URI Signing for HAS content

CDNI Meeting

IETF 92

Dallas

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Liaison from MPEG

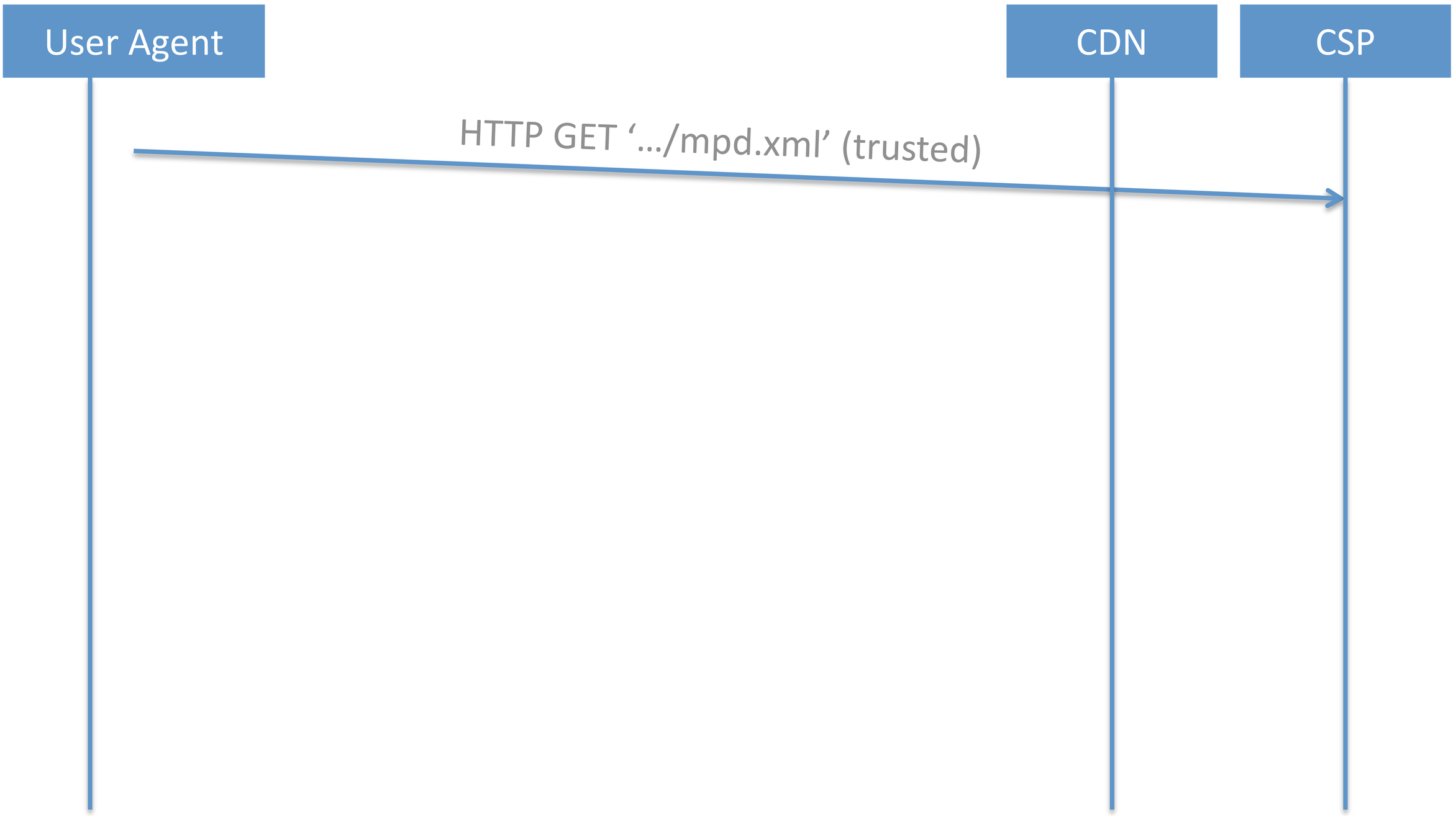
- Dated: July 2014
  - https://datatracker.ietf.org/liaison/1342/
  - No reply from CDNI WG yet

