Parallel Appends for Resumable Uploads

draft-spk-httpbis-parallel-upload-01

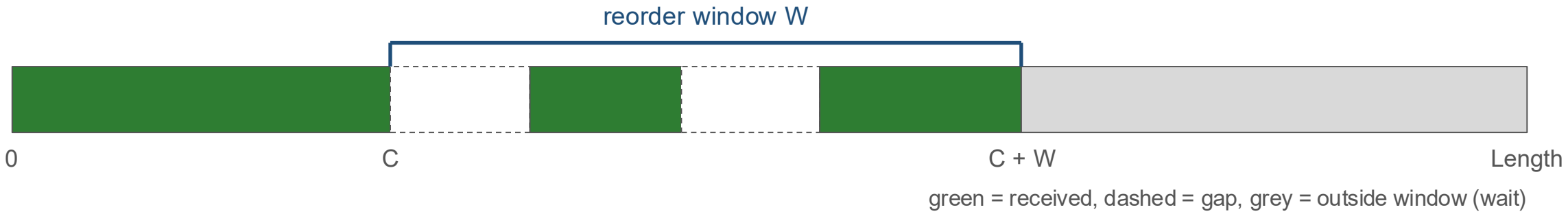
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Problem

- Downloads: parallel ranged GETs (RFC 9110 Section 14), any client, any server
- Uploads have no equivalent
  - Partial PUT (RFC 9110 Section 14.5) is not defined
  - RESUMABLE Section 4.6: clients MUST NOT transfer an upload in parallel
- Current practice is vendor-specific
  - S3 multipart, Azure Put Block, GCS compose, tus Concatenation
  - Incompatible with each other; opaque to inspecting intermediaries

Proposal: appends inside a reorder window



- Negotiated at creation: Upload-Parallel and new Upload-Limit parameters
  - `max-parallel, reorder-window, append-alignment, commit`
- PATCH at any offset in [C, C+W); beyond it: wait, or 409
- Upload-Received lists the ranges held; client re-sends only the gaps
- Not negotiated by both sides: RESUMABLE behaviour, unchanged

Why the window is bounded: in-order inspection



- DLP / AV engines scan bytes in order
  - Window W = the buffer an intermediary must hold
- Intermediaries may only tighten limits, and must enforce them
- commit=explicit: stream everything, hold only the final empty append
- Lost or split state: cancel the upload (410), never pass uninspected bytes
- Vendor schemes give a middlebox no way to take part

Performance: open question

- Parallel streams on one H2/H3 connection
  - Removes idle round trips; a slow append does not block the rest
  - One congestion controller: no extra throughput
- Additional connections
  - Can help on long or lossy paths, but contend with other traffic
  - Draft Section 12.3: add connections only while throughput improves
- Raised on the list: parallel can also be slower
  - Measurements needed; scenarios and data welcome

Next steps

Is there interest in adoption?

- Comments on the list and on GitHub
  - `datatracker.ietf.org/doc/draft-spk-httpbis-parallel-upload`
  - `github.com/santoshpallagatti/draft-spk-httpbis-parallel-upload`
  - `ietf-http-wg@w3.org`