

# **P2P and Service Providers**

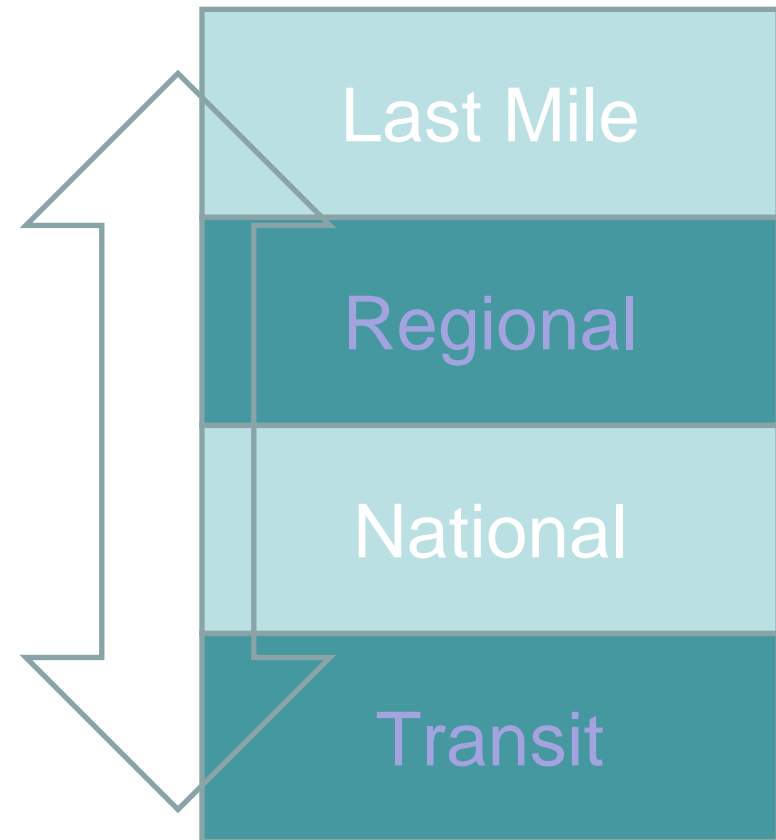
## **ICNP 2008**

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# Problem #1 Bandwidth Costs

- P2P is part of larger Internet Video trend: subscriber fees are flat, the cost are increasing due to growing broadband consumption (UGC video, premium online content, Bittorrent)
  - In last 12 months bandwidth capacity in US ISP networks grew by 75-100% , while number subscribers grew at 15-20%
- The capacity is provisioned by peak-time consumption
  - YouTube clips downloads may incur more cost than 24x7 P2P downloading
- For different ISPs, the pain point is in different network segments
  - type of broadband
  - regional network type
  - geographical location



# Problem #2 Control

- Peer-to-peer applications optimize for download acceleration
  - Swarming: Use of multiple concurrent connections
  - Peer selection: Selection of best performing peers, regardless of topology and underlying network costs
- Work around traffic engineering
  - Port hopping: Avoid L4 traffic engineering techniques
  - Transport obfuscation: Avoid L7 bandwidth throttling

# What's being done?

- Unilateral control of the costs
  - Quota field trials
  - Fair Share (application-neutral bandwidth throttling)
  - DPI bandwidth throttling (internationally)
- Cooperative network-aware peer selection
  - P4PWG
  - IETF ALTO
- Transport-level support for bulk transfer
  - IETF TANA

# P2P Caching

- Cache is a seeder that is always there
  - Provides localization for content that is not available with on-network peers anymore
- Reduces bandwidth costs AND provides application acceleration
  - Combination of on-net caching and peer-to-peer swarming is shown to provide wire-speed delivery (5-10 Mbps)
- Provides basis for ISP-based commercial content delivery services
  - HD content distribution
  - P2P-based “catch-up TV”
  - P2P-based STB network
  - Personal P2P

# Thank You