WEBTRANS WG
IETF 115

Hybrid Meeting

Thursday, November 10, 2022

Session II

Richmond 2

13:00 - 15:00 London Time

Mailing list: webtransport@ietf.org
MeetEcho: https://wws.conf.meetecho.com/conference/?group=webtrans
Notes: https://notes.ietf.org/notes-ietf-115-webtrans

IETF 115 Meeting Tips

In-person participants

- Make sure to sign into the session using the Meetecho (usually the "Meetecho lite" client) from the Datatracker agenda
- Use Meetecho to join the mic queue
- *Keep audio and video off if not using the onsite version*
- **Wear masks unless actively speaking at the microphone.**

Remote participants

- Make sure your audio and video are off unless you are chairing or presenting during a session
- Use of a headset is strongly recommended

IETF 115 Remote Meeting Tips

- Enter the queue with ✋ , leave with ✋

- When you are called on, you need to enable your audio to be heard.

- Audio is enabled by unmuting 🎙 and disabled by muting 🎙

- Video can also be enabled, but it is separate from audio.
- Video is encouraged to help comprehension but not required.

Resources for IETF 115 London

- Agenda
  https://datatracker.ietf.org/meeting/agenda
- Meetecho and other information:
  https://www.ietf.org/how/meetings/115/preparation
- If you need technical assistance, see the Reporting Issues page:
  http://www.ietf.org/how/meetings/issues/

Note well

This is a reminder of IETF policies in effect on various topics such as patents or code of conduct. It is only meant to point you in the right direction. Exceptions may apply. The IETF's patent policy and the definition of an IETF "contribution" and "participation" are set forth in BCP 79; please read it carefully.

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- By participating in the IETF, you agree to follow IETF processes and policies.
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- Personal information that you provide to IETF will be handled in accordance with the IETF Privacy Statement.
- As a participant or attendee, you agree to work respectfully with other participants; please contact the ombudsteam (https://www.ietf.org/contact/ombudsteam/) if you have questions or concerns about this.

Definitive information is in the documents listed below and other IETF BCPs. For advice, please talk to WG chairs or ADs:

- BCP 9 (Internet Standards Process)
- BCP 25 (Working Group processes)
- BCP 25 (Anti-Harassment Procedures)
- BCP 54 (Code of Conduct)
- BCP 78 (Copyright)
- BCP 79 (Patents, Participation)
- https://www.ietf.org/privacy-policy/(Privacy Policy)

Note really well

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Reminder: IETF Mask Policy

- Masks must be worn in meeting rooms and are recommended for common areas but not required.
- In meeting rooms, masks may briefly be removed for eating and drinking, but that cannot be an excuse to leave them off for long periods.
- In meeting rooms, active speakers, defined as those who are at the front of the room presenting or speaking in the mic queue, can remove their mask while speaking.
- No exemptions for mask wearing, medical or otherwise, will be allowed.
- Masks must be equivalent to N95/FFP2 or better, and free masks will be provided.

https://www.ietf.org/how/meetings/115/faq/#covidmeasures

About this meeting

- Agenda:
  https://datatracker.ietf.org/doc/agenda-115-webtrans/
- Notes: https://notes.ietf.org/notes-ietf-115-webtrans
- WG Chairs: Bernard Aboba & David Schinazi
- Zulip Scribe: David Schinazi
- Note Takers: ?

