openhead-end

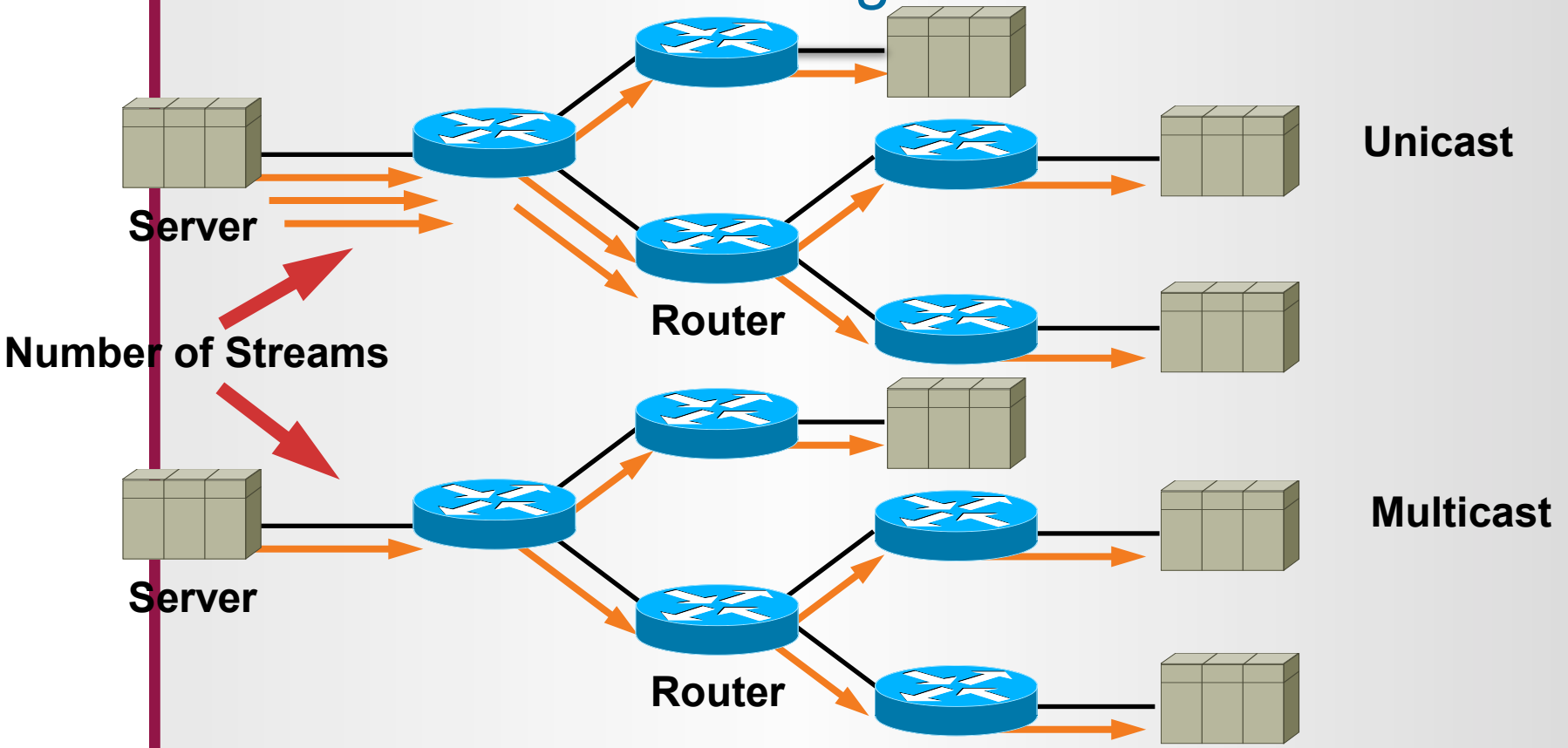
Automatic Multicast Tunneling & Upipe: a Proof of Concept

Christophe Massiot (FOSDEM 2015)

Why multicast?

- Saves network bandwidth by avoiding packet duplication
- Particularly useful for television, but not only

Unicast vs. Multicast Scaling



Who uses multicast?

