Economic Mechanisms

Grand Challenge:

Design economic mechanisms that provide incentives for increasing the utility of the network

- Motivation
- Features
- Example
- Research Issues

Motivation

- Different application requirements
  - Enable new applications → higher revenues
- Different user utilities
  - Enable market segmentation → higher revenues
- More flexible economic arrangements
  - 800-service, third party billing, ...
- Various players get fair share of revenues
  - Incentive for improved services
  - Flexible peering agreements
Desirable Features of E.M.

- Everybody is a player
  - Not simply social maximization
- Designed for multi-provider and multi-business environment
  - Heterogeneous
- Incentive-compatible
  - Don’t assume altruism
- Scalable
  - 12,000+ ASes
- Flexible: Support different service types
  - Dependable service, variable price
  - Dependable price, variable service
- Catalyst for ecology
  - Network; Storage; Distribution; Contents; ...

Example

- Simple protocol at call set up time
- Game between providers and users
- Can be designed for dependable service
  - Price controls utilization
- Analysis shows that
  - In tandem network with at least 3 providers
  - If demand is the constraint
    Cooperation > Nash > Stackleberg
- Suggests charging protocol
- Ideas extend to complex topologies and capacity constraints (congestion pricing + revenue sharing)
Research Issues

- Necessity of economics-networking synergy
  - Upgrades of networks require incentives
  - Incentives necessitate economic mechanisms
  - Economic mechanisms require protocols

- Design of protocols that are flexible
  - Support different economic models

- Suitable mechanisms
  - Impact on industry structure

- Implementation considerations
  - Are overlays desirable?
  - Security