Agenda

- Preliminaries, Chairs (15 minutes)
  - Note Well(s), Note Takers, Participation hints
  - Agenda Bash
- W3C WebTransport Update, Will Law, (20 minutes)
- WebTransport over HTTP/2, Eric Kinnear (10 minutes)
  - https://datatracker.ietf.org/doc/html/draft-ietf-webtrans-http2
- WebTransport over HTTP/3, Victor Vasiliev (30 minutes)
  - https://datatracker.ietf.org/doc/html/draft-ietf-webtrans-http3
- Reset Stream, Marten Seemann (25 minutes)
  - https://github.com/ietf-wg-webtrans/draft-ietf-webtrans-http3/issues/77
- Hums, Wrap up and Summary, Chairs & ADs (10 minutes)

W3C WebTransport Update (1)

W3C WebTransport WG progress since July 26

- **Status:** Published a [Working Draft](#) - latest version October 25th, 2022
- **Charter [extension](#)** proposed for additional year. New charter will expire Dec 31, 2023.
- **Timetable** for year
  - Dec 30 : Candidate for Recommendation - requires stability in API
  - Jan 30 : Proposed Recommendation - requires two independent implementations per our charter.
  - March 2023: Call for Review of a Proposed Recommendation
  - May 2023 - Publication by W3C as a Recommendation after AC review.
- **Milestone** status
  - [minimum-viable-ship](#) has 2 remaining issues.
  - New milestone aligned with W3C release process - [Candidate Recommendation](#). (10 open issues, 5 ready-for-PR)

W3C WebTransport Update (2)

- **Decisions and updates since last IETF report (July 26):**

  - **Add protocol mappings table for QUIC→streams and clean close #407** - connection cleanly terminated with closeInfo
  - **Add congestionControl contructor arg and readonly attribute #406**:

    ```
    const wt = new WebTransport(url, {congestionControl: "low-latency"}); // | "throughput" | ("default")
    console.log(wt.congestionControl); // parrots input "low-latency" if satisfied or "default" if not
    ```

  - **Update link to websockets spec #418** - editorial
  - **BidirectionalStream's readable and writable lost their types #423** - editorial
  - **Add Samples Directory (and WebCodecs Echo Sample) #415** - demo code for WT combined with WebCodecs for real-time video pub/sub
  - **Add simple echo sample #427** - demo code for an echo server which can reflect unidirectional, bidirectional streams and datagrams.
  - **Make WebTransportSendStream & WebTransportReceiveStream transferable. #433**

W3C WebTransport Update (3)

Current issues of debate:

1. **Prioritization**
   - Datagram vs stream & relative stream prioritization [#62](#62)
   - Weighted flows of datagrams and short-lived streams [#419](#419)
   - Supporting MoQ with strict send ordering of streams [#431](#431)

   Various APIs have been proposed, along with proposed constructs around flows of short-lived objects. Browser implementers seem to have no enthusiasm for adopting one of the various API shapes that have been put forward around weights and flows. Latest issue calls for supporting MoQ base protocol prioritization requirements at a minimum.

2. **Stat surface**
   - PR https://github.com/w3c/webtransport/pull/421
   - Issue https://github.com/w3c/webtransport/issues/21

   Prior discussion has suggested that pkt_arrival, pkt_departure, latest_rtt and ecn information would be necessary. Newer thinking is that a single property expressing available/target throughput would be sufficient. But debate over expected size of congestion window, remaining/total availability, rtt, calculations just focused at the next frame, or projections multiple frames ahead?

Asks of IETF WEBTRANS WG

1. Will WebTransport protocol as defined by IETF include a send priority mechanism which W3C User Agents can leverage?
2. If so, how will priorities be signalled and consistently applied between intermediate relays? https://github.com/w3c/webtransport/issues/62
3. Can WT require an L4S-friendly (Prague) low-latency CC?
4. Can the WT protocol mandate inclusion of the QUIC timestamp option for a W3C API to use to surface stats for JS-based CC?

