Enhancing Over-the-Top Video Streaming Quality with DASH Assisting Network Elements

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From TV broadcasting to Video on Demand (VoD)..

- Online video streaming is extremely popular:
  - YouTube and Netflix account for over 50% of Internet traffic

NETFLIX

HBO NOW

YouTube

hulu

From TV broadcasting to Video on Demand (VoD)..

- Online video streaming is extremely popular:
  - YouTube and Netflix account for over 50% of Internet traffic
- Video content is delivered “over-the-top”:
  - distribution over the Internet (HTTP)
  - not using dedicated and managed infrastructures

Users have high expectations..

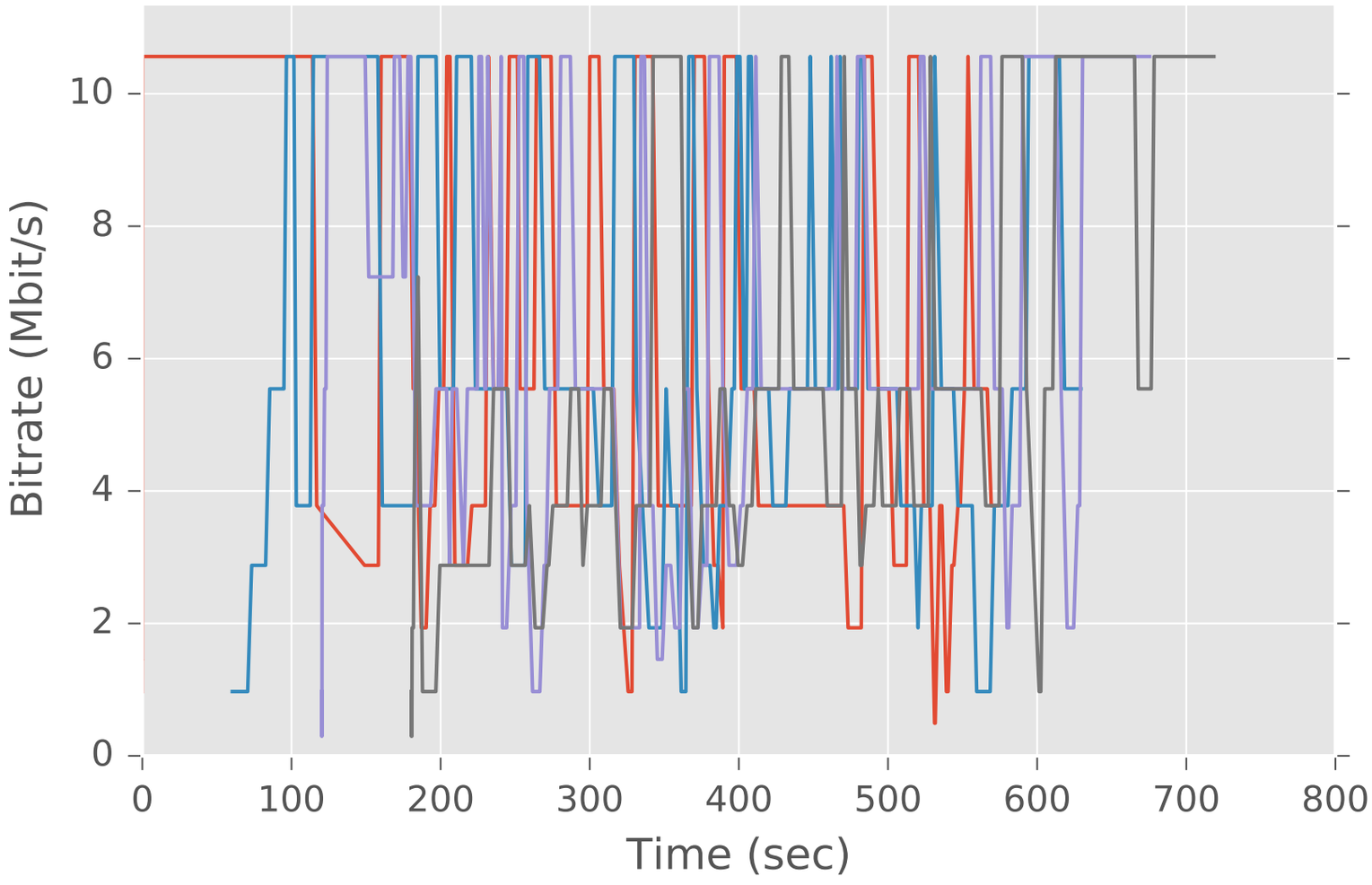
- A stream should start without delay
- No freezes
- Consistent high quality
- Equal quality among devices