- “Any Source Multicast” (RFC1112) requires assignment of limited resources
- Several (complex) subscription protocols
- Used in closed IPTV networks

Multicast over Internet Howto

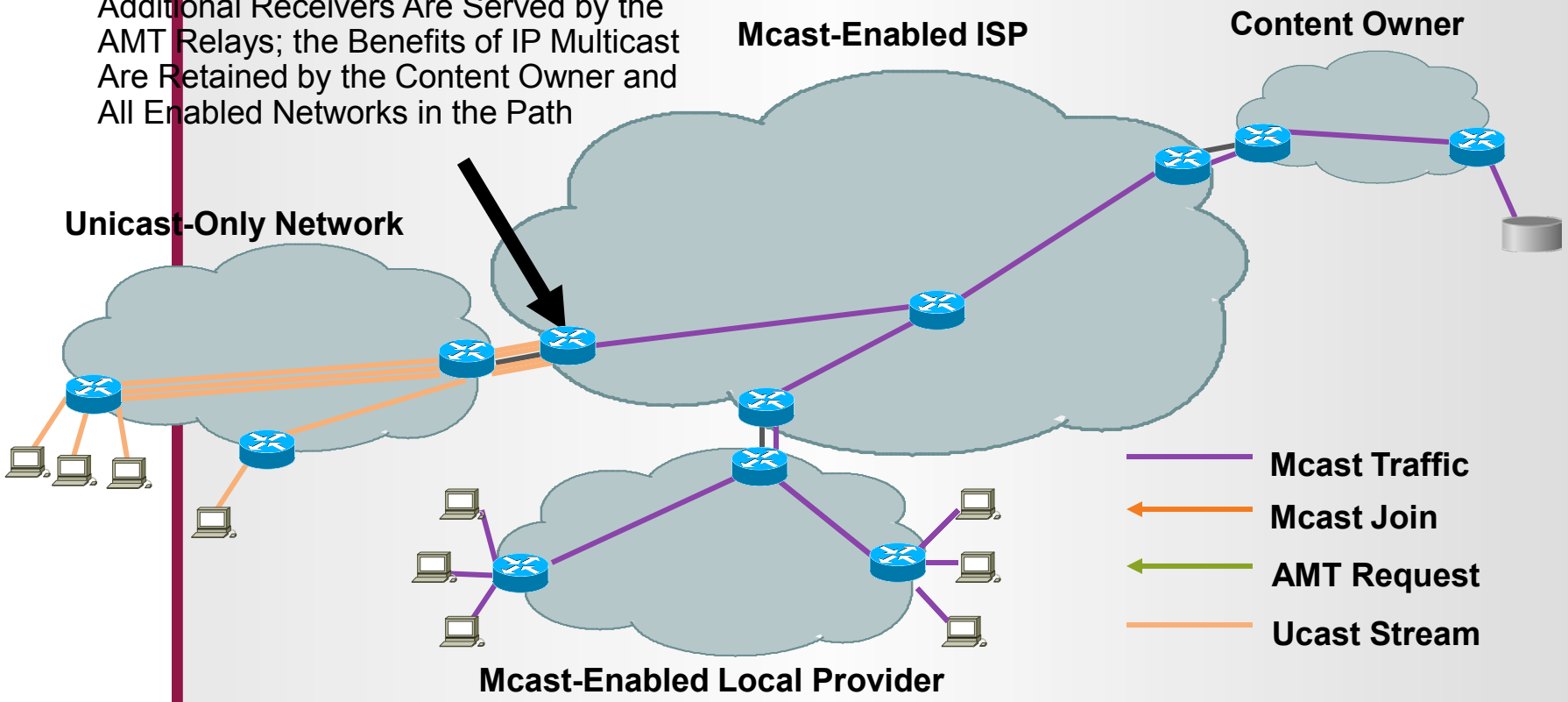
- “Source Specific Multicast” (RFC4607) defined by source + multicast addresses
- Simple subscription protocol
- Also used for IPTV
- Built for Internet, but seldom used
  - Lack of incremental adoption strategy
  - Industry concentrated on IP multicast in networks that could roll it out natively