WebTransport over HTTP/2 (10 minutes)

Eric Kinnear

https://datatracker.ietf.org/doc/html/draft-ietf-webtransport-http2
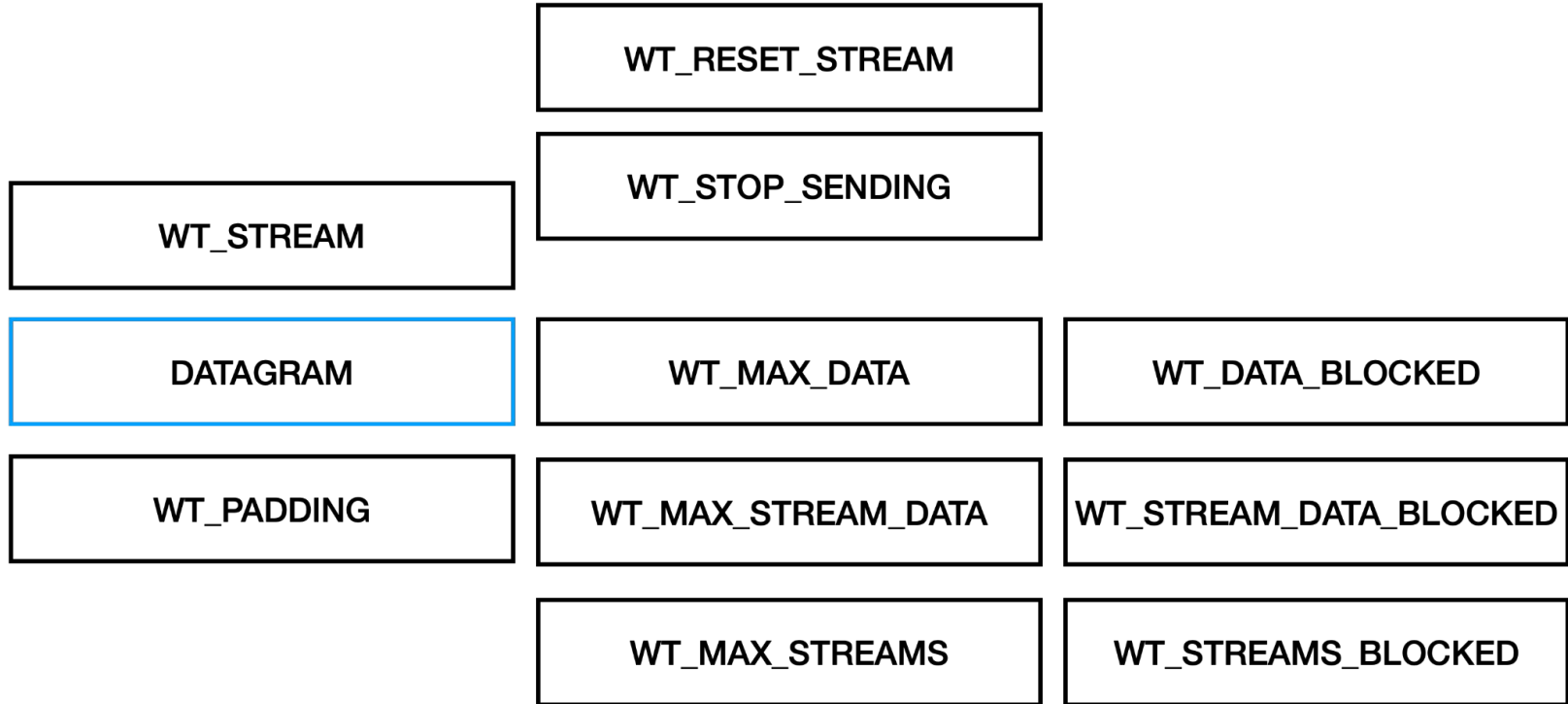
Capsules

Capsules

Capsules

Capsules

Capsules

Capsules

Capsules for H3 and H2, mostly H2

SETTINGS changes

Session flow control base text, full text for H2

Capsules in HTTP/2

	WT_RESET_STREAM	
	WT_STOP_SENDING	
WT_STREAM		
DATAGRAM	WT_MAX_DATA	WT_DATA_BLOCKED
WT_PADDING	WT_MAX_STREAM_DATA	WT_STREAM_DATA_BLOCKED
	WT_MAX_STREAMS	WT_STREAMS_BLOCKED

Negotiating WebTransport

QUIC Transport Parameter
    max_datagram_frame_size

H3 SETTING
    SETTINGS_ENABLE_CONNECT_PROTOCOL
    SETTINGS_ENABLE_WEBTRANSPORT

Will discuss later today

Settings?

