Pricing in Internet

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Abstract

Internet is moving towards commercial networking where different demands of service are coming to every day issues. This change of service requires also changes to approach how services are offered to the customer population. This change is not just philosophical but also economical. Today majority of ISPs implement flat fee pricing to cover their expenses. However as ISP business is turbulent and very rapidly increasing, many ISP is making their business with high loss rate with assumption that as they tie their customers through proprietary services with high reluctance to change ISP even with increasing prices. This paper is attempt to clarify some issues related to pricing and cost management of ISP business - however I must clarify at this point that hidden costs of hot line help and other cost like marketing and running every day business are not taken account. These costs may be covered as added value telephone numbers with high per minute pricing.

1 Cost management

Every business operates on the revenues which are drawn out of operation. Revenues cover the costs of operation and expected profit margin. Information and networking industry is one of the most explosively increasing industrial areas.

So revenues are drawn out of operation of business, in Internet service provisioning this business is providing the network connectivity to wide customer population. This customer population is usually mixture of residential and corporate customers with different preferences in service they require. These different preferences demand varying efforts from ISPs which they price differentially.

General rule for pricing is that price of a good should have reflection of the cost to manufacture the good. With Internet this means that price should reflect the resource cost that user is generating. This way price should have understandable basis and user can by his actions influence this price, within certain limits.
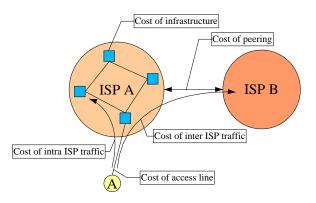
Total cost of the Internet connection is combination of different types of operational costs:

- The cost of providing network infrastructure, which is combination of annual cost of lines, routers and other devices.

- The cost of connection to the network, each new customer sets a pressure to upgrade network. This upgrade is two level problem:

  - Each customer directly requires access line and line termination equipments which need to be rent, leased or purchased.

  - Indirectly each new customer also requires more capacity to the rest of network - the assumption is that customer wants to use his new asset as well as he can.

- Operational cost of network infrastructure. No network runs by itself or builds by itself. Operation of network requires labor and labor costs.

- User traffic based costs

  - Quality of connection
  - Capacity the connection is using

– End point of connection

– Time of the day

There are set of other issues that directly relate to the user traffic and the cost which it has for the network

– Load of the network, is user causing the congestion in the network.

Flat rate: Cost of infrastructure, Cost of access line, marginal cost of new customer
Time dependent: Reservation time of access server resources
Volume dependent: Inter ISP traffic, Intra ISP traffic – if network congested

Figure 1: Items generating cost for ISP and their relation to time connection and volume of traffic

Exercise 1: Draw picture which expresses the cost items from Figure 1 as a fuction of respective volumes.

2 Pricing

Price is the incentive that controls the usage of commodity - network resource. Price if follows the cost of operation is indication of competitivines of ISP. To cover the costs of operation ISP can build different pricing structures:

1. Fixed-rate charging

2. Volume-based charging

   (a) Number of packets sent
   (b) Number of bits sent
   (c) Maximum transfer rate

3. Time dependent charging

4. Distance based pricing

   (a) Geometrical
   (b) Logical (hop count)

From customers standpoint clear pricing structure makes possible to control the usage of resources against the price paid for it. Also comparison between competing ISPs is possible if the ground of pricing structure is well understandable. However from the standpoint of ISP clear structuring is not the best option. It is obvious that in competitive market where new ISPs are born monthly the penetration of market is reached by loss based operation in market entry. If pricing structure is clear and readily understandable customers would easily change after lower prices.
General elements behind every pricing model are:

• Access service; type of access (dial-in/permanent), speed of access (64kbps/10Mbps)

- Duration of call; if call based accounting is used

- Amount of data passed; volume of resource usage

- Distance of communication; is peering a part of communication

- Quality of network service; is QoS networking required

Exercise 2: Sketch possible pricing models for ISP with respective target to be able to run operation with at least zero profit margin. Calculate average price for bit/packet/minute/month in our case. How fair is the pricing model if usage pattern changes. Who substitues who ?
Applications used in this exercise are:

1. Video (128kbps -¿ 512kbps / 250MB / 2h / 576B)

2. IP-phone (64kpbs / 15min / 160B)

3. Email (0kpbs -¿ 64kbps / 1MB / 12h / 1024B)

Communication is done from single location to various other locations during one month:

1. HKI - TRE (145km / 8 hops / 9 hops/ 10 times)

2. HKI - Stockholm (402km / 12 hops / 12 hops / 8 times)

3. HKI - NYC (6635km / 14 hops / 22 hops / 5 times)

4. HKI - LA (9030km / 21 hops / 22 hops / 5 times)

We assume that each customer produces costs based on following measures:

1. Local traffic 0mk

2. International traffic

   (a) Case: hop dependent - 1p per hop per packet
   (b) Case: geographical - 1p per 1000km per packet

3. Connection time costs for ISP 1mk per 10 minutes

4. Access line and customer management based costs 5mk per 64kbps per month

During one month customer makes connection to all of previous places with each application.