Multicast Video

Motivating Observations

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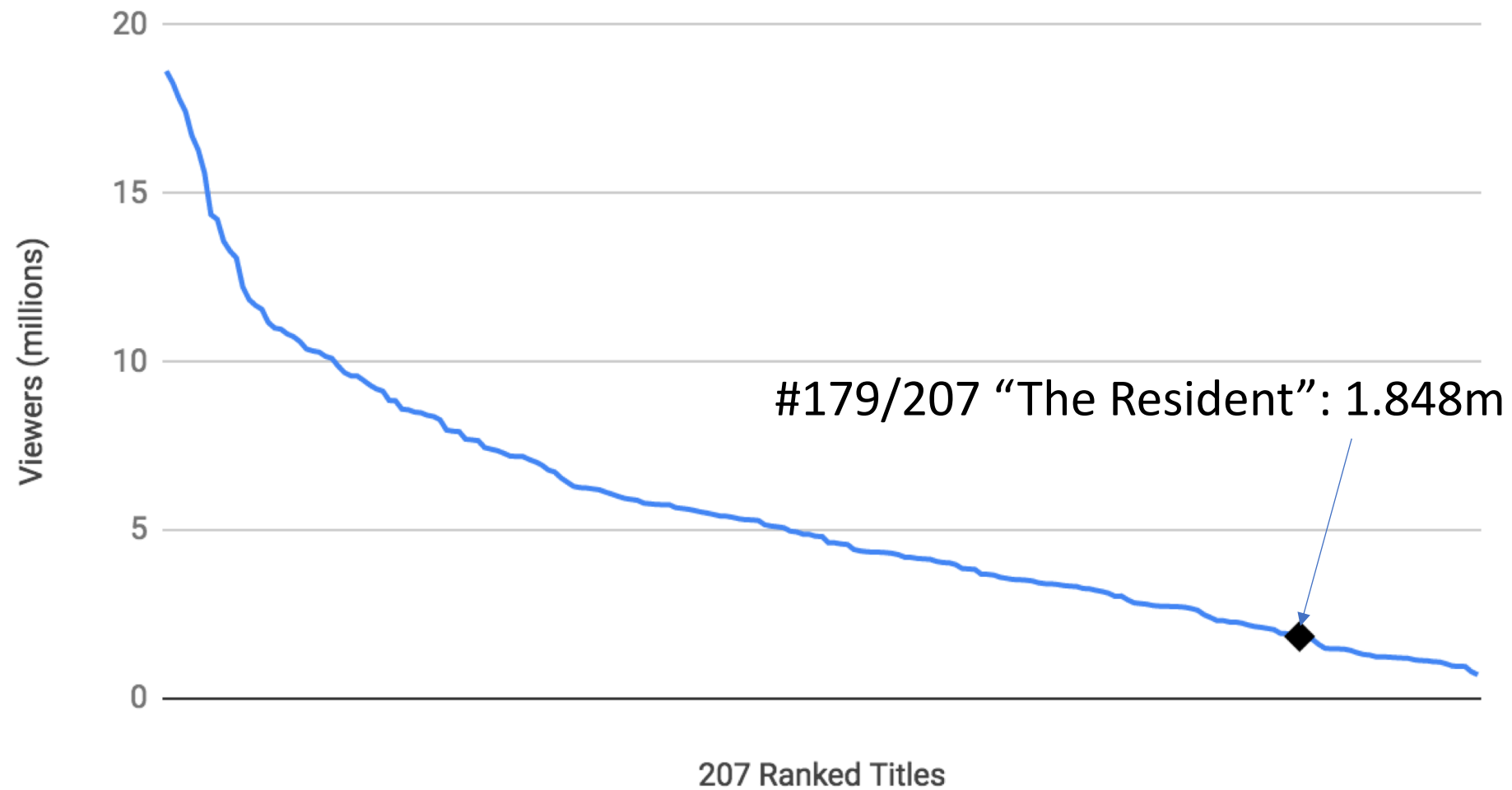Akamai

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

Viewers (millions)

20
15
10
5
0

#179/207 "The Resident": 1.848m

207 Ranked Titles

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

Unicast Arithmetic (Delivery)

Game download = 65GB, Popular game = 100m users

65×10^9 bytes * 8 bits/byte * 100×10^6 users / 72×10^{12} bps => 722,000s

=> 8.4 <u>days</u> to deliver to all users (@record CDN rate)

65×10^9 bytes * 8 bits/byte / 50×10^6 bps => 10,400s

=> 3 <u>hours</u> user expectation from 50mbps network

Podcast-style/DVR video delivery? (18GB = 1 hour 4k)

Misperceptions

- "MBONE is dead"
  - Limited deployment is live in internet2
  - Tunnel ingest works
    - Virtual MBONE anywhere you want

- "Multicast Too Hard"
  - Compared to?
    - 5-10x total server footprint?
    - laying new fiber?

Multicast IPTV (walled garden)

- Several solutions:
  - Competing product lines: Akamai, Broadpeak, Koovik, others?
    - New Akamai Licensed CDN product deployed Jan 2019
  - Open-source & home-grown solutions
    - Gstreamer, VLC
- Proven utility
- Access networks need it too
  - Bits saved at layer 1

Conclusion

- Start looking at multicast
- Think about ingest & delivery
  - Find your numbers: what makes it worthwhile?
- Vast gains
  - Enough that everybody can benefit

It's about user quality of experience