- Request from MPEG: Make sure URI Signing mechanism defined by IETF also works for segmented content (MPEG-DASH)
  - Note: URI Signing draft is also applicable to non-CDNI use cases (CSP -> CDN)

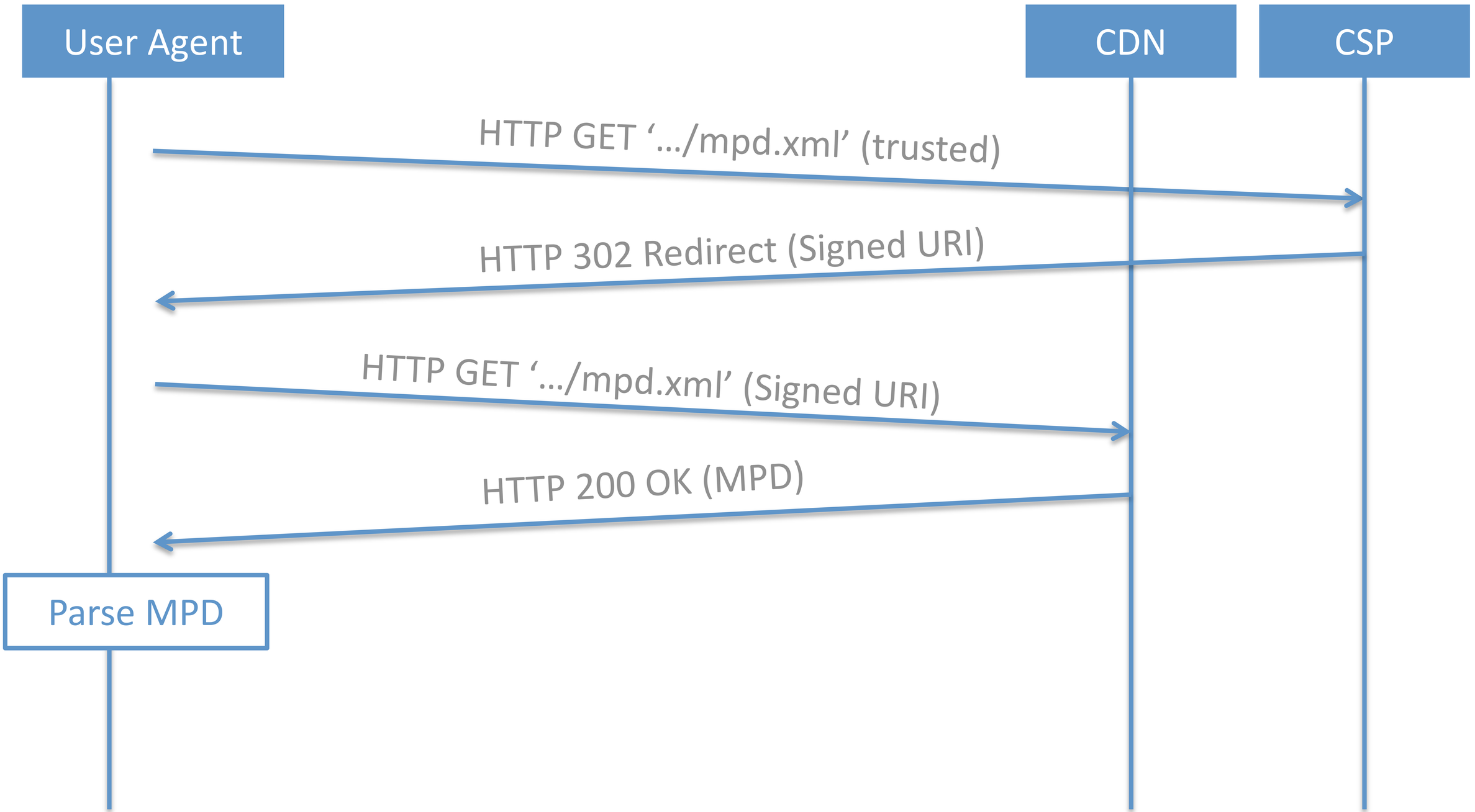
- Main issue: With manifest-based content with relative URLs, each request is independent, with no redirection between CSP and CDN
  - Not able to do segment-level access control

- Although we can work with MPEG to define client-side behaviour, it would be best if whatever solution we come up with would also work for non-DASH ABR content (e.g. HLS, Smooth, etc.)