Video delivery..

- Dynamic Adaptive Streaming over HTTP:
  - video player adapts video quality to the network conditions
  - reusing the HTTP delivery infrastructure = CDNs

- But…
  - DASH players suffer performance problems on shared network connections

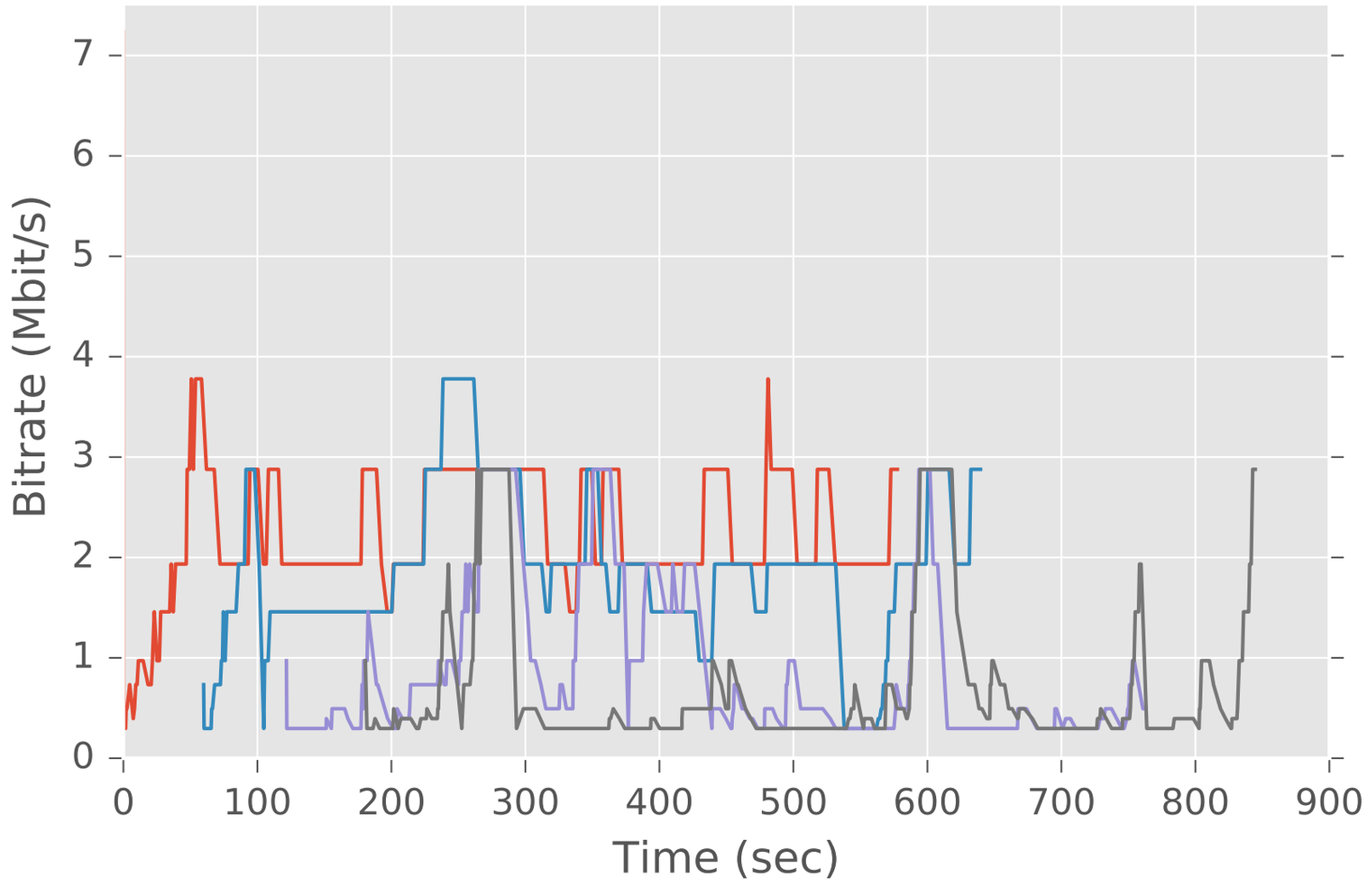
Traditional DASH adaptation algorithm..



