Voice-Over-IP
Hype vs. Reality

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VoIP in the News

VoIP hype and Skype  (Peter Cochrane, 4/21/04)

“For telcos, many see the arrival of the Internet and Voice over IP (VoIP) as a parallel situation. While there is a lot of hype, exaggerated claims and oversimplification, the risks are real enough. This is an industry with over 100 years of history, an established infrastructure and a dedicated customer base often too lethargic to move. But it is also a highly competitive and deregulated sector struggling with rapid technology change--and it may be staring death in the face. “

VoIP in the News

VoIP hype and Skype (Peter Cochrane, 4/21/04)

“In all of this there is an existence theorem for the tolerance of customers that says: No telco engineer or manager ever anticipated that so many would pay so much for such a poor service as that provided by a mobile phone connection. The fixed line network is one of strict quality control and the maintenance of extremely high standards but 12 years saw it rejected by customers that value mobility above all else. I think the Internet heralds yet another change in customer values as they seek and value a self-determined and unrestricted DIY world of low cost everything. “

Don't Believe the VOIP Hype
Yes, one day Internet calls will rule. But that's still a ways off.

"It takes time to roll out these products and get customers." In fact, VOIP has been around for several years, and today fewer than 200,000 residential customers in the U.S. use it for their primary communications. Consumers need to first sign up for broadband Internet access to get VOIP (only 20% of the nation's households have done that); transmission often isn't as good as traditional phone services (but often better than wireless); and if the electricity goes out, so does VOIP.

Julie Creswell, 12/29/03 Fortune,
http://www.fortune.com/fortune/subs/print/0,15935,567668,00.html
VoIP Hype?

- “Voice over IP is our foundation for the future” AT&T
- AT&T expect to have 1 million customers by the end of 2005
- “We believe VoIP will emerge as a viable, even necessary alternative to the traditional public switched telephone network”, Vonage
Outline

- Objectives
- What is VoIP?
- Market Size for VoIP
- Demand for VoIP
- Discussion
- Future Research
Objectives

1. What is VoIP?
2. Identify “Drivers” of VoIP
3. Use Variation of Contingent-Valuation Procedures to Estimate Demand for VoIP
4. Estimate Elasticities
5. Comment on Market Size and Market Potential
VoIP: A Brief Tutorial

Circuit Switching

- Connection made between your telephone and the other party’s line, opening the circuit.
- You talk for a period of time, hang up. At that point the circuit is closed, freeing your line.
- A 10 minute conversation consumes about 9.4 megabytes. Much of the transmitted data is wasted (one talks the other listens, dead air etc) - over 75% wasted
Packet Switching

Packet switching

- Opens the connection just long enough to send small chunks (packets) of data from one system to another
- Minimizes the time the connection is maintained
- A 10 minute call now uses less than 1/3 the resources that a circuit switched call uses
Voice over IP Protocol*

“Voice over Internet Protocol (VoIP) is a common term that refers to the different protocols that are used to transport real-time voice and the necessary signaling by means of Internet Protocol (IP). In another word, it allows the user to place a call over IP networks.”

http://www.personal.psu.edu/users/f/x/fxz122/project/voip.html
The Size of the Market
VoIP Forecast

Frost & Sullivan estimates there will be 128,000 Canadian Internet telephony customers by the end of this year; 375,000 in 2005; 713,000 in 2006; 1.15 million in 2007; and 1.58 million in 2008. In the United States, subscriber growth is expected to jump to 1.16 million this year from 100,000 in 2003. By 2008, Frost & Sullivan forecasts there will be 16.5 million subscribers in the United States.

How Large is the VoIP Market?

- Internet Households: 62 M
- High Speed Households: 23 M
- WTP > 0: 12 M
- Smaller: (Total - 97 M)
VoIP “Drivers”

- Telephone Bill
  - $42
  - Average local & LD bill

- Broadband Penetration
  - (23-24)%
  - Broadband % of households
Distribution of Telephone Bill
Distribution of Total Telephone Bill - I

Target population when WTP < $50
Distribution of Total Telephone Bill – II

Target when WTP < $30
Broadband Demand
Key Driver: Broadband Growth

- Broadband Availability
  - An issue only for Best Practice VoIP
- What will Drive Broadband Growth?
  - Content – Gaming – Entertainment -- Shopping
  - Multimedia and video
- Price
  - Discounting
  - Bundles
    - Triple Play (Voice – Video – Data)
    - Multimedia + Call Management
Distribution of Income & Broadband