SETTINGS_WEBTRANSPORT_MAX_SESSIONS
and SETTINGS_ENABLE_WEBTRANSPORT

Both sides send ENABLE

Server sends MAX_SESSIONS

Flow Control in HTTP/2

SETTING to limit number of sessions

Limit number of streams within a session with MAX_STREAMS

Next Steps

Please read and review PRs

WebTransport overview WebTransport over HTTP/3 (30 minutes)

Victor Vasiliev

https://datatracker.ietf.org/doc/html/draft-ietf-webtrans-http3

HTTP/3 draft updates

Notable merged PRs:

● Clarify when the client can open streams and send datagrams (#80)

Issue #84: support for underlying features

Proposal:

- WebTransport explicitly requires capsules, QUIC datagrams, HTTP datagrams, and extended CONNECT
- We require the relevant SETTINGS/transport parameters to be explicitly negotiated

Issue #61: HTTP redirects

- Last meeting, we were leaning towards supporting redirects
- Problems:
  - What if the redirect source does not support WebTransport?
  - What if the redirect destination does not support WebTransport?
  - Idempotency issues
  - API issues – what if there were data sent before redirect?

Issue #48/71/81: stream framing

- During IETF 114, we decided that WEBTRANSPORT_STREAM frames have to be placed at the beginning of the stream
- Is this just a special bidi stream frame, or a bidi stream type header? PR#83 suggests the latter

  (TODO: insert a picture of a bikeshed here)

Other pending PRs

- Add a capsule to drain a WebTransport session (#79)
- Clarify SETTINGS behavior for 0-RTT (#87)
- Add recommendation text for throttling (#88)

Reset Stream Reliability (15 minutes)

