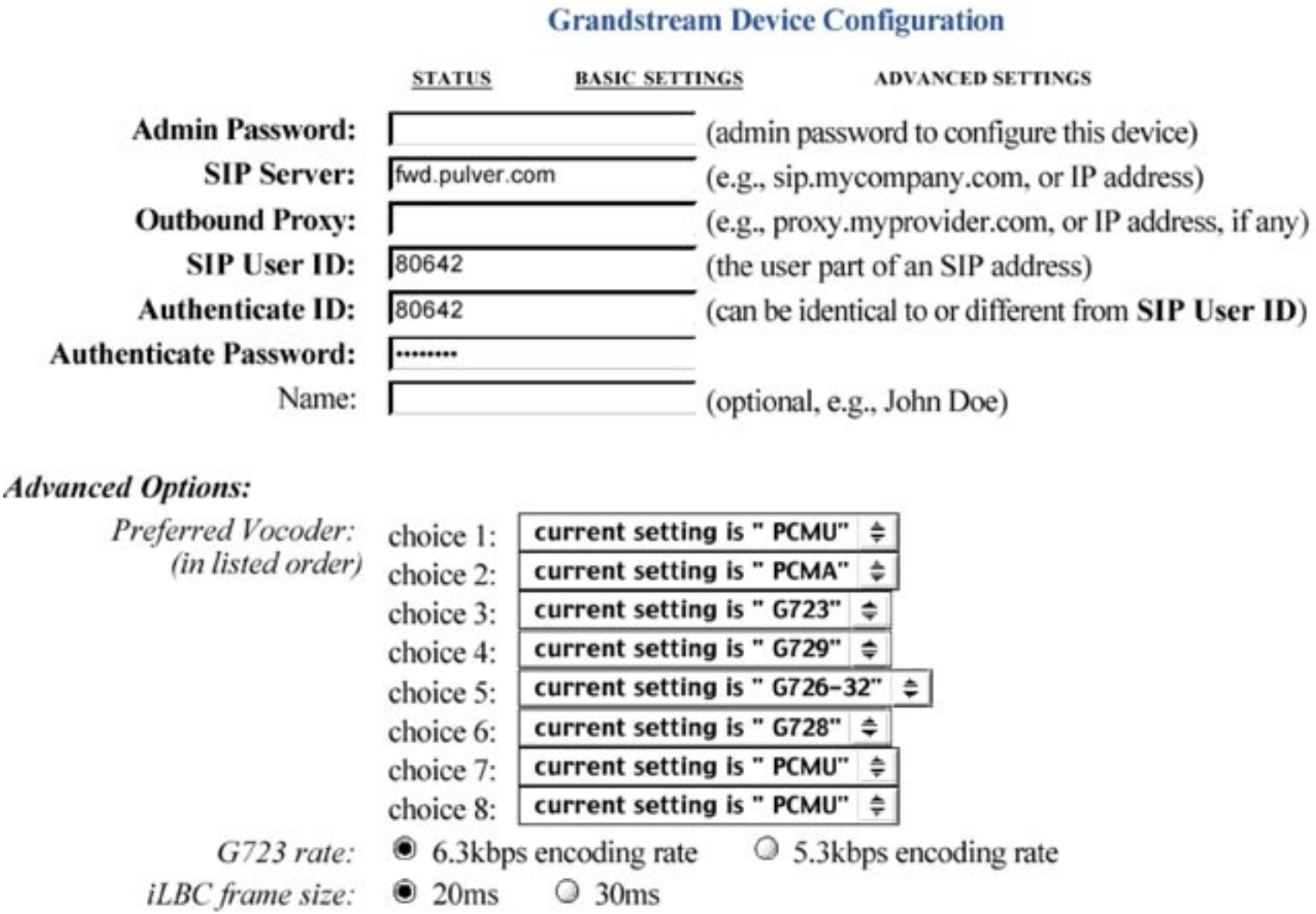
With all of Lingo's calling plans you use your existing broadband service to make phone calls through your Internet connection. Click here to find out how Internet phone calls work.

