Simple Economic Management Approaches of Overlay Traffic in Heterogeneous Internet Topologies

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ALTO Service based on BGP Routing Information

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Background

- Simple Economic Management Approaches of Overlay Traffic in Heterogeneous Internet Topologies (SmoothIT)

- European Seventh Framework STREP FP7-2007-ICT-216259

- Internal Trial with Telefonica, Madrid, Spain
- External Trial with PrimeTel, Cyprus
BGP-based Mechanism

- Numerous studies of “BitTorrent under locality.” Locality helps, but how to effectively get locality info?
- BGP as source of the locality info (actually, more than that)
- Assumption: ISPs running the ALTO service

1. Peer sends a list of other peers’ IP addresses to the ALTO Server
2. Server sends back the (sorted) list
   - Each address has a value assigned
   - Values computed according to BGP attributes (Local preference, MED flag, AS hops)
3. The querying peer uses the sorted list
   - Ranking based on BGP locality information
Relevant BGP Information

- BGP attributes used for ranking
  - Local Preference: Different ranges of values for different business relations (customer, provider, peer, backup)
  - AS Path: Distance to destination
  - Multi-exit discriminator (MED): Assigned by neighbors, therefore used only if neighbors do it in the same way

- BGP operation:
  - Prefer the route with the largest local preference value
  - In case of tie, prefer route with shortest AS path
  - In case of tie, prefer route with lowest MED value
BGP based Ranking

– In: IP address with \( localPref, asHops, med \) attributes set
– Out: ranking assigned to the address

\[
\text{ranking} = \begin{cases} 
localPref \cdot (\text{MAXAS} + 1) \cdot (\text{MAXMED} + 1) \\
+ (\text{MAXAS} - asHops) \cdot (\text{MAXMED} + 1) \\
+ \text{MAXMED} - med \\
(MAXPREF + 1) \cdot (MAXAS + 1) \cdot (MAXMED + 1) \\
\end{cases} 
\]

Remote AS

Own AS
Thank you for your attention!