Video over ICN
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Draft focus

- Video composes most of the traffic in current network

- No signs for trend to abate: any new Internet architecture need to handle video

- Questions of the draft:
  - Can current Internet mechanisms for video distribution be adapted to an ICN?
  - Should new mechanisms be designed that are native to ICN?

Draft-video

- 4th version of the draft: Berlin, London, Toronto, Honolulu
- After Toronto, official WG item
- No seismic changes: same contributors, roughly same length (*32* pages to *35* pages, *10,704* words to *11,782*)
- Updated to reflect discussion in IETF90
- But new organization, new abstract, modified ToC/organization, sharpened focus
  - Two new sections

ToC Deltas…

Current video mechanisms

- Look at some use-cases trying to capture a range of requirements:
  - Video download
  - Netflix-like video streaming
    - Biggest share of traffic, but also simpler
    - DASH-like mechanisms exhibit similarity and complementarities with ICN architecture
  - P2P video distribution
    - Infrastructure-less scenario is one of the key selling point of ICN
    - PPSP-based ICN extensions
  - IPTV
    - Real-time delay constraints
- Other use-cases no in the draft: mentioned in research items.
  - Flash crowds/peak
  - Video-conferencing
  - (not mentioned, but discussed in Toronto: In- network DVR?)

Expanded list of research Items

- Potentially the structure of a "ICN-specific video mechanisms" document

- Items thus far:
  - Real-time issues (video conferencing)
  - Requirements of flash crowd, local video distribution (stadium, concert, demonstration, etc...) for scalability, content discovery, content sharing
  - Store-and-forward benefits + transport issues
    - Short discussion next!
  - Heterogeneous environments
  - Network coding for video distribution in ICN

- What do you want to contribute?

Store&Forward, Transport issues

- Caching discussed mostly to reduce bandwidth in the network by avoiding to repeat duplicate requests

- But can be used to increase network capacity for a single transmission

server

capacity / time (graph showing high capacity dropping to low)

cache

capacity / time (graph showing low capacity rising to high)

client

Store&Forward

server

capacity / time

cache

capacity / time

client
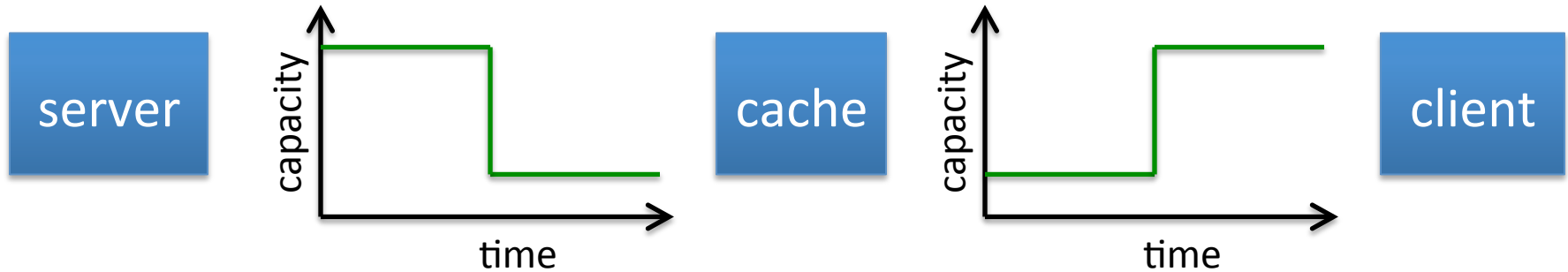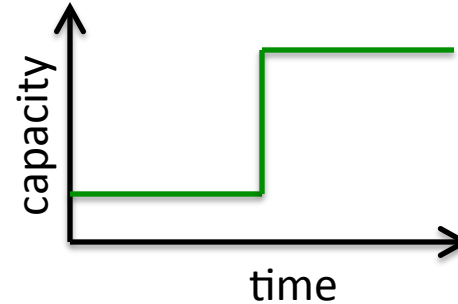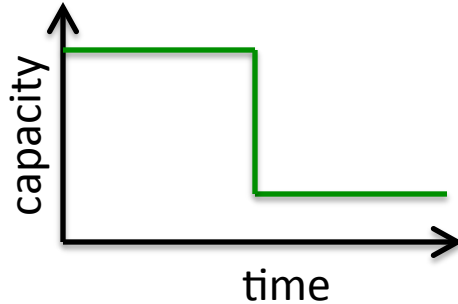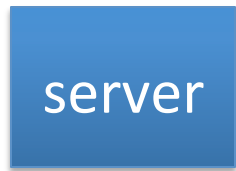
- e2e rate adaptation achieves the minimum bandwidth

capacity / time — e2e throughput

- ICN-specific/cache-aware mechanisms achieves wireless bandwidth capacity

capacity / time — ICN throughput

Fill cache

Draw from cache
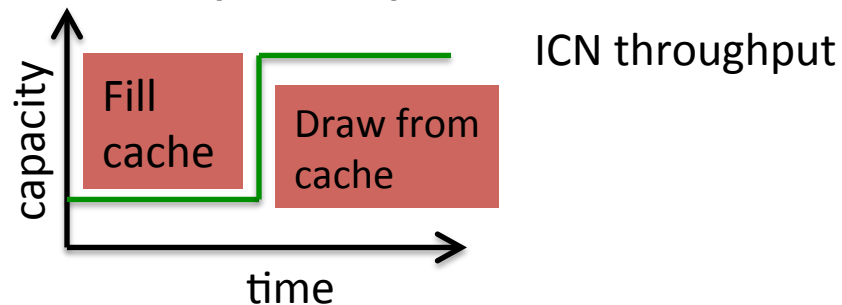
Store&Forward

- Questions: how to adapt rate in this situation?
- What is the proper rate adaptation mechanism to avoid buffering events, rate variations while at the same time maximizing QoE for end user
- What are the mechanisms to insert cache awareness in the video stream?

Next steps?

- Move this document to Informational RFC?
  - What would it take?
- Next document: native ICN video streaming, what would it look like?
  - How to fully leverage the abstractions of, say, CCN/NDN? What transport layer? How to use cache? New ways to do rate adaptation? Multi-source transport?
  - Draft list some research questions