Example VoIP Phones

Analog Terminal Adapter (ATA)

Standalone VoIP Phone

Configuration Interface



In addition to everything you can do with your current home phone, VoIP services provide some unique features

- Mobility management
- Multiple appearances
- Presence
- Integration with other IP services (e.g. eMail)
- Computer integration
- Unlimited “lines”
- Flexible call routing

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There is a natural evolution toward integrated applications beyond telephony

- Distributed games
- Virtual reality
- Web-pages and applets
- Links in e-mails
- Web-IVRs
- Click-to-dial
- Directory Services
- Video conferencing
- Instant Messaging
  - voicemail notifications
  - stock notifications
  - callback notification
- Calendars
  - pre-setup conference calls
- Unified Messaging
  - voicemail2email

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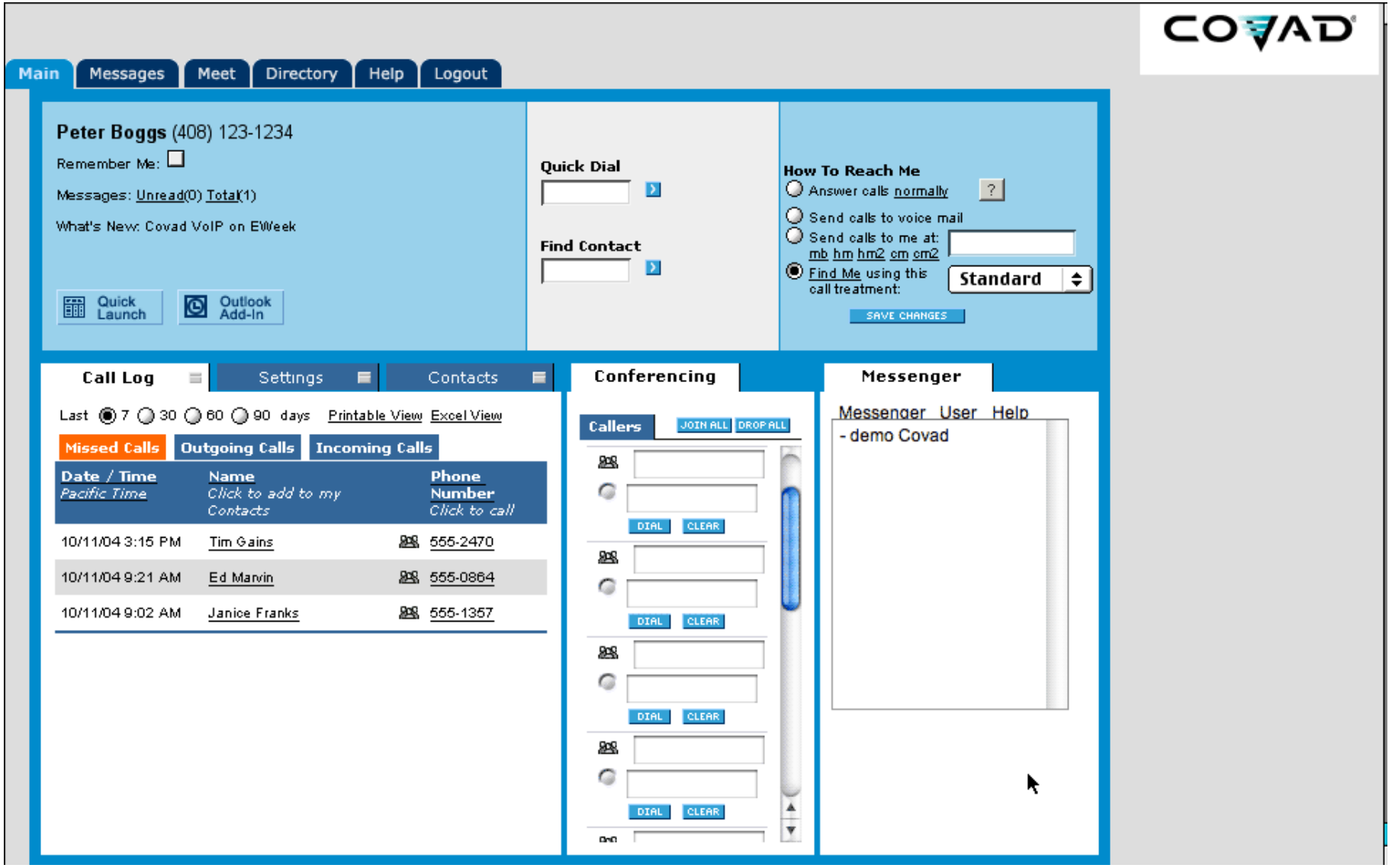
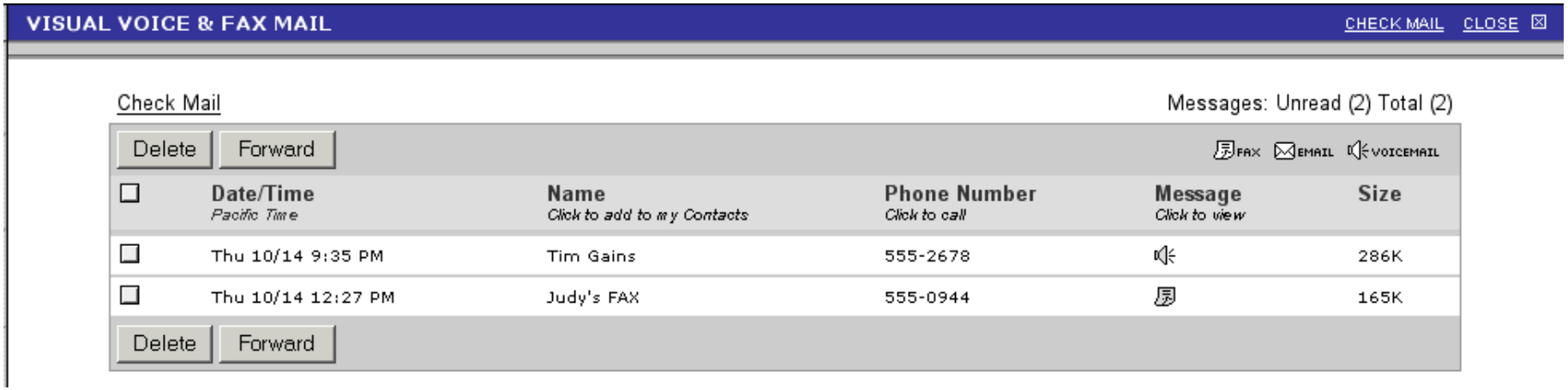
Softphone on a PC

