Multicast to the Browser

IETF 108 mboned, 2020-07-31, status update
Jake Holland
draft-ietf-mboned-dorms
draft-ietf-mboned-cbacc
draft-ietf-mboned-ambi

Outline

- Updates since 2020 interim
  - Implementation
  - Outreach
- Feedback
  - Issues raised
  - Solution proposal (preview, no draft yet)
- Next Steps
  - Trials
  - Implementation & Draft priorities

Implementation/Deployment Progress (@2020-07)

- Chromium Intent to Prototype posted:
  https://groups.google.com/a/chromium.org/forum/#!topic/blink-dev/JVKSTHFiDzo
- Refactors completed:
    - ReadableStreams in API (like webtransport)
    - Command-line flag guarded (early experimental-stage requirement)
- Internal POC successful (basic native receive, no AMBI/CBACC yet)
    - Plays video from LMS* sender via WebAssembly SDK+MSE
    - Needs improvements on CPU utilization
- DORMS server running and discoverable (CZ.NIC's jetconf):

  ```
  dig -t SRV _dorms._tcp.4.185.212.23.in-addr.arpa
  ```

* Akamai's Aura/LMS: https://www.akamai.com/us/en/products/network-operator/licensed-multicast-solution.jsp

Operator Community Outreach

- ~30 ISP meetings with architecture walkthrough
- NANOG 79 presentation "IP Multicast: Next steps to make it real":
  https://www.youtube.com/watch?v=2aihLUb1elg
- APNIC blog post:
  https://blog.apnic.net/2020/07/28/why-inter-domain-multicast-now-makes-sense/
- Game/Software delivery recognized as a key use case

Mostly supportive, trials likely (negotiations ongoing)
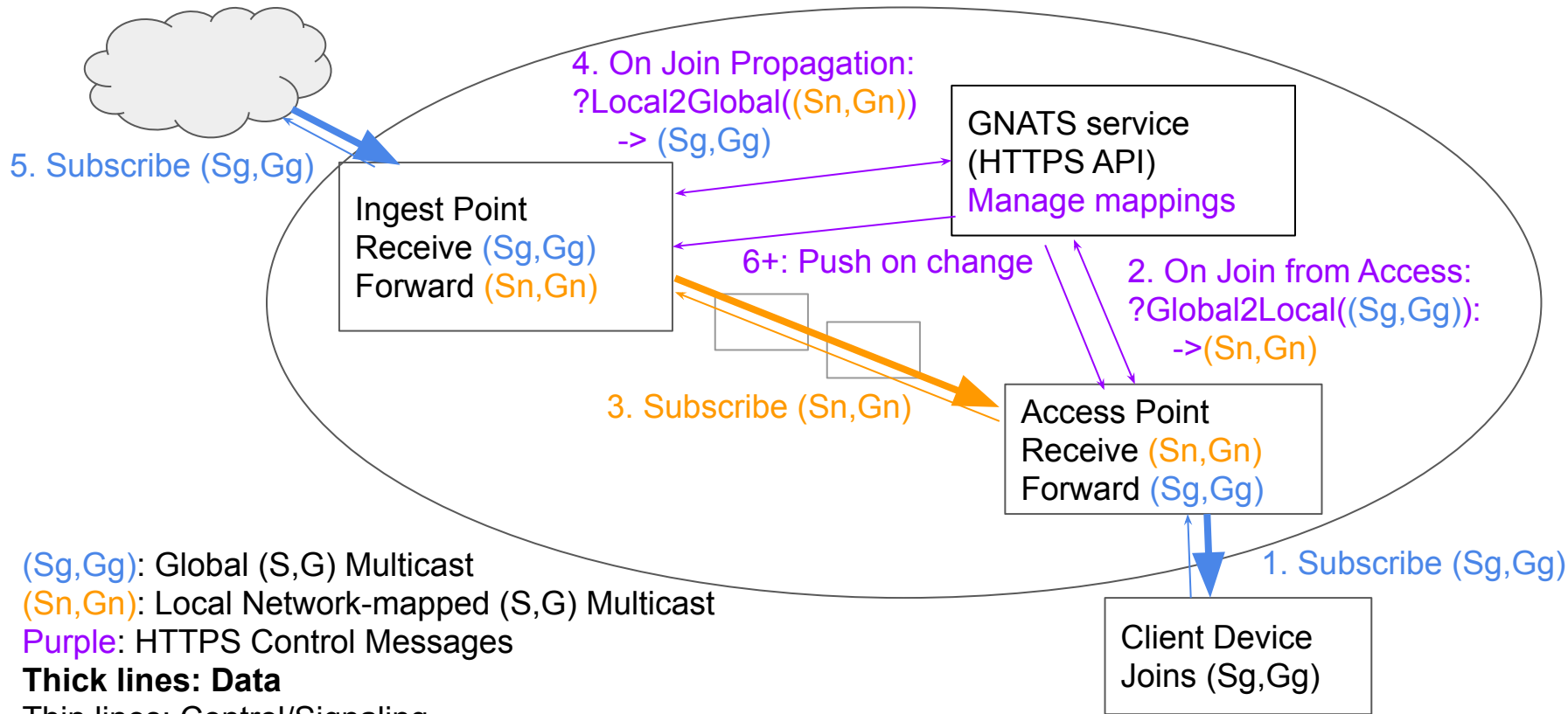
Content Owner Outreach

