Unreliability as a QoE goal

Jon Crowcroft,

http://www.cl.cam.ac.uk/~jac22
http://hubofallthings.com/
Reliability a goal at every layer

- modulo End-to-end argument
- Integrity checks in link CRC
- Integrity of routing & fwd
  - Ip hdr checksum
  - Reverse path check
  - Router-router (bgp) sec
- Reliable, integrity of data, in-order delivery in TCP transport
Internet Classic Apps reliable

- Telnet, FTP, SMTP
  - Were all reliable
- SSH, HTTP-S, PGP add
  - Security/more integrity
- Distributed apps like E-Mail even
  - Had 40 days retry timers
  - from back in uucp days
Reality is less assured...

- We live in a filter bubble (pace Eli Pariser)
- What you get in
  - Search
  - Social Nets
  - Microblogs
  - And even E-Mail
- Depends
  - who you are, where you are, when you look
  - And your mileage may vary too
So all that hard work is to no avail

- Apps and proxies and middle boxes
  - Select, modify, remove etc
- So we should engineer accordingly
- We're aware of this for multimedia
  - RTP/UDP designed for loss tolerant codecs
  - Even do partial packet checksums...
  - Add symbol level net coding, etc etc
- Also for trading nets (gaming)
  - Pragmatic General Multicast
Go further: s/IP/DTN+ICN/

- users experience poor performance:
  - *Because* of misplaced reliability effort
  - Let's go back to drawing board
  - Reliability (even integrity) is the exception, not the rule
- So, Information Centric Net (ICN)?
  - Aka Named Data Networking
  - Substitute pub/sub for IP...
Not enough just ICN...

- Need delay tolerance too...
- And delay intolerance -
  - When to discard (idea from PGM):
  - Time limited window of delivery
  - When to forget (cache eviction etc)
- Note also integrity
  - may not care which version, just any will do
  - May not care if transcoded en route
Locality of Relevance

- As with googling, facebook, twitter
- What you get depends
  - when you look,
  - Where you are
  - Who you are
- Locality is a good optimisation technique
  - But if we keep all that reliability legacy
  - We downright downrate the user experience!
In summary

- to re-assert unreliability as a feature
  - Not a bug
- Modern apps re-target e2e argument
  - In app protocol layer, not transport
- Your mileage should vary less
  - And be in kilometers, anyhow
Who Am I?