unconditional localisation?

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Response to ALTO BoF

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localisation NOT consistently desirable

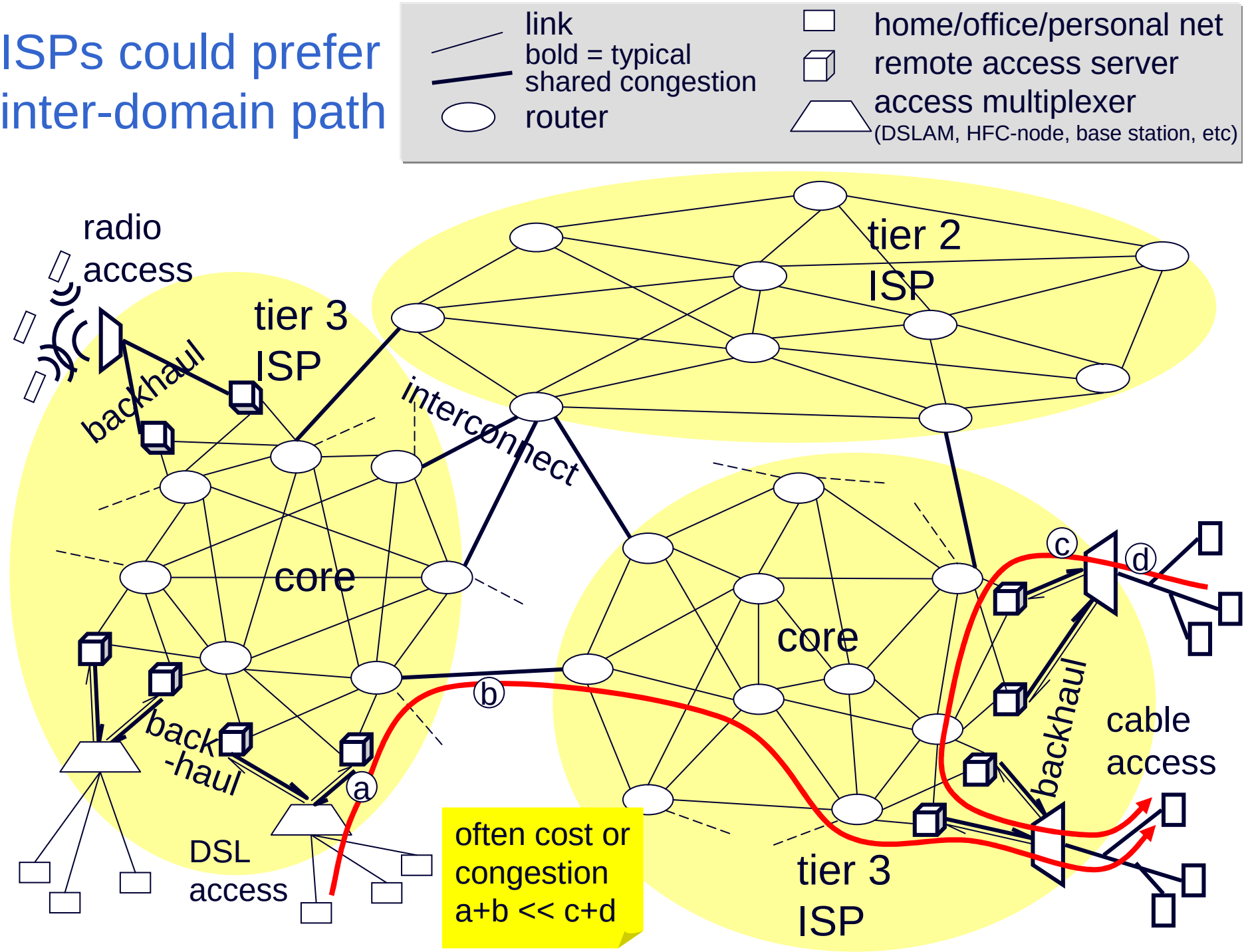
whether by AS count, hop count, RTT, ...

- for ISPs (slide #3)
  - using an interconnect path may impact other users less and not cost more

  a) upstream backhaul link
     - in some access technologies (e.g DSL) the upstream backhaul is never congested – it's typically a symmetric link fed by an asymmetric access
     - retail ISPs often lease this link without any upstream usage penalties

  b) interconnect
     - if interconnect charging is based on 95th percentile and it's currently not near the 95th percentile
     - or if interconnect is based on a peering contract which only requires the balance of volume transferred between networks to be checked at peak times, and it's currently not a peak time
- for users & apps (slide #4)
  - with newer cc algos, longer RTT hardly requires slower rate
  - desire for shorter RTT to get higher rate will go away

ISPs could prefer inter-domain path



lower RTT isn't nearly as good as we thought

for long-lived flows

- app desire for localisation is artefact of TCP algo
  - TCP average rate depends on $^{1}/_{RTT}$ (for similarly congested paths)
- modern congestion control algos don't do this
  - FAST TCP [Jin04], BitTorrent DNA (rate-based mode)
- for stability, doesn't rate need to depend on $^{1}/_{RTT}$?
  - No. Research agrees only *acceleration* needs to
  - Equilibrium rate can be independent of RTT

	peer 1 (baseline)	peer 2
congestion	1%	0.5%
RTT	50ms	200ms
TCP	x1	x0.35
FAST TCP	x1	x2

what metric judges 'better'?

- NOT lower inter-domain traffic (necessarily)
  - if at the cost of more local upstream congestion
- NOT faster p2p downloads (necessarily)
  - if at the expense of slower downloads for non-P2P users

closing message

- localisation is only desirable conditionally
  - over some inter-domain paths, at some times, with some transports
- updating an inter-domain oracle for dynamic path-specific info is not proven feasible
  - hard even for a single residential ISP
    - e.g. 20M access lines => $20M^2$ paths (400,000,000,000,000 paths)
    - and that doesn't include home network segments
    - even edge-edge, 7,000 access multiplexers => 50M paths
  - for inter-domain oracles, 100M muxes => 100,000,000,000,000,000 edge-edge paths
- nonetheless, topology-based heuristics modified by static policy (e.g. P4P) are perhaps 'better' than random guesses
- but "localisation is good" MUST NOT be the goal
  - that will lead to the DISINTERNET
- localisation would be easy,... but if it's NOT the goal
  - is an oracle appropriate for standards activity or only for more research?