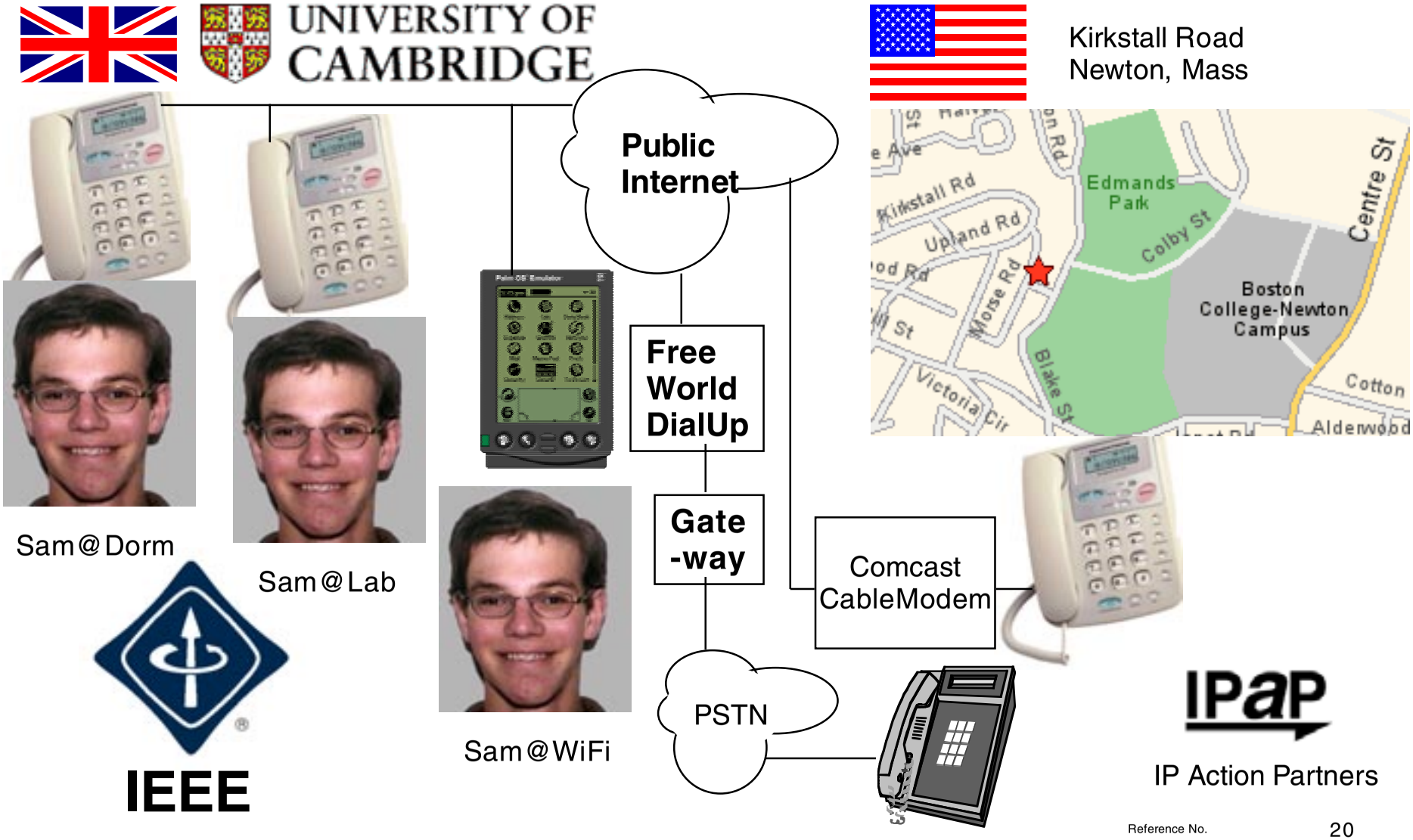
Visual Voicemail and Integrated eMail Dashboard