Automatic Multicast Tunneling

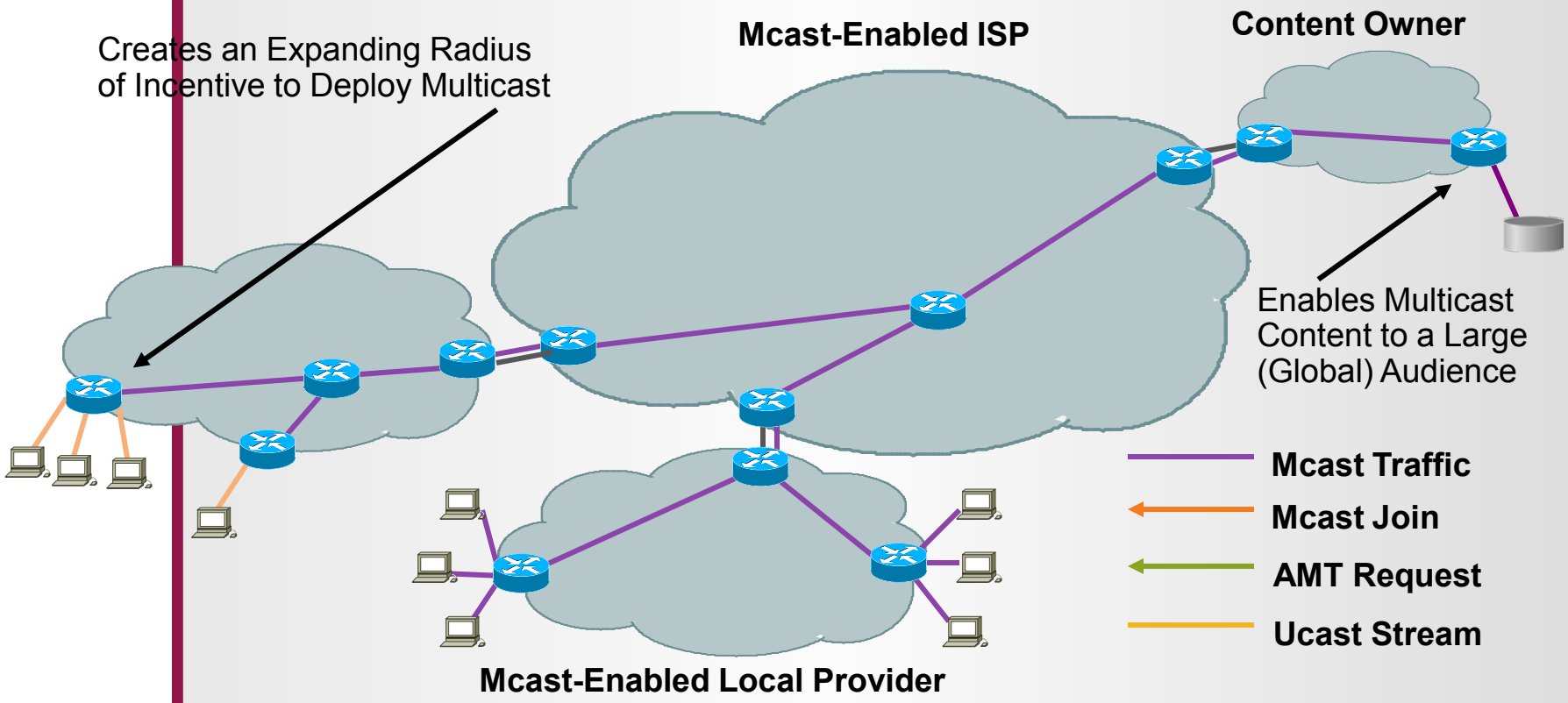
- RFC draft “draft-ietf-mboned-auto-multicast-18”
- Protocol between a gateway (client-side) and a relay (server-side)
  - Allow multicast distribution to extend to unicast-only connected receivers
  - Provide the benefits of multicast wherever multicast is deployed
  - Work seamlessly with existing apps

AMT—Automatic Multicast Tunneling

Additional Receivers Are Served by the AMT Relays; the Benefits of IP Multicast Are Retained by the Content Owner and All Enabled Networks in the Path



AMT—Automatic Multicast Tunneling



What AMT doesn't fix

- Packet loss
- Network latency, jitter, packet reordering
- Network congestion (adaptive bitrate)

PoC: Upipe + Chrome

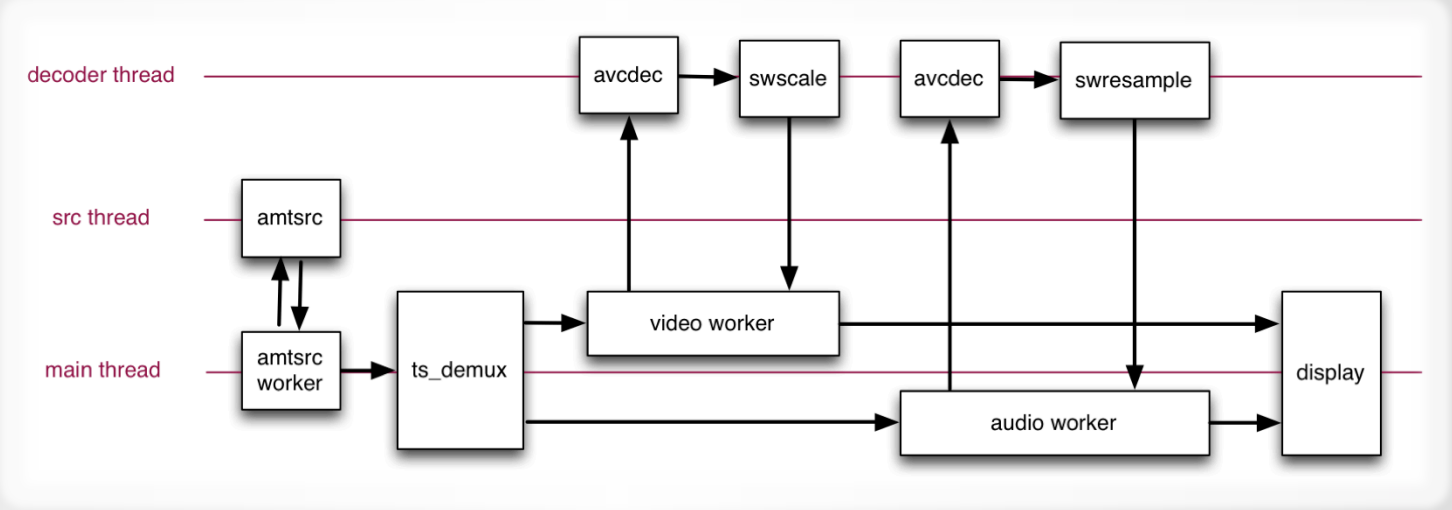
- Display a multicast stream in a web browser, using AMT if needed
- Without AMT support from the OS, or from a local network equipment