- ~30 Content owner meetings with arch walkthrough
- Content owners generally supportive
  - Hybrid unicast + opportunistic multicast
  - Open standards
  - SDK a minus but not usually a stopper (b/c hybrid unicast)
- Stretch goal: production A/B video test (no promises)
  - Using Android SDK, not browser
- Game/Software delivery talks still ongoing
  - Prototype running

Feedback: Early Notes from Operators

- Operators are seeing the need
  - Mostly supportive
  - Cautiously optimistic on feasibility of multicast ingest

- Issues raised
- Common theme: challenges with dynamic global (S,G)s
  - 6-10 max groups across some deployed CMTS gear
  - Existing services use statically pinned groups
  - Source IP MUST come from internally ISP-assigned pool
    - Conflicts with sender-managed Source-IP-based global auth/ingest/meta

Proposed Solution Preview

Group Network Address Translation Service (GNATS)

4. On Join Propagation:
?Local2Global((Sn,Gn))
-> (Sg,Gg)

GNATS service
(HTTPS API)
Manage mappings

5. Subscribe (Sg,Gg)

Ingest Point
Receive (Sg,Gg)
Forward (Sn,Gn)

6+: Push on change

2. On Join from Access:
?Global2Local((Sg,Gg)):
->(Sn,Gn)

3. Subscribe (Sn,Gn)

Access Point
Receive (Sn,Gn)
Forward (Sg,Gg)

1. Subscribe (Sg,Gg)

Client Device
Joins (Sg,Gg)