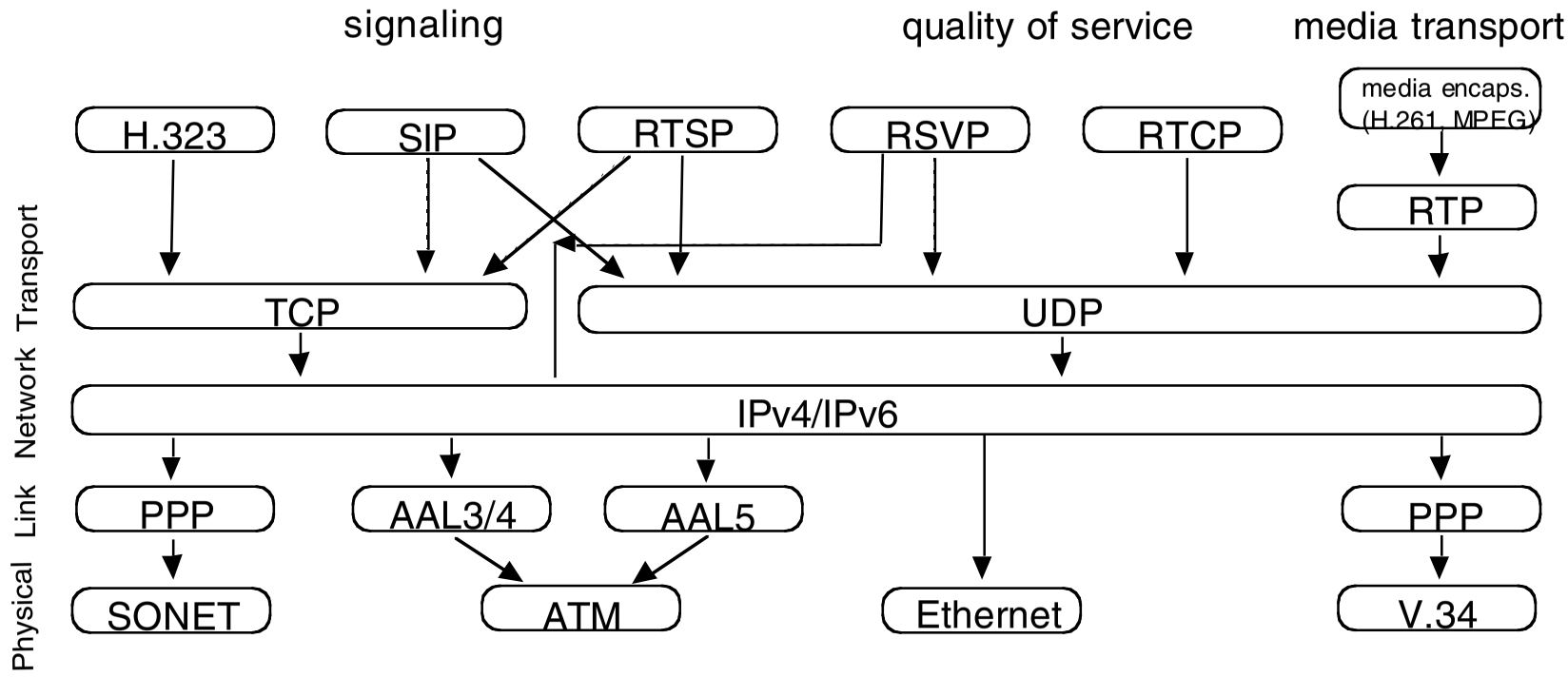
Visual Voicemail and Integrated eMail Dashboard 2