Example..

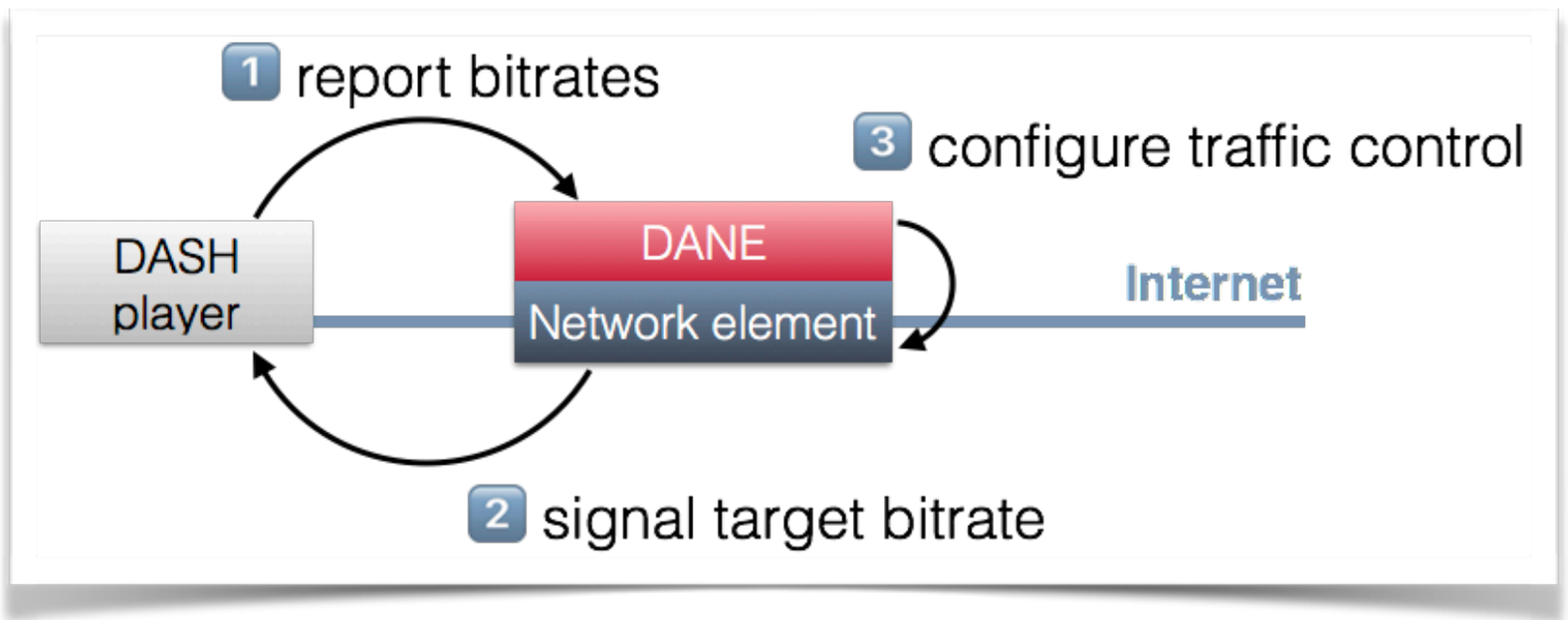
Example..

