

Overview

Motivation

- Overlay networks generate most of the traffic in current networks (around 80%)
- This traffic increases, since more bandwidth is available in end nodes
- ISPs aim to control and manage the network traffic from overlays to reduce interconnection costs and to avoid QoE degradation for end users

Main SmoothIT objective

To define ETM (Economic Traffic Management) mechanisms in interactions between overlay and underlay to:

- Reduce ISPs' costs, thus enable ISPs to offer lower prices to end users,
- Improve QoS for overlay applications.

Example optimization potentials

File Sharing (eDonkey)

- Adapting overlay topology to underlay topology to speed up file transfer and to reduce inter-domain traffic

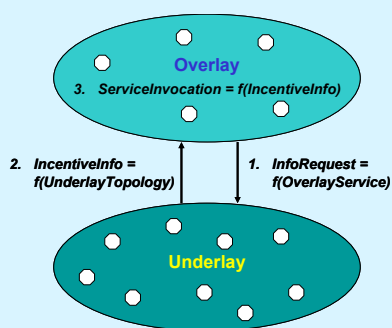
VoIP (Skype)

- For relayed traffic, the selection of appropriate super-nodes
- QoS differentiation for real-time applications as an ISP offer

VoD (Joost)

- Make clients connect to VoD servers and other clients according to underlay information, optimizing ISPs costs
- QoS differentiation taking into account multimedia streaming requirements and end users demands
- Combination of topology awareness and QoS differentiation

A new approach for managing overlay traffic

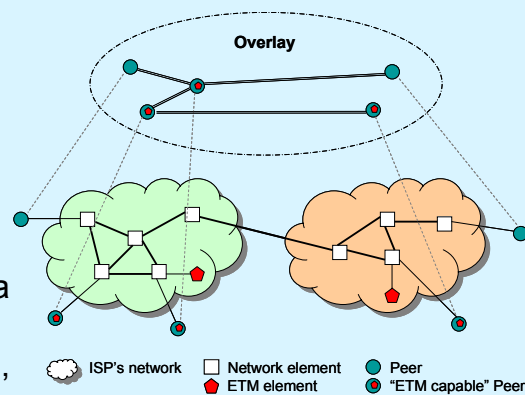


Locality-based pricing

- Price differentiation based on destination addresses
- Users would prefer cheaper intra-domain traffic over more costly inter-domain traffic

Underlay information useful for overlay

- Locality of nodes; performance of a transport service; path reliability
- ETM elements as a "cross ISP infrastructure" providing a special service to evaluate utility (similar to an enhanced, sophisticated index server)



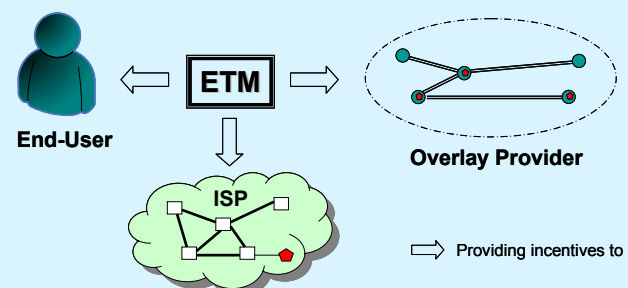
Incentives for different players

End Users

- Lower price
- Better QoS
- Higher performance
- Higher reliability
- Higher security

Overlay Providers

- Lower costs, e.g., for bandwidth
- Better service for end users
- Efficient use of capacity



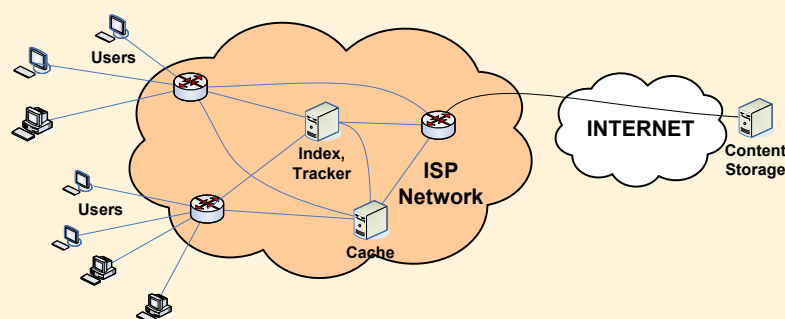
ISPs and Telcos

- Active role in traffic management
- Lower Capital Expenditures (CapEx) and Operational Expenditures (OpEx)
- Maintain users' loyalty

Scenario 1: ISP P2P application

Description

An ISP takes part in a P2P overlay application by offering some initial resources and letting users contribute in P2P manner.



Performance improvement

Due to ISP capability to monitor its network usage, the ISPs tracker can steer the content distribution process by implementing:

- Locality awareness
- Efficient bandwidth utilization
- Congestion avoidance

Scenario 2: Service provider and ISP collaboration

- Application controlled by a single service provider, which forms a proprietary overlay network in the backbone
- ISPs offer economic and/or technical incentives to service providers, if they adapt their overlay topologies according to optimal traffic management decisions