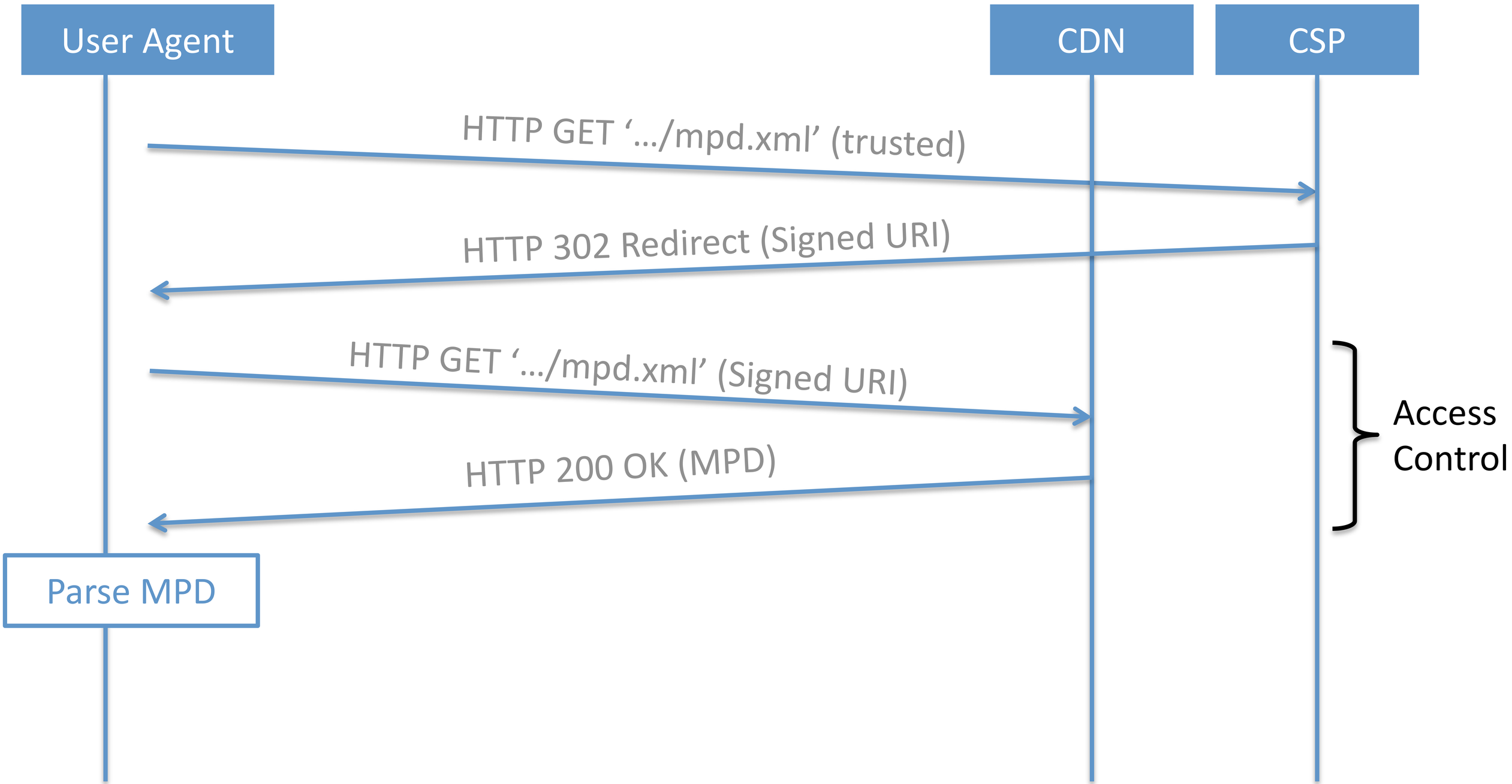
Problem in more detail



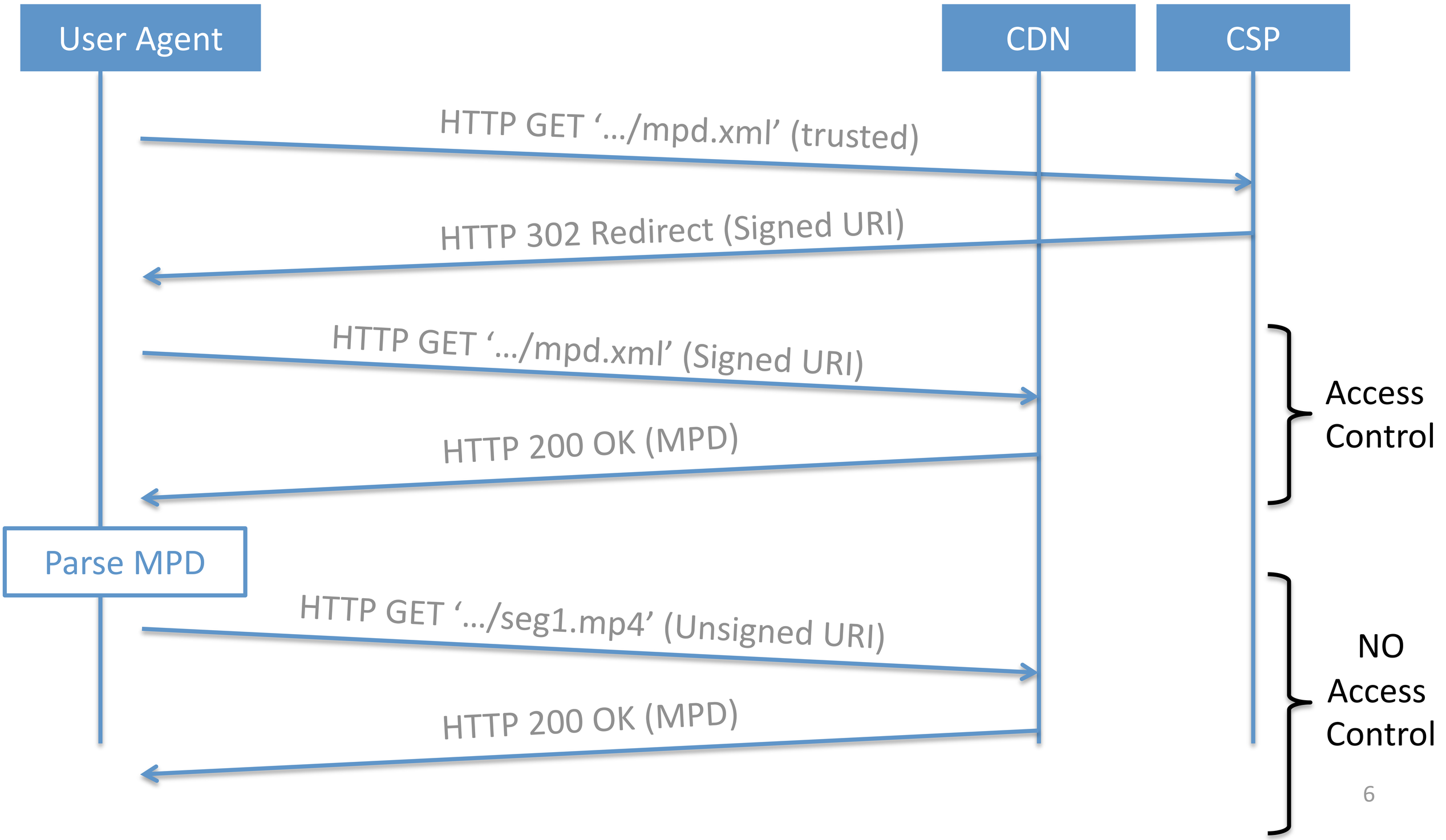
Problem in more detail



Problem in more detail



Problem in more detail



What do we need to decide today?

- Do we want to make sure that URI Signing also works for segmented content?