Marten Seemann

https://github.com/ietf-wg-webtrans/draft-ietf-webtrans-http3/issues/77

QUIC Stream Resets

Sender: stops retransmitting STREAM frames

Receiver: (usually) reports the reset error to the application

QUIC Stream Resets
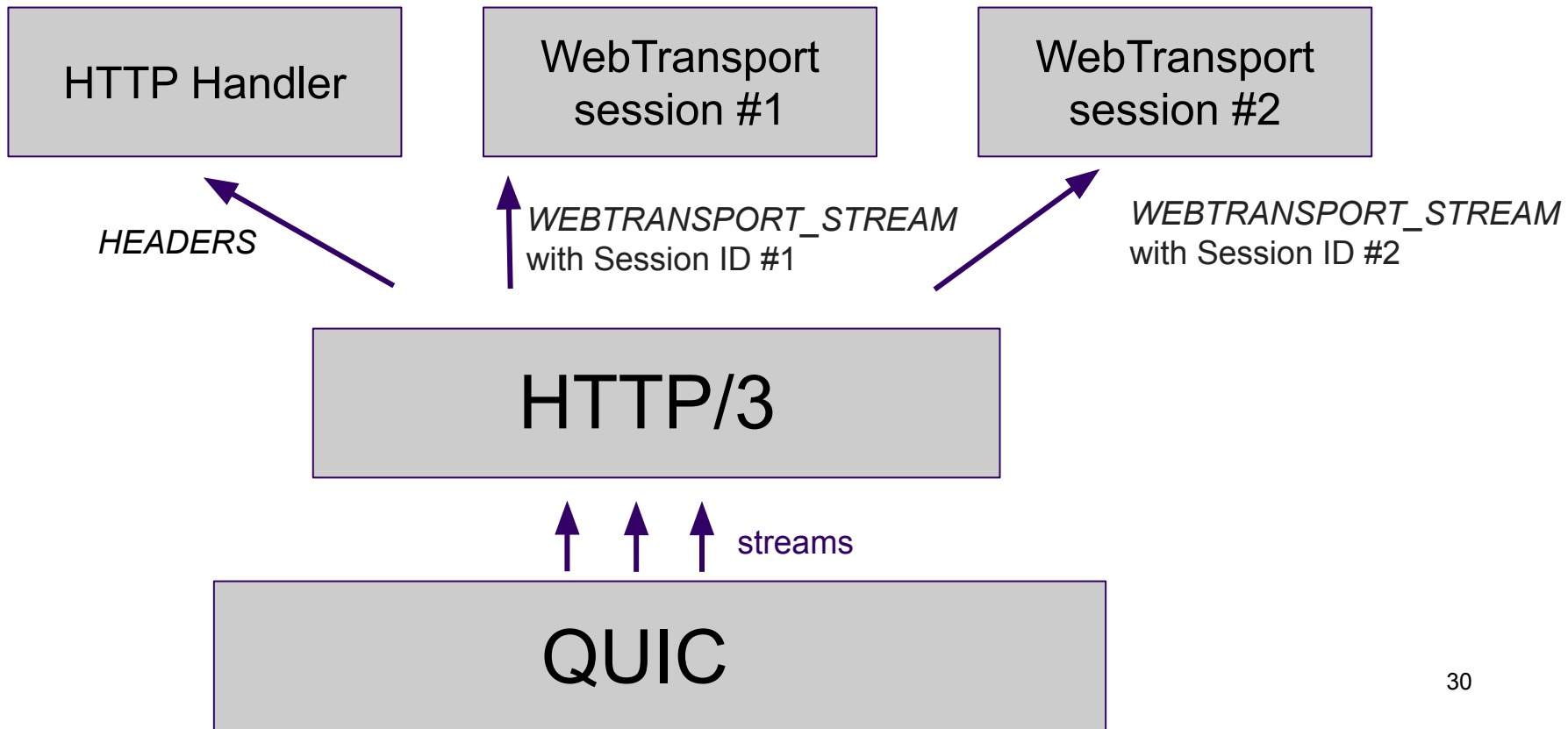
QUIC Stream Resets

What shall we do when a stream is reset before we could read the first HTTP/3 frame?

Option 1: do nothing

Just reset the other side of the stream at the HTTP/3 layer.

Pros:
- simple

Cons:
- Application protocols might rely on resets
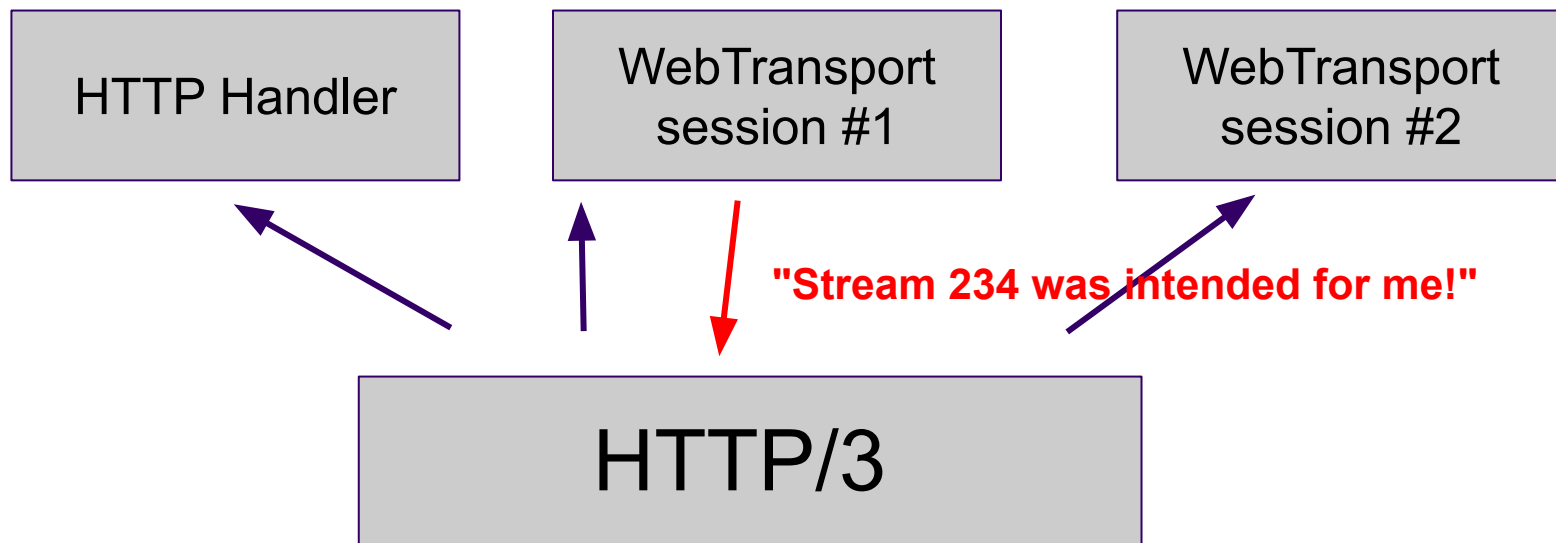
Option 2: RESET capsules

