WEBTRANS WG
IETF 117
Hybrid Meeting
Thursday, July 27, 2023
13:00 - 15:00 Pacific Time
Session II, Plaza A

Mailing list: webtransport@ietf.org
MeetEcho: https://meetecho.ietf.org/conference/?group=webtrans
Notes: https://notes.ietf.org/notes-ietf-117-webtrans
IETF 117 Meeting Tips

In-person participants
- Make sure to sign into the session using Meetecho (usually the “Onsite tool” client) from the Datatracker agenda
- Use Meetecho to join the mic queue
- Keep audio and video off if not using the onsite version

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

This session is being recorded
IETF 117 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 117

● Information about IETF 117
  https://www.ietf.org/how/meetings/117

● Agenda
  https://datatracker.ietf.org/meeting/agenda

● If you need technical assistance, see the Reporting Issues page:
  http://www.ietf.org/how/meetings/issues/
Note well

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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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About this meeting

- Agenda: https://datatracker.ietf.org/doc/agenda-117-webtrans/
- Notes: https://notes.ietf.org/notes-ietf-117-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, (15 minutes)

● WebTransport over HTTP/2, Eric Kinnear (40 minutes)

● WebTransport over HTTP/3, Victor Vasiliev (40 minutes)

● Wrap up and Summary, Chairs & ADs (10 minutes)
W3C WebTransport Update (1)

W3C WebTransport WG progress since March 29, 2023

- **Status:** Published a [Working Draft](#) - latest version July 12 2023
- **Charter** current [charter](#) will expire Dec 31, 2023. We will need another extension.
- **Timetable** for year
  - Sept 30, 2023: Candidate for Recommendation - requires stability in API
  - October 2023: Proposed Recommendation - requires two independent implementations per our charter.
  - December 2023: Call for Review of a Proposed Recommendation
  - February 2024: Publication by W3C as a Recommendation after AC review
- **Milestone** status
  - [Candidate Recommendation](#) (74% complete, 13 open (13 ready-for-PR), 37 closed)
- **Annual TPAC meeting** planned for Tuesday Sept 12, 17:00 - 18:30 CEST
W3C WebTransport Update (2)

Major decisions and updates since last IETF report (March 29):

- Add `estimatedSendRate` to stats. #494 - the estimated rate at which queued data will be sent by the user agent, in bits per second. This rate applies to all streams and datagrams that share a WebTransport session and is calculated by the congestion control algorithm. Now also available for pooled connections #497 (no pooling across origins)
- Specify BFCache interaction #500 - allow pages using WebTransport to enter the BFCache, but close the connection when navigating away.
- Networking privacy considerations #485 - improved the spec language on fingerprinting and tracking
- Support BYOB Readers for Datagrams #487 - this change adds support for BYOB readers for datagrams in the spec, similar to WebTransportReceiveStreams.
- Make `streamErrorCode` 32-bit long #509 - ‘nuff said
- Add `sendStream.sendOrder = n` attribute. #510 - allows setting sendOrder of incoming BiDi streams and modifying stream sendOrder after creation.
- UA SHOULD divide bandwidth fairly between all streams that aren’t starved #521 - User agents are strongly encouraged to divide bandwidth fairly between all streams that are actively sending (e.g. not starved by having lower send order numbers)
WebTransport is now in Firefox 114 general release!
This means we now have two independent implementations of WebTransport.

- Firefox 114 supports WebTransport, including datagrams and BYOB
  - Congestion control is CUBIC
  - Protocol implementation is largely in Rust as part of our neqo http3 support
  - Passes 551 / 594 web-platform tests
    A few features haven’t landed yet: sendOrder support, getStats

- Demo with [https://jsfiddle.net/jib1/y05av6xz/](https://jsfiddle.net/jib1/y05av6xz/)
  - select file to send to server and back

- Demo with MOQ demo server ([https://moq.streaming.university/](https://moq.streaming.university/))
  - Playback remains blocked on upcoming webcodecs in Firefox.
W3C WebTransport Update (4)

Current issue of debate:

1. **Priority Groups #515** - prior work added the ability to opt send streams into strict-ordering by setting a non-null int64 `sendOrder`. This was designed with per-media-segment streams in mind. But an application with two or more such media flows would need to create streams at a lock-step rate with identical highest `sendOrder` for this to work. This seems too limiting, e.g. when mixing stream-per-frame and stream-per-segment flows. It also didn’t address datagrams. **Proposal**: introduce explicit priority groups in the API to separate flows and their `sendOrder` number-spaces.
   
