Making Multicast IP More Successful

Presentation to IETF 101 Hackathon

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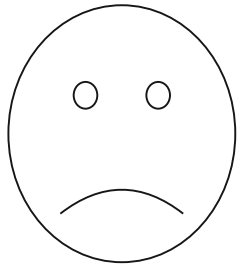
Lucas Pardue

BBC | Research & Development

Problem

Mass audiences of IP-based TV distribution cause scalability problems for the Internet.

20 Mbps (per stream) × 20 million streams =



A means to a solution

- IP multicast provides a scalable way to address audiences but its success has been limited
  - We'd like to reach audiences on **managed** and **unmanaged,** heterogenous networks
    - Interdomain multicast is not universally deployed
    - Multicast islands
- Automatic Multicast Tunneling (AMT) RFC 7450 is one way to gain reach

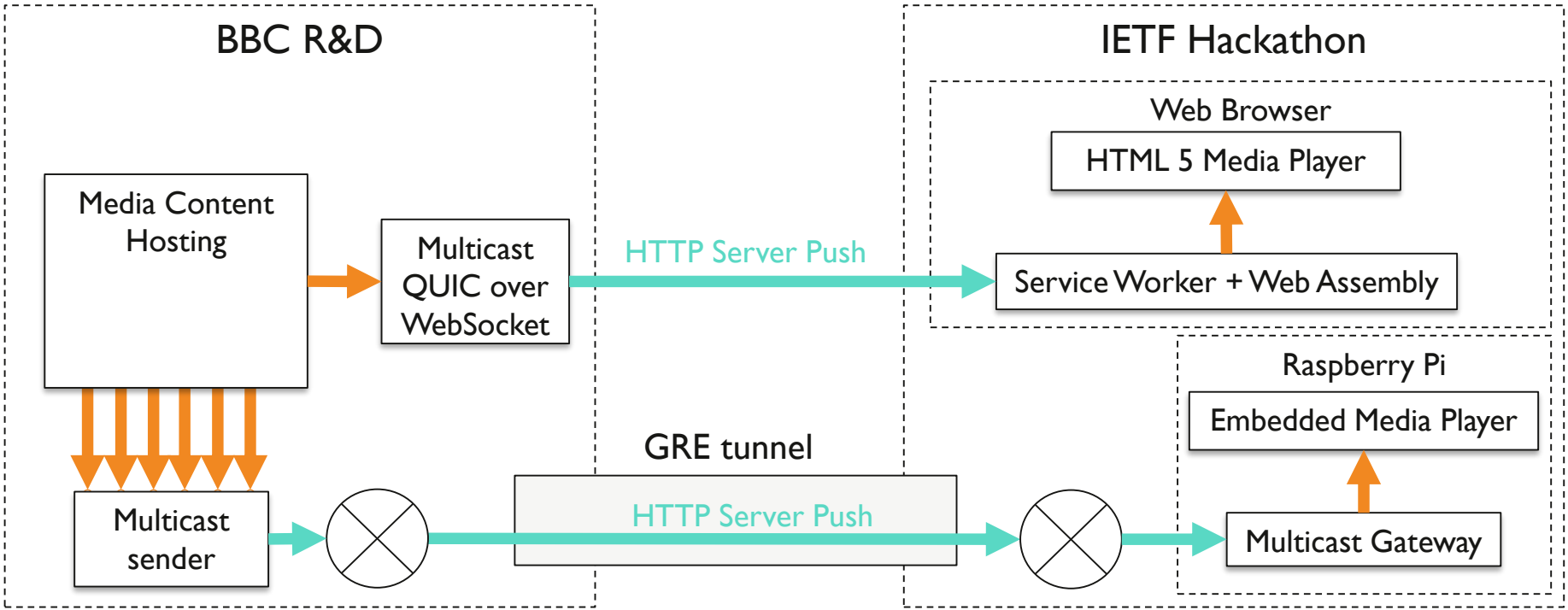
HTTP-based media streaming future

- HTTP-based adaptive media streaming is popular for IP unicast
  - File delivery enables new content experiences
- A solution for delivering this over IP multicast would help address scalability
  - Can we make QUIC (UDP-based HTTP) work over IP multicast?
    - draft-pardue-quic-http-mcast
      - Unidirectional HTTP using Server Push
    - BBC R&D have an end-to-end demonstrator based on earlier Google QUIC
      - An embedded client on a Raspberry Pi

The Hackathon plan

- Continue work on AMT – Jake Holland, Akamai
- Deliver current GQUIC HTTP over multicast QUIC to IETF – Anthony Turner, BBC
- Uplift to IETF version of HTTP over QUIC – Sam Hurst & David Waring, BBC R&D
- Develop a browser-based proof-of-concept client – Alice Foster & Lucas Pardue, BBC R&D
- QUIC transport testbed – Craig Taylor, BBC

Multicast distribution to the IETF Hackathon



What got done

- Continue work on AMT – Jake Holland, Akamai
- Deliver current GQUIC HTTP over multicast QUIC to IETF – Anthony Turner, BBC
- Uplift to IETF version of HTTP over QUIC – Sam Hurst & David Waring, BBC R&D
  - A design and early, limited implementation of a library to sit on top of ngtcp2 transport library
- Develop and test browser-based proof-of-concept client – Alice Foster & Lucas Pardue, BBC R&D
- QUIC transport testbed – Craig Taylor, BBC

What we learned

- UK-based GeoIP checks don't necessarily succeed on the IETF network when it is in the UK
- AMT is 'fun'
- We have feedback to help improve the ngtcp2 API for application mappings
  - We have a reference client and server but did not test them
- Deserialising QUIC packets to HTTP resources is possible in JavaScript
  - JavaScript promises are difficult when many in flight at the same time

Wrap up

Team members:

Lucas Pardue - BBC R&D

Jake Holland – Akamai

Craig Taylor -BBC

First timers @ IETF/Hackathon:

David Waring, Sam Hurst, Alice Foster - BBC R&D

Anthony Turner - BBC