RESET capsule sent on the WebTransport control stream

```
WEBTRANSPORT_RESET_CAPSULE {
    Stream ID (i),
    ErrorCode (8),
}
```

Option 2: RESET capsules

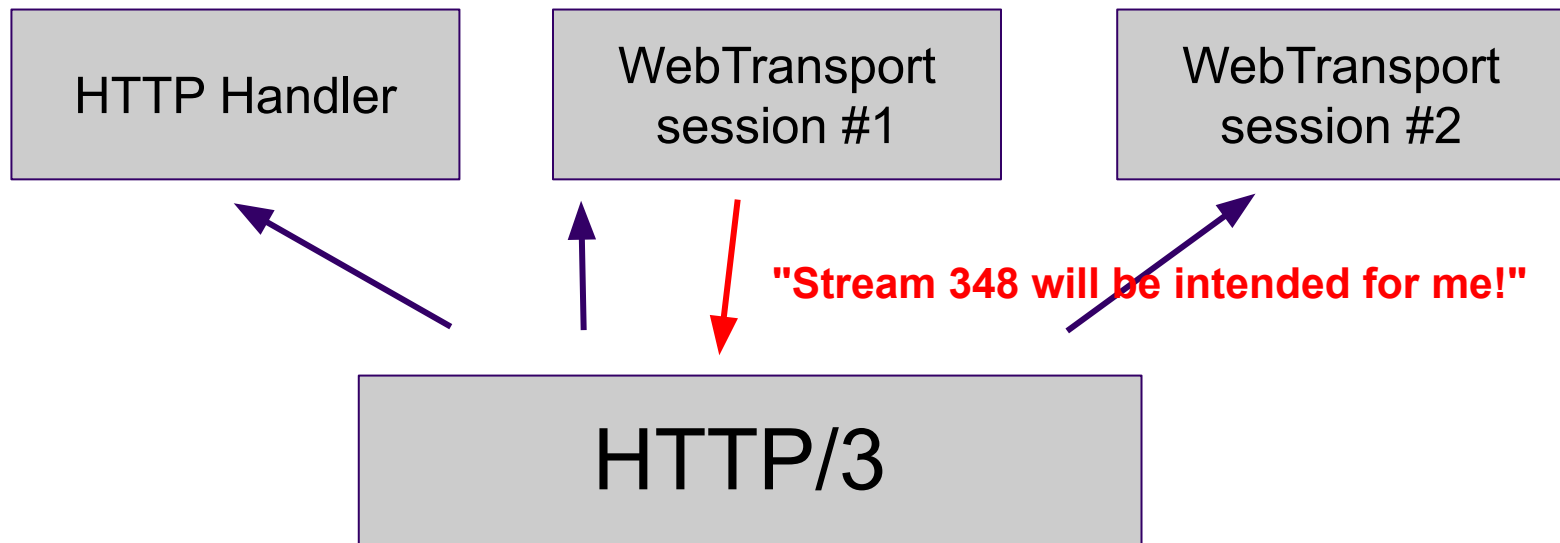Scenario: stream reset is received **before**
`WEBTRANSPORT_RESET_CAPSULE`