Our personal situation demonstrates a VoIP application



There are many choices, too many!



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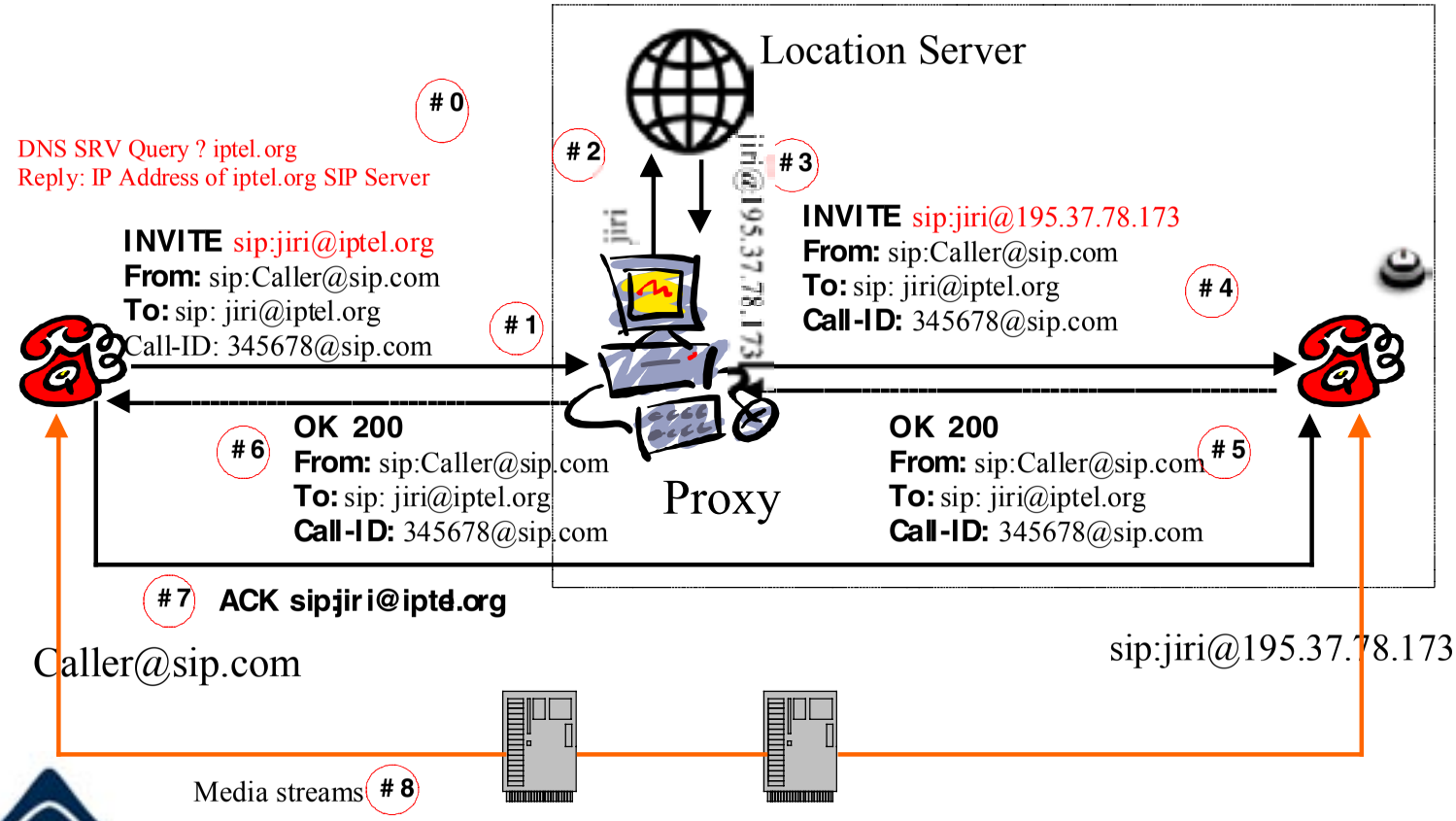
The current VoIP signaling protocol of choice is SIP