(Sg,Gg): Global (S,G) Multicast
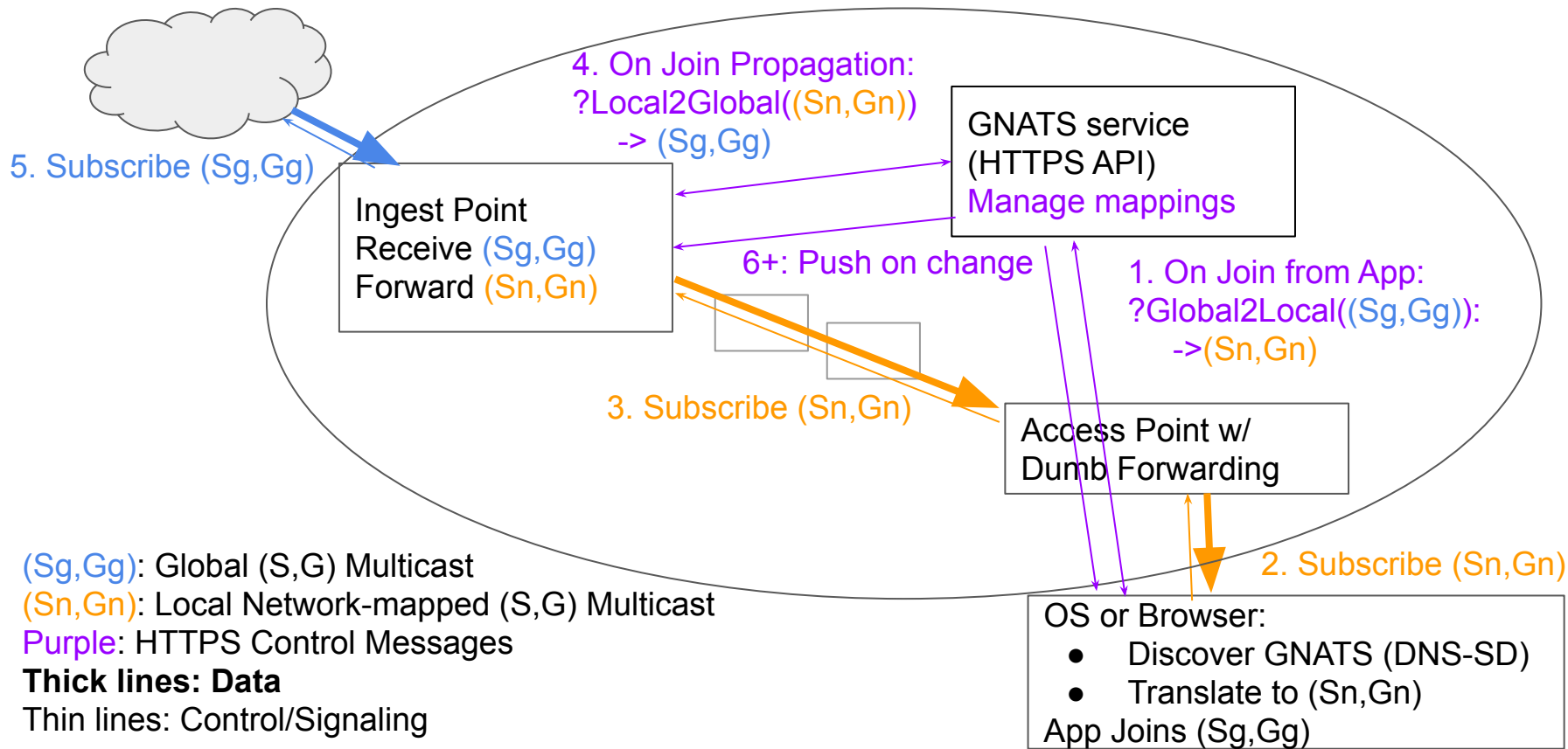(Sn,Gn): Local Network-mapped (S,G) Multicast
Purple: HTTPS Control Messages
Thick lines: Data
Thin lines: Control/Signaling

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Proposed Solution Preview

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GNATS service
(HTTPS API)
Manage mappings

Ingest Point
Receive (Sg,Gg)
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6+: Push on change

1. On Join from App:
?Global2Local((Sg,Gg)):
->(Sn,Gn)

3. Subscribe (Sn,Gn)

Access Point w/
Dumb Forwarding

2. Subscribe (Sn,Gn)

(Sg,Gg): Global (S,G) Multicast
(Sn,Gn): Local Network-mapped (S,G) Multicast
Purple: HTTPS Control Messages
Thick lines: Data
Thin lines: Control/Signaling

OS or Browser:
- Discover GNATS (DNS-SD)
- Translate to (Sn,Gn)

App Joins (Sg,Gg)

GNATS-addressable Issues

Immediate:

- Specific local IP assignments (static groups, sender IPs, etc)
- ASM-only networks
- V4 over V6 network and V6 over V4 network
- Population count without RFC 6807 (PIM experimental)

Future possible extensions:

- Local broadcast channel assignment? (PON/Cable/5G/ATSC)
- BIER signaling applicability?

Next Steps

- Trials, trials, trials (3-6 to start this year, hopefully)
  - [multicast-ingest-platform](#) for ingest prototype
  - CBACC prototype integrated with ingest-platform
  - Stretch goal: CBACC external implementation
    - Drive ACL API on existing router hardware
  - At least 1 probably includes GNATS prototype
    - (maybe before writing spec, depending)
- Draft updates incorporating feedback so far
- Get chromium experimental API checked in
- Later: get moving on AMBI (maybe fix and add ALTA)