Background traffic..



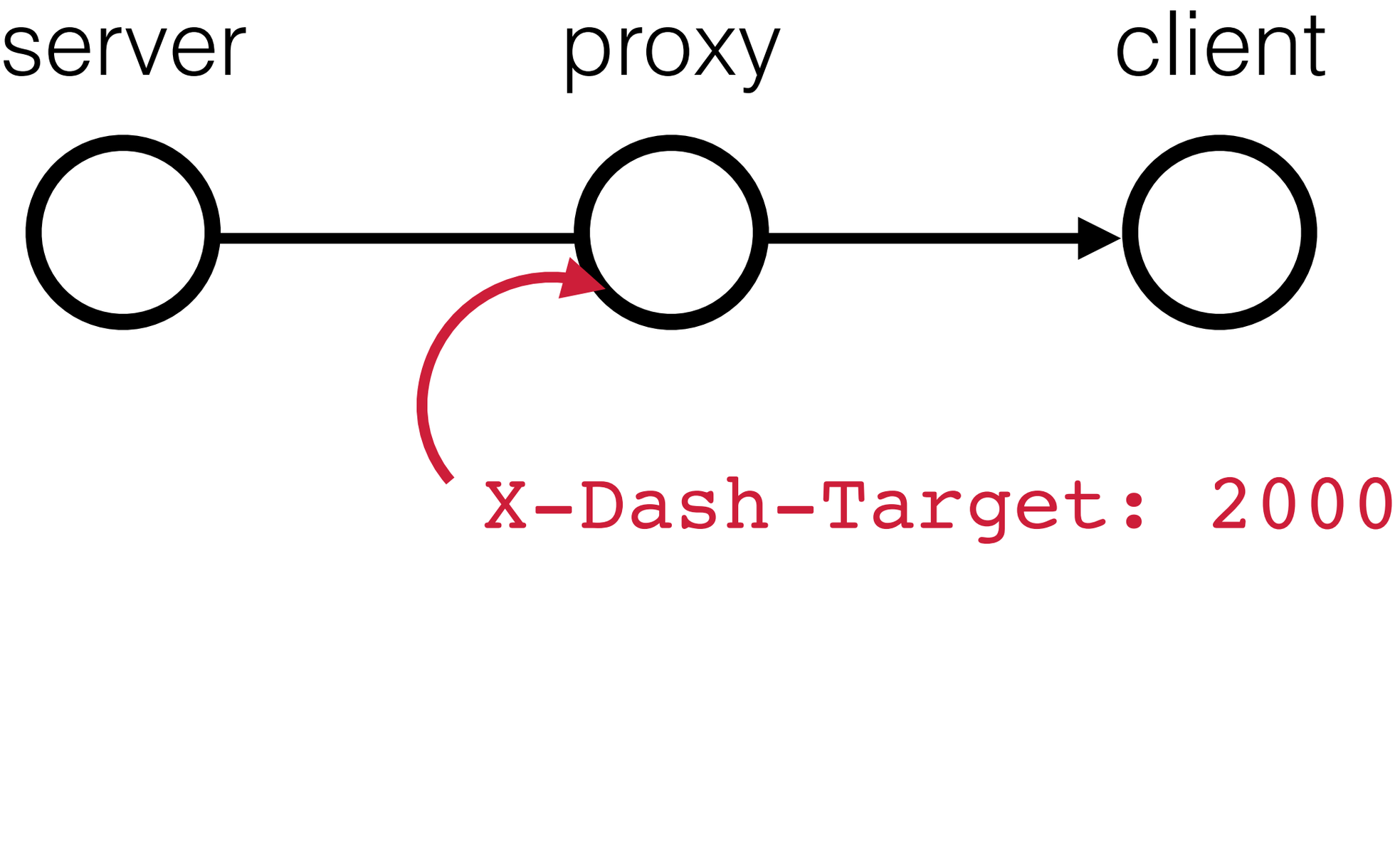
DASH Assisting Network Elements (DANEs)..

