Internet Pricing - Combining Sender and Receiver Payments in the Internet

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The Current Internet Pricing Model
(Regional Payment Scheme)
What is wrong with today’s scheme?

- No way of demonstrating that the revenue neutral boundaries are actually in the correct place in the Internet.

- No effective way to rationalize the payment for expensive components in the middle of the network.

- No way to identify those users who would pay more to have better service and serve them appropriately.

- Some benefits to the current scheme:
  - Simple to implement, no data gathering required
  - Forces each region to be as cost-effective as possible
New Payment Scheme

• It must be possible
  – to specify the desired service for a flow
  – for the sender and the receiver to share the service costs.

• Preserving the basic service of the Internet
  – If there is insufficient total willingness to pay, the consequence should be reasonable and predictable.
Goals of New Payment Scheme

• Each participant in the flow should be able to predict his component of the costs.

• It should be possible, at inter-provider connection points, to determine easily the direction in which compensation for the flow should go.

• An advanced pricing scheme must not break the current operation of the Internet.
Implementation Issues

- Router must be able to determine two things easily:
  - what enhanced service is requested for the packet
  - whether the sender or some set of receivers is willing to pay for that service

- Self-describing instead of per-flow state
  - Information stored in the packet
  - The limited amount of information
Implementation Issues

- Basically, each packet contains a field to say who will pay for itself.

- Problem in cost sharing
  - The setting of the field may be changed as the packet crosses region boundaries.
  - Some more complex notation will be required to specify the region across which the sender and receiver are willing to pay.
Zone Based Cost Sharing

- Zone: a region of willingness to pay
  - Within site, city, or region
  - Across wide area in country
  - End-to-end within country
  - Trans-ocean
  - End-to-end
Zone Based Cost Sharing

- When a packet leaves the sender, the sender specifies the zone that the sender’s willingness to pay.

- But, it is hard to predict if the receiver is willing to pay the rest zone.

- When receiver will pay:
  - Unicast: Using a control packet to carry information about the receiver to the sender
  - Multicast: The information about the willingness of the receiver to pay must be stored as state within the routers along the multicast tree.
Roles of Pricing

• To shape user behavior in socially desirable ways:
  – Attaching some incremental cost to network usage tends to discourage low value usage.
  – Disadvantage: it discourages exploration of new uses for which the value is not clear.
  – Advantage: it discourages annoying usage such as junk e-mail.
Roles of Pricing

- Sender-pay mode:
  - Junk e-mail is sender driven, so the pricing scheme would have to include a sender-pay mode to discourage mail sending.

- Receiver-pay mode:
  - Casual web browsing, which can clog servers, is receiver initiated, and could only be controlled by a receiver-pay mode.
  - It is harder to implement because packets, flowing from the sender, can easily carry information about the sender’s willingness to pay, but not the receiver’s.