Motivation

- Communication as a co-operative multi-party act: Eg sender, multiple receivers, access providers, network providers, conference chair, trusted-third party, bank, …

- But interests diverge …

- Core question: how can we distribute control between the parties?

Specific Example: Internet congestion control Multiple senders share a router and must back off when it becomes congested. How do we ensure fairness and efficiency?

We have answers based on market management techniques developed by our lab in, for example, the M3I project.

Current Work

Two specific projects:

- **MMAPPS**
  Innovative middleware to motivate fuller participation in P2P services.

- **Stimulating routing in ad-hoc networks**
  Multi-hop, multi-owner networks require *lightweight* mechanisms to stimulate nodes to contribute

MMAPPS

EU funded 5th Framework project
- 7 partners
- BT Lead

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ETH
Eidgenössische Technische Hochschule Zürich
Swiss Federal Institute of Technology Zurich
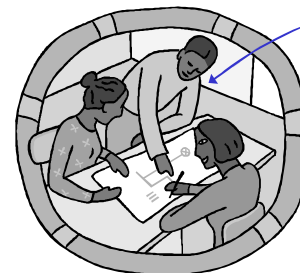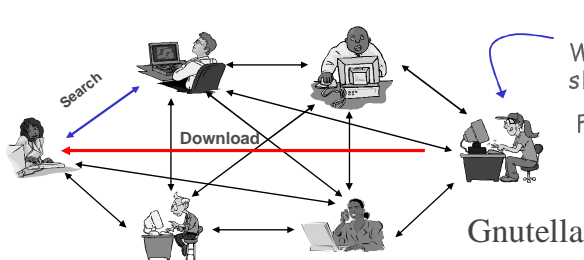
Athens University of Economics and Business

TELE KOM AUS TRIA

MYSTERIAN

LANCASTER UNIVERSITY

http://www.mmapps.org/

Motivation - The Edge Lab

Markets and Peer-to-Peer

P2P services exhibit the distributed control problem:

Search

Download

Why should I share my files?

Free-riding

Gnutella

Who controls the discussion?

Groove – collaboration software

Others have looked at free-riding

Only generic solution proposed so far: Free Markets

- Too heavyweight
- Market Failures

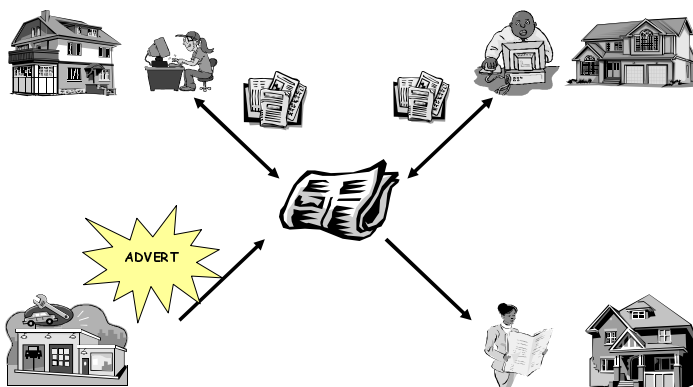…and not very P2P!

Motivation - The Edge Lab

Approach

- Look at the real world:
  - social interactions, reputation, evolution and psychology of co-operation.
- Mutual enforcement of rules within co-operative communities of peers
- Rules may supplement markets for fair exchange

Example scenario

P2P-based Local Newspaper

Rules relate to both service and resource contributions…

Example service contribution:

> Authors receive financial remuneration and enhanced reputations according to the number of 'posts' and their associated ratings

> -At the end of each month 1/12th of the kitty is allocated to authors in proportion to their total article rating.
>
> - Each month your reputation increases by the average of the rating of the articles you submitted that month.

Example resource contribution:

> Everyone should contribute resources during searches and remain usually online.

> -You must answer 80% of the search queries, and 50% of the content requests addressed to you
>
> - A consensus (>70%) of complaints causes expulsion.

Scenario II

Peer WLAN

- community of peer WLAN administrative domains
- roaming between peer domains
- better geographical coverage than any peer

- users within a domain may form their own community rules

Example consortium rules
- if domain prevents roamers, its users denied roaming
- excessive misbehaving users in one domain denies roaming to all users from that domain

Motivation - The Edge Lab