Non-standard video in a browser

- NPAPI deprecated
- ActiveX not portable and unsecure
- Media Source Extensions very tied to “chunked” delivery
- Google’s PPAPI & Native Client best choice for a proof of concept

Choice of components

- Cisco's open source AMT library
  - https://github.com/cisco/SSMAMTtools.git
- Multimedia framework w/ NaCl support: Upipe
  - http://upipe.org/



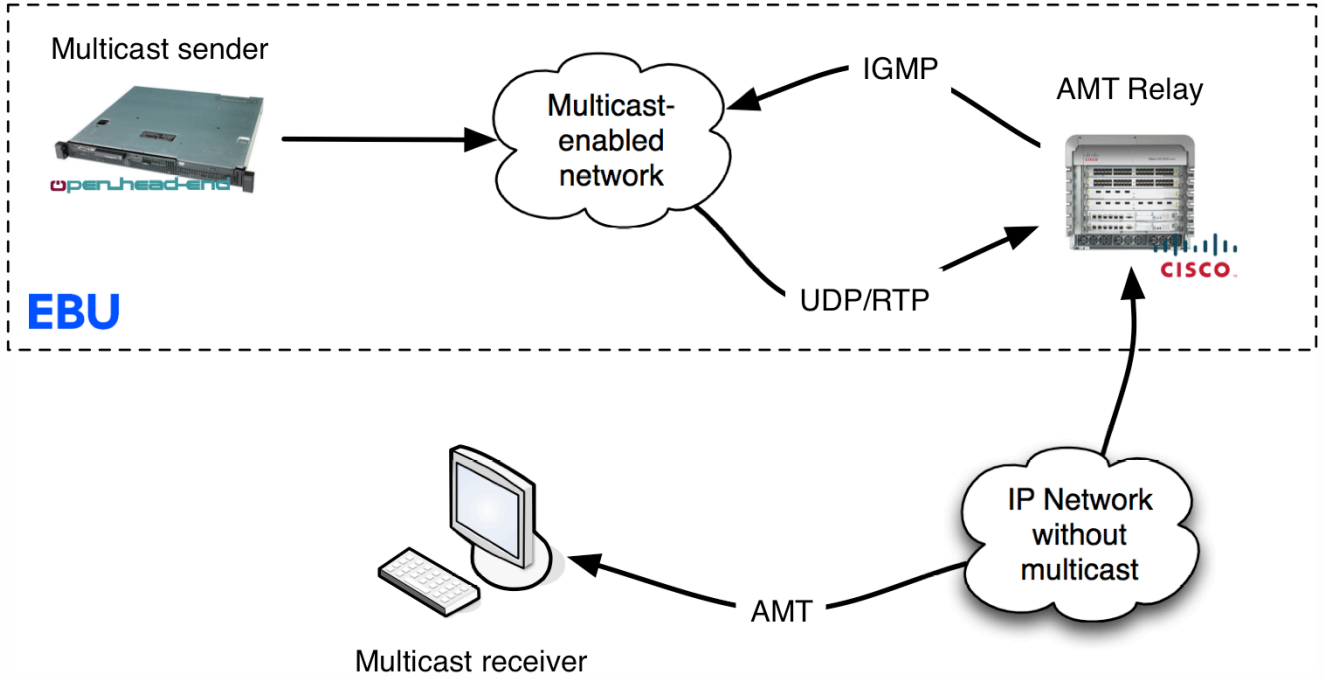
Limits of the current PoC

- Sockets blocked by default by NaCl sandbox
- No IGMP support in PPAPI
- No FFmpeg assembly optimizations

Future perspectives

- PPAPI now features a “video decoder” interface
- AMT should probably be integrated into MSE/other W3C stuff

Hands on!



http://upipe.org/player_chrome/
https://workspace.ebu.ch/display/BISMulti/

cmassiot@openheadend.tv

Upipe meet-up in BOF room Sunday 14:00