Pricing and Resource Allocation

Alternative Pricing and Incentive Approaches

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Previous Work on Pricing: Pricing for Differentiated Services

Fixed Access Pricing vs. Usage-based Pricing

+ Usage-based Pricing: Fulfil partially the role of congestion control mechanism

– Usage-based Pricing: Billing overhead
Previous Work on Pricing: Pricing for Differentiated Services

Various Usage-Based Pricing Mechanisms

“Smart Market” (Mackie-Mason and Varian, 1995)
Partition network into several logical subnetworks (Odlyzko, 1990)
Edge-Pricing: Entry point determines the price users pay
Expected Capacity Pricing: users charged according to expected capacity of network
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Previous Work on Pricing

First-Best Pricing

Use prices to induce flow patterns that optimize an overall system objective.

Marginal Cost Pricing: charging individual users for the negative externality they impose on other users.
Fixed Pricing and the Marginal User Principle (results)

In a wireless network, the profit-maximizing fixed price is equal to the utility of the marginal user in the network (marginal user: a user who is indifferent to joining the network), (Acemoglu et al, 2004)

Such a resource allocation algorithm and price can be computed by the service provider under certain assumptions on the utility functions (Acemoglu et al, 2004)
Incentives for Cooperation in P2P Networks

- Nearly half the traffic in today’s Internet is due to P2P networks
- BitTorrent-type Network (Qiu and Srikant, 2004)

Incentives for Cooperation in Wireless Networks

- Tremendous growth in the near future in multihop wireless networks
- Non-gametheoretic setting, He et al. (2004) and Mahajan et al. (2005)
- Using game theory, Milan et al. (2006)
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