- "Smart" network elements that are aware of active DASH players
- Divide available bandwidth among DASH players and other traffic
- Signal target bitrate to players
- Traffic control



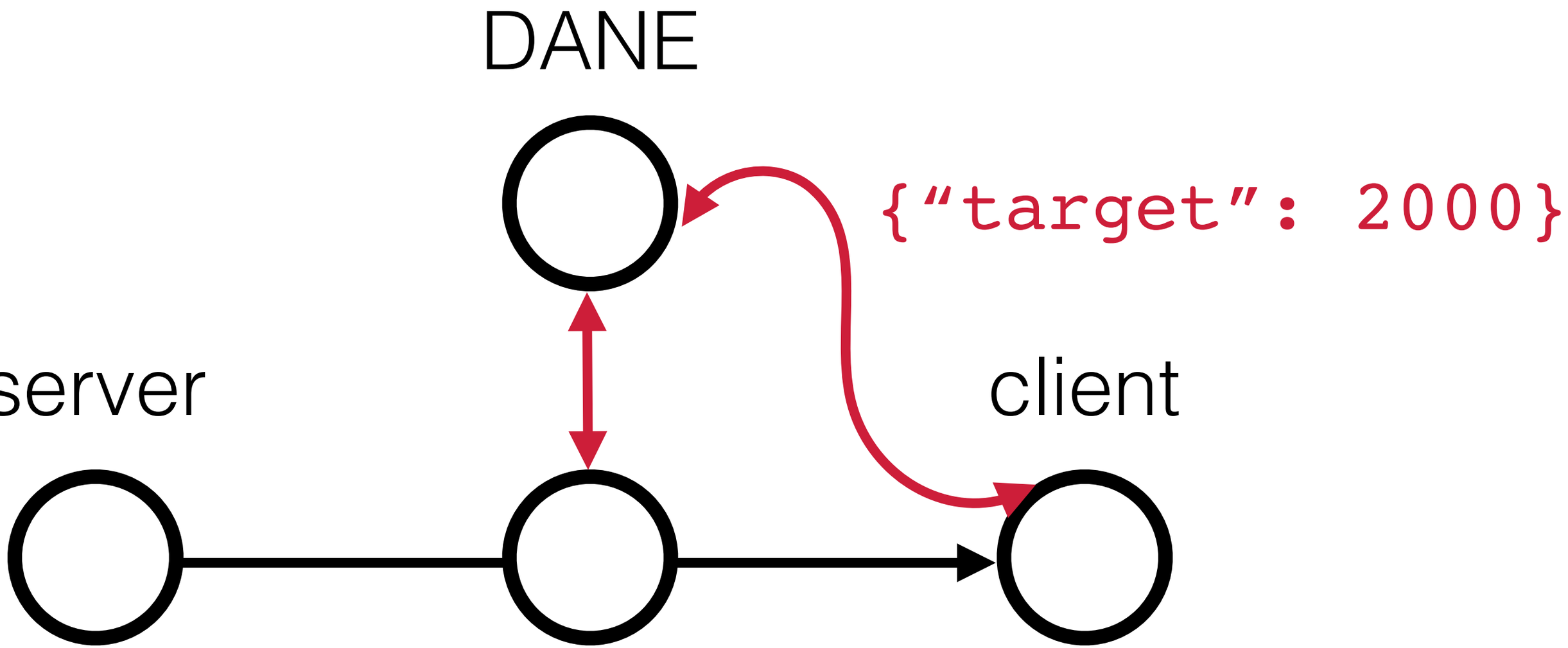
DASH Assisting Network Elements..

- Proxy server (in-band):



DASH Assisting Network Elements..