Option 2: RESET capsules

Scenario: stream reset is received **after**
`WEBTRANSPORT_RESET_CAPSULE`

HTTP Handler	WebTransport session #1	WebTransport session #2

"Stream 348 will be intended for me!"

HTTP/3

Option 2: RESET capsules

Lots of error conditions:

- stream reset received, but received no `WEBTRANSPORT_RESET_CAPSULE` (after a certain time)

- `WEBTRANSPORT_RESET_CAPSULE` received, but no stream reset (after a certain time)

- multiple `WEBTRANSPORT_RESET_CAPSULE`s claim the same stream

Option 2: RESET capsules

Pros:

- allow applications to properly react to stream resets

Cons:

- Implementation complexity
- wasteful

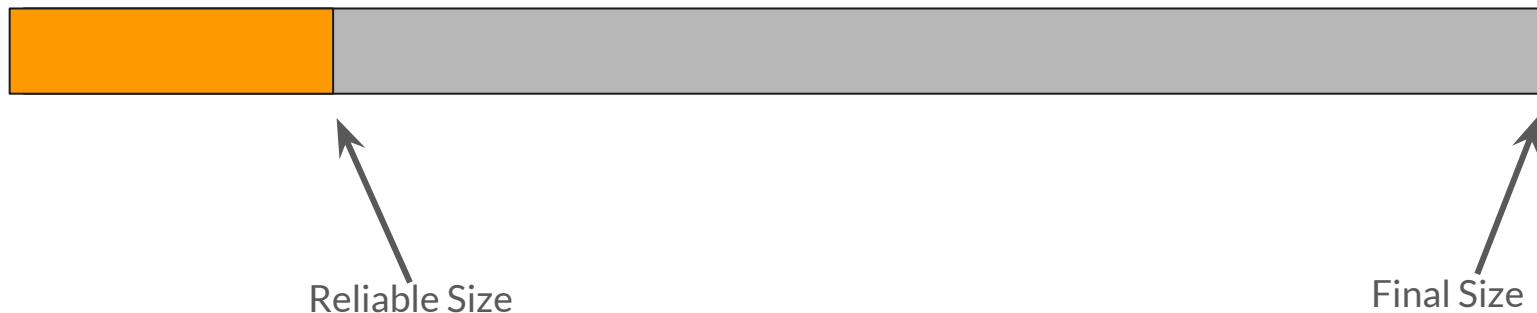# Option 3: solve at the QUIC layer

adds a new frame to QUIC (*not* HTTP/3)

```
RELIABLE_RESET_STREAM Frame {
  Type (i) = 0x72,
  Stream ID (i),
  Application Protocol Error Code (i),
  Final Size (i),
  Reliable Size (i)
}
```

Option 3: Reliable Stream Resets

A part of the stream is delivered reliably, even when reset.

Reliable Size

Final Size

Reliable Size would cover the *WEBTRANSPORT_STREAM* frame

Option 3: solve at the QUIC layer

Pros:

- allow applications to properly react to stream resets
- "correct" layering

Cons:

- requires defining an extension to QUIC

Hums, Wrap-up, and Summary (15 minutes)

Bernard Aboba

David Schinazi

Thank you

Special thanks to:

The Secretariat, WG Participants & ADs