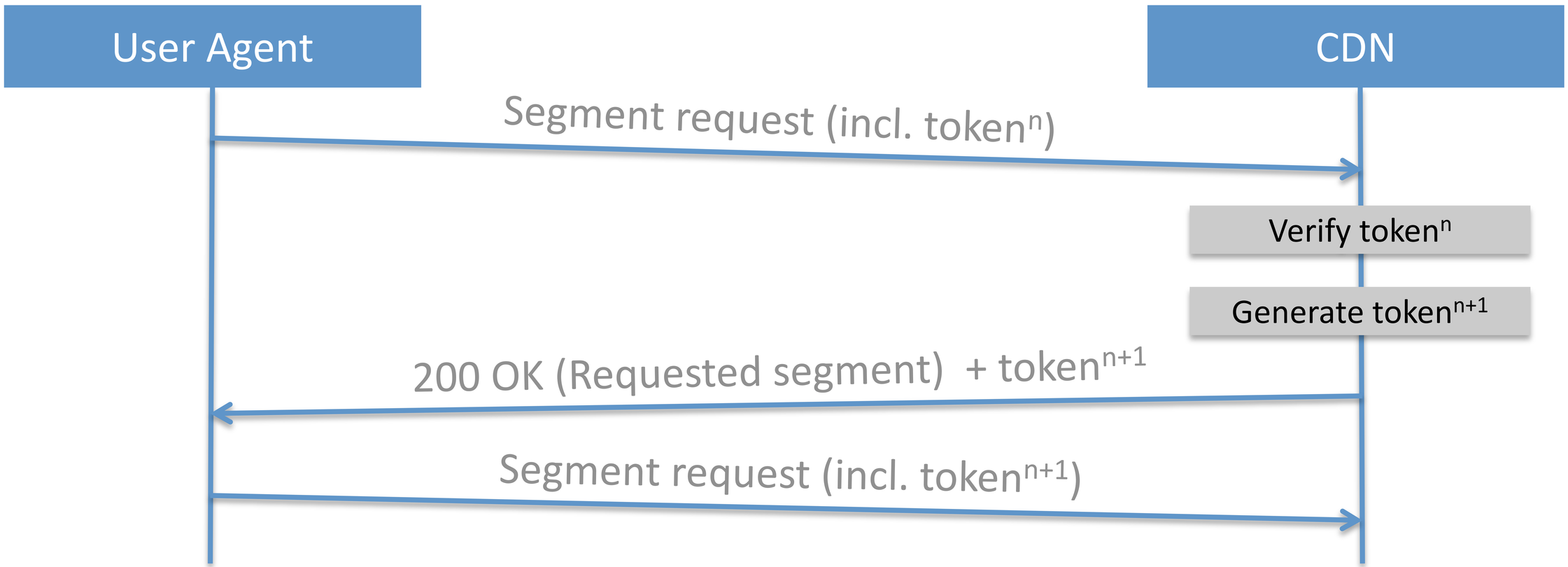
- If so, do we want to solve that in the current URI Signing draft, or in a new draft?

- Is the proposal on the following slides an acceptable solution, or do we see other, preferable, ones?

Proposal

Disclaimer: Elements of the following proposal may include IPR

Proposal: Access control via chained tokens



- Two options for token:
  - Cookie-based (works on existing UAs, and for non-DASH protocols)
  - URL-based (in line with existing URI Signing spec)

Token validation mechanism

How to validate token^{n}

- Current URI Signing draft signs URL, preventing UA to request other content (other URLs)
- With segmented content, it is not always clear which segment will be requested next
  - UAs can pause, seek, etc. (segment 1 is not always followed by segment 2)