- Extra interface (out-of-band):



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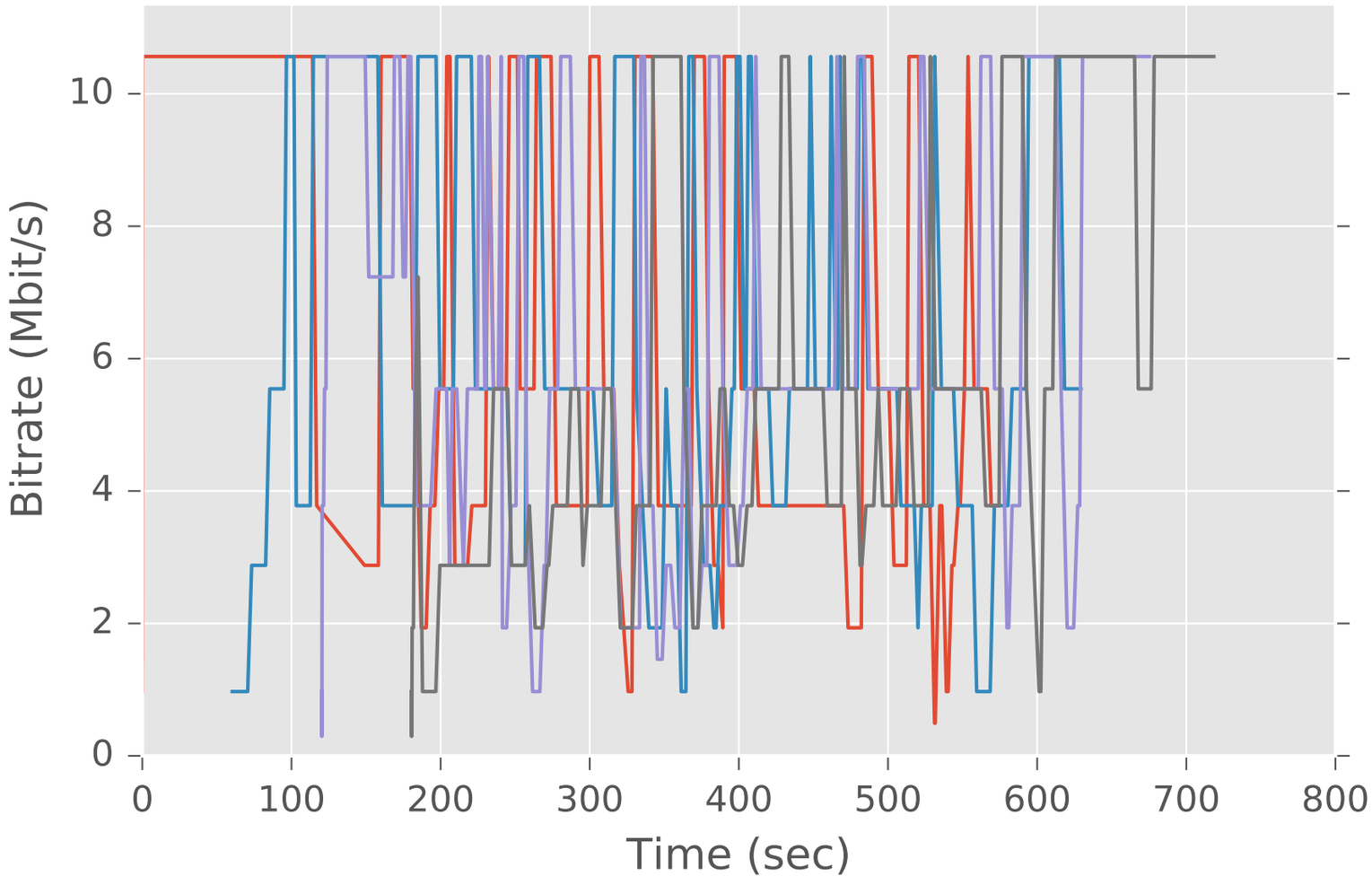

DASH Assisting Network Element..