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Low bit rate Codecs allow efficiency with minimal MOS impact

	ID	Bit Rate (kb/s)	MOS
Baseline Waveform CODEC	G7.11	64	4.3
Source CODECs	G.723.1	5.3-6.4	3.5
	G.728	9.6, 12.8, 16	4
	G.729A	8	3.8
	G.729B	12	3.8

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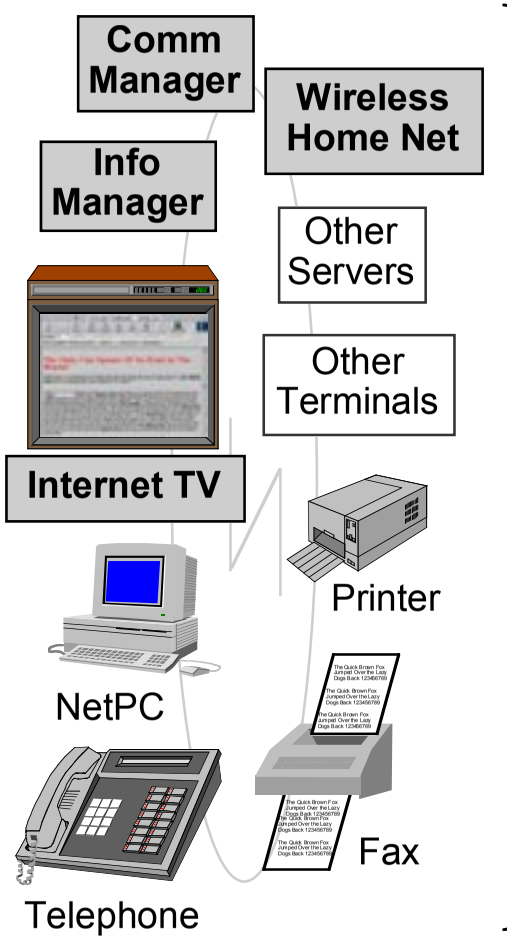
EoIP=Everything Over IP



- Telephony
- Video
- Music
- Applications Sharing
- Games
- Home Automation
- Security
- Conferencing
- eMail
- Unified messaging
- Telecommuting

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