Mythbusting P2P Traffic Localization

draft-marocco-p2prg-mythbusting-00

Enrico Marocco
Ivica Rimac
Vijay Gurbani

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Before we start...

... sorry for using the term “localization” :-(
P2P Traffic Optimization

• Huge interest
  • In academia: because it's challenging
  • In the industry: because it fills cross-domain links
    - Yes, yes, video is growing... but it's easier to cache

• Different approaches
  • Shaping → against the users
  • Caching → issues with the content
  • Improving peer selection → ...
Peer selection in P2P applications

(1) First cut generally random (e.g. from ~1000 to ~100 candidates)

(2) Subsequent selection according to application logic (e.g. tit-for-tat, RTT, jitter...)

• Providing applications with locality information may help improve (1)
  • Balanced preference toward local peers
  • Actually hard to predict effects and side-effects
There's a $4.2 \times 10^{-9}$ probability that this baby will create a black hole that destroys the Earth.

Wow, what's the chance it will do something useful?

Well, there's a $4.2 \times 10^{-9}$ chance that we'll be rid of Paris Hilton.
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- A container for discussions of possible effects of P2P traffic localization
  - Source: various meetings and mailing lists
- A collection of relevant references

- How this relates to ALTO
  - IETF defines a protocol for imparting preferences
  - IRTF investigates how to make the best use of it
    - Both on the provider and on the application side
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- Organized as a collection of:
  - Myth
    - Facts
    - Discussion
    - Conclusions

- Intended as a community effort: -00 is a strawman

- Please provide input!
Myths (to date)

- Reduced Cross-domain Traffic
- Increased Application Performance
- Increased Uplink Bandwidth Usage
- Impacts on Peering Agreements
- Impacts on Transit
- Swarm Weakening
Reduced Cross-domain Traffic

• Facts:
  ✓ P4P simulations (~70% reduction)
  ✓ Comcast's trial (34% out, 80% in)
  ✓ TU Berlin (up to 80% increase in local exchanges)

• Discussion:
  • Well... that's the main point of localization, no?
Reduced Cross-domain Traffic

• Facts:
  ✔ P4P simulations (~70% reduction)
  ✔ Comcast trial (34% out, 80% in)
  ✔ TU Berlin (up to 80% increase in local exchanges)

• Discussion:
  • Well... that's the main point of localization, no?
Increased Application Performance

• Facts:
  ✓ P4P simulations (up to 23% reduction in dl time)
  ✓ Comcast's trial (up to 85% increase in dl rate)
  ✓ Ono experiment (31% avg reduction in dl time)
  ✓ TU Berlin (up to 34% reduction in dl times)
  ✓ Ono experiment (slight degradation in low connectivity)
  ✓ Bell Labs (low effectiveness in some scenarios)

• Discussion:
  • Beneficial in many cases
  • May harm in low connectivity networks
  • Localization should be balanced
Increased Uplink Bandwidth Usage

• Facts:
  ✗ Comcast's trial (no increase in uplink traffic)

• Discussion
  • Total uploads equal total downloads
    – Assuming unlimited content and 24x7 downloaders, increasing dl speed means increasing uploads
  • In mature swarms, local leechers could be preferred to remote seeders (actually increasing local uplink usage)
Impacts on Peering and Transit

- What if a tier 1 ISP decided to address peers in its network toward networks it provides transit service to?

- What happens to peering agreement when one of the parties significantly reduces interdomain traffic generated by its users?