[Graph showing the distribution of income and broadband penetration across different income brackets, with bars and a line graph indicating the percentage of broadband penetration.]
Broadband and the Telephone Bill

Households (,000)

$20 - $30
$31 - $40
$41 - $50
$51 - $60
$61 - $70
$71 - $80
$81 - $100
>$100
Broadband Forecast

Source: CentrisPlus
Interest in VoIP
Interest in VoIP
“Very Interested”

Source: WWW.centris.com
Interest in VoIP
“Top Box*”

*Very Interested + Somewhat Interested
Interest in VoIP
“Top Box*”

*Very Interested + Somewhat Interested
The Demand for VoIP

Willingness to Pay
Demand for VoIP Service

Focus is on the price of the service – thus economic value associated with a service is generally bounded.

Application is directed towards the estimation of price elasticities.
Lognormal Demand Curves

Let

Then

Assuming that is distributed as a lognormal with parameters
Lognormal Demand

We have:

\[ P(1|\theta)P(\theta)1(\theta, \alpha) \]

Let \( Q \) represent the expected proportion of buyers we have:

\[ Q(\theta)1(\theta, \alpha)(1/\alpha, \alpha) \]
Willingness to Pay Given Broadband

Source: WWW.centris.com
Willingness to Pay for Voice-Over-IP

"Demand for VoIP" based on WTP and Broadband access. At a "price" of $20, the expected size of the market is approximately 6 million households. This computation does not take into account the associated distribution of telephone bills, which once factored in, would likely result in a lower market potential.
Willingness to Pay for Voice-Over-IP
Sample

- 8,000 survey responses for from Q1, 2004
- Based on CENTRIS\textsuperscript{SM} Omnibus survey
  - National RDD sampling
  - CENTRIS\textsuperscript{SM} tracks over 75 communications, entertainment and technology areas on a daily basis, at the household level

www.Centris.com
## Elasticities

<table>
<thead>
<tr>
<th>WTP</th>
<th>Broadband Households</th>
<th>Non Broadband Households*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$1-$10</td>
<td>-0.20</td>
<td>-0.80</td>
</tr>
<tr>
<td>$11-$20</td>
<td>-0.59</td>
<td>-1.12</td>
</tr>
<tr>
<td>$21-$30</td>
<td>-0.98</td>
<td>-1.44</td>
</tr>
<tr>
<td>$31-$40</td>
<td>-1.37</td>
<td>-1.76</td>
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<tr>
<td>$41-$50</td>
<td>-1.76</td>
<td>-2.08</td>
</tr>
<tr>
<td>$51-$75</td>
<td>-2.54</td>
<td>-2.72</td>
</tr>
</tbody>
</table>

* Assuming $20 month for broadband
Market Simulations
Market Potential - I

Price (WTP)
< $40 12 million households
> $40 about 41 million households

Telephone bill

Broadband
24 million households
Market Potential - II

Price (WTP)  
<$40 12 million households  
>$40 about 41 million households

Telephone bill

Broadband
24 million households

8,952,000
Market Potential - III

Price (WTP)
<$40 12 million households
>$40 about 41 million households

Telephone bill

Broadband
24 million households

2,300,000
Discussion

- **Price clearly matters**
- **Broadband penetration matters**
  - Focusing simply on “interest in VoIP” leads to significant over estimation of market size
  - Insight requires understanding the relationships between “price” and the distribution of telephone bills and between “price” and the distribution of income
Discussion

- Quality of service not addressed
- Focus was only on VoIP delivered over the Internet
- Security: Virus, Trojan Horse, Worms and Spam
- Competitive RBOC responses not incorporated into the demand model (e.g. Verizon’s Freedom plan)
Discussion

Regulation

- Classify VoIP as a telephone service
  - USF obligations
  - Access charges
  - 911 requirement
  - Licensing, taxation policies
- State and Federal regulation
VoIP References

♦ Service Providers
  - http://www.voip-calculator.com/directory/search.htx?page=1&category=1
  - http://www.voip-info.org/wiki-VoIP+Service+Providers

♦ FCC
  - http://www.fcc.gov/voip

♦ General Reference
  - http://www.voip-info.org/wiki-VOIP+sites

♦ Tutorials
  - http://www.iec.org/online/tutorials/vfoip/
  - http://www.cse.ohio-state.edu/~jain/refts/ref_voip.htm
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