

# Media Issues Taxonomy

draft-jholland-mops-taxonomy

Jake Holland

Akamai

# Motivation

- Doc I wish I had a few years ago
- Quick and painless orientation, if possible
- Reference for solutions

# Sections

- Bandwidth
- Congestion Avoidance Strategies
- (Conferencing?)
- (Pointer to implementations?)

# Bandwidth Requirements

- Per-receiver
  - Video, point cloud, audio
- Replication
  - Caching, multicast
  - Effects & challenges
  - Live vs. On-demand
- Asymmetric Links

# Unicast Arithmetic (Live Video)

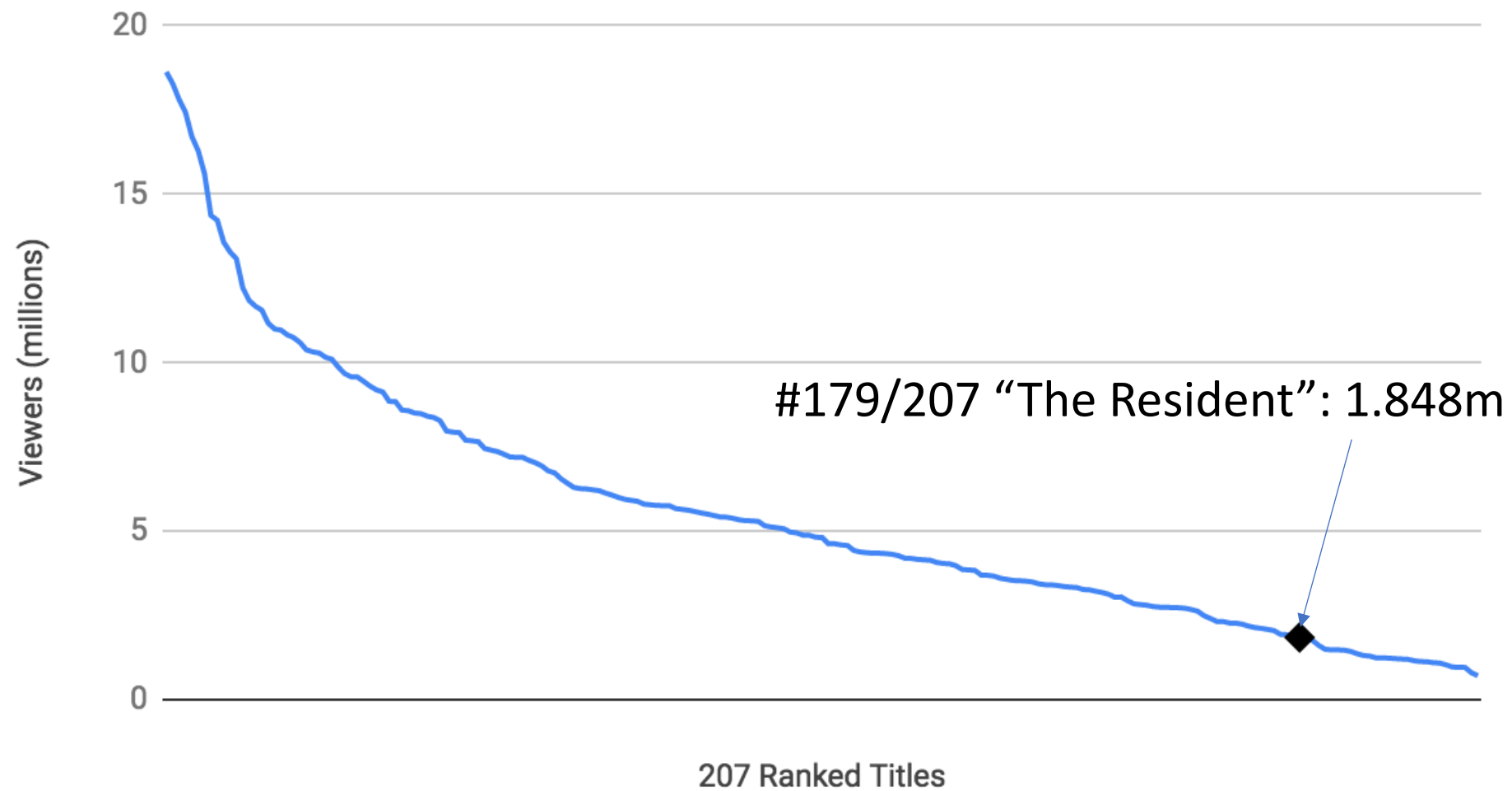
- 72 tbps = Akamai Traffic Record, Dec 2018\*
- 40 mbps = 4k standard frame rate (35-45 mbps, 24-30fps)

$$72 \times 10^{12} / 40 \times 10^6$$

=> 1.8m simultaneous 4k viewers to set new traffic record

\* Akamai estimated to deliver: 15-30% of total web traffic

# Nielsen Audience Size by Title 2017-2018



# Something has to give...

## Overall:

- Fifa World Cup Finals 2018: 500m
- Cricket World Cup (India playing) 2015: 200-300m
- Super Bowl 2019: 100m

## Online:

- Twitch concurrent viewers record, June 2018: 2.9m
- World Cup 2018 online Peak concurrent views: 9.7m

# Congestion Avoidance

- ABR with reliable segments
  - Bit-rate detection: Challenges & approaches
- Feedback-driven streaming
  - RTP (explain flavors?)
  - Others?



# Conferencing?

- Latency requirements
- Multi-directional options
  - Peer-to-peer
  - Hub & spoke
  - Hybrid? Tiered?

# Implementations

- Pointer to web page/github repo?
- Criteria for listing?

# Next Steps

- Useful?
- Adopt if WG?