   a. Every writable in the session (streams and the datagram queue) gets a priority group. There is a default group.
   b. All groups have equal (implementation-defined) “fairness” from a send priority standpoint.
   c. Within groups, every stream has an int64 `sendOrder` that's strict and 0 by default, neer null (simpler).

```javascript
const group = new WebTransportSendPriorityGroup(wt); // or const group = wt.createSendPriorityGroup();
const writable = await wt.createUnidirectionalStream({sendPriorityGroup: group});
const {writable} = await wt.createBidirectionalStream({sendPriorityGroup: group});
for await (const {writable, readable} of wt.incomingBidirectionalStreams) {
  writable.sendPriorityGroup = group;
}
```

**Questions:**

d. Is this group construct sufficient to meet expected media (and non-media) transmission needs?

e. Currently fairness is implied between groups. Is explicit weighting needed for groups?

f. Should datagrams be in their own group? If so, what should their relative default weight be?

g. Are groups actually “Flows”? When applied to datagrams, this would allow sending of parallel flows.

h. If flows were implemented on the send side, is there any mechanism in the transport to replicate these flows on the receive side?

i. Does such an application-level priority group construct match any WebTransport layer construct around prioritization and fairness?
Current issues of debate continued:

2. **Retransmissions and send order #523** - should new data on higher sendOrder stream preempt retransmissions of data lost on a lower sendOrder stream?

Questions:
1. Should there be a Boolean API to toggle whether retransmissions inherit stream sendOrder?
2. Should there be an API to specify a time window within which retransmissions be given the highest send priority?
3. This may not be a problem if retransmissions are rare and short lived.
4. This may not be a problem because lower priority streams can be aborted by the sender.
WebTransport over HTTP/2

Eric Kinnear

Changes since IETF 116

-06
Adds initial flow control limits
Settings
  Defaults for new sessions on that connection
Header field
  Defaults for each session
Changes since IETF 116

-06

Updated examples
What’s left?

Error handling (#44)
A few new issues from implementation experience
Error Handling (#44)

Matching HTTP/3, but…

If a fatal error is discovered, reset the HTTP/2 stream
Final Size (#87)

WT_RESET_STREAM Capsule {
    Type (i) = 0x190B4D39,
    Length (i),
    Stream ID (i),
    Application Protocol Error Code (i),
}

QUIC RESET_STREAM Frame {
    Type (i) = 0x04,
    Stream ID (i),
    Application Protocol Error Code (i),
    Final Size (i),
Final Size (#87)

Unlike the equivalent QUIC frame, this capsule does not include a Final Size field. In-order delivery of WT_STREAM capsules ensures that the amount of session-level flow control consumed by a stream is always known by both endpoints.
Final Size (#87)

Unlike the equivalent QUIC frame, this capsule does not include a Final Size field. In-order delivery of WT_STREAM capsules ensures that the amount of session-level flow control consumed by a stream is always known by both endpoints.

Is that sufficient? Sometimes you want to know how much was consumed
Flow Control Terminology (#88)

You cannot lower the max number of sessions after advertising a higher value.

Stream limits are cumulative, perhaps with an example:
You need to keep updating with a higher value if you want more streams (i.e. they are not about the concurrent number of streams).
WebTransport overview
WebTransport over HTTP/3 (40 minutes)

Victor Vasiliev

Key exporters (#116)

There is a proposal for how to derive key exporters for a given WebTransport session

Issue: do we need this?
Protocol negotiation (#130)

SETTINGS_WEBTRANSPORT_MAX_SESSIONS is currently required in both directions. Every WebTransport version has its own codepoint.

Version used =
  \[ \max( \max(\text{client\_offered}), \max(\text{server\_offered}) ) \]

Proposal: only send the setting on the server-side, rotate codepoints of frames on breaking changes.
Flow Control (#85)

draft-thomson-webtrans-session-limit

Could also include WebTransport-Init
Flow Control (#85)

WT_MAX_DATA
WT_MAX_STREAMS
WT_MAX_STREAM_DATA

WT_DATA_BLOCKED
WT_STREAMS_BLOCKED
Wrap-up, and Summary
(15 minutes)

Bernard Aboba
David Schinazi
Thank you

Special thanks to:

The Secretariat, WG Participants & ADs