

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: Fulfill partially the role of congestion control mechanism

– Usage-based Pricing: Billing overhead

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Expected Capacity Pricing: users charged according to expected capacity of network

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)

Current Research on Pricing and Incentive Models

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

- 1 Non-gamethoretic setting, He et al. (2004) and Mahajan et al. (2005)
- 2 Using game theory, Milan et al. (2006)

Areas for Future Research

Incentive-compatible Differentiated Pricing

Capacity Investments

Simple Pricing Rules

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A key role of prices in networks: allocate users with different requirements to differentiated services

A combination of competition among service providers and the incentive-compatibility constraints

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Complicated policies necessary?