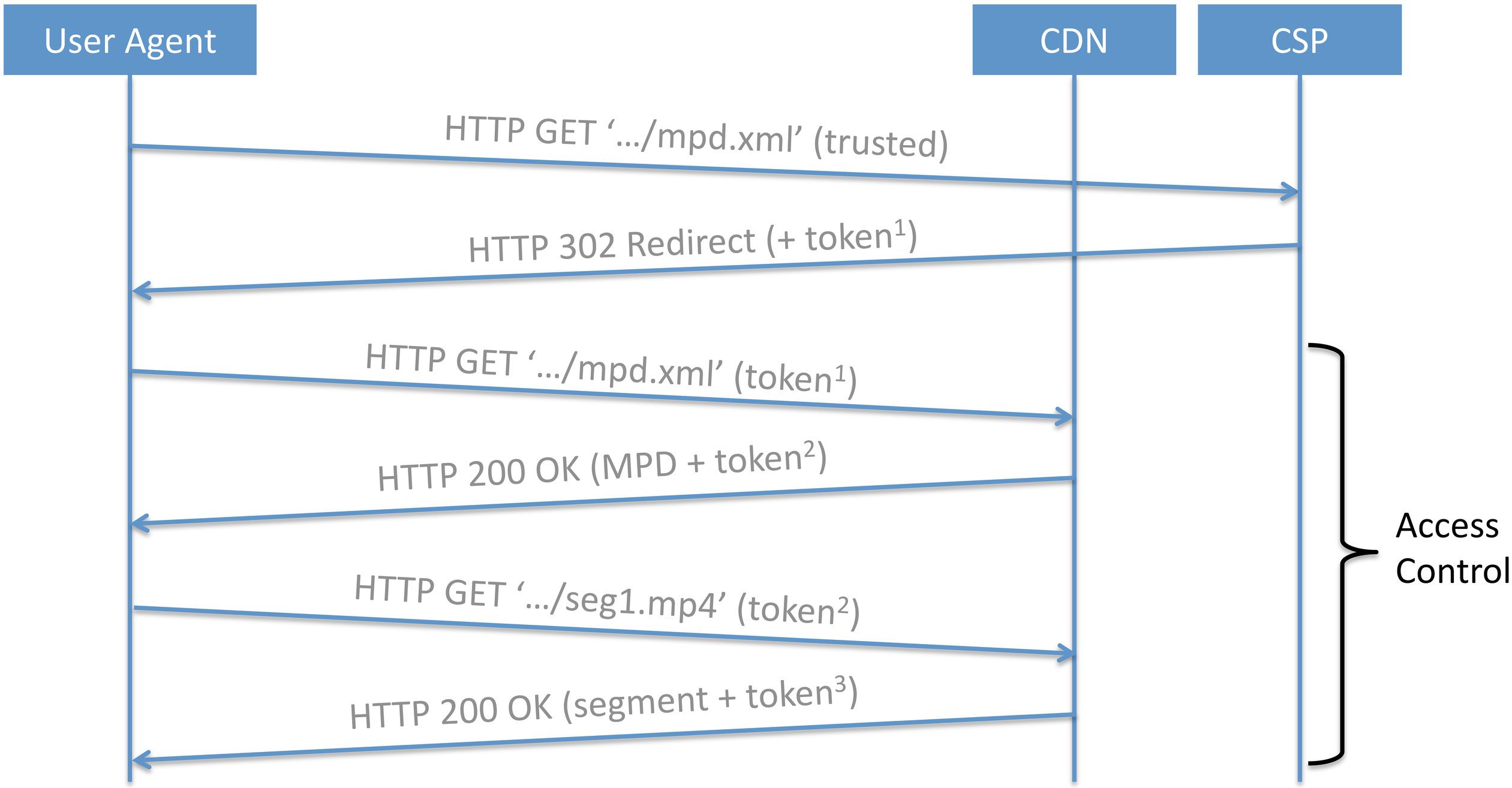
- Proposal: Add new ‘path_pattern’ enforcement attribute to URI Signature
  - Similar to `path_pattern` described in CDNI Metadata
  - Example: ‘/path/to/folder/*/segment*.mp4’
  - CDN checks if requested URL mathes ‘path_pattern’ attribute to check whether UA is authorized to request requested content
  - This requires that the regular ‘path’ part of the request URL to be excluded from the URL signature, with the signature being calculated over the ‘path_pattern’ attribute instead.

Token generation mechanism

How to generate token^{n+1}

- Similar to token generation as described in current URI Signing draft, with a few modifications:
  - The same attributes in the URI Package that allow a dCDN to verify a request can be used to generate a new token
  - After every request, each new token needs to increment the Expiration Time attribute
  - The magnitude of this increment is determined by a new ‘ET Increment’ attribute, which is distributed inside the token along with the other, existing, Information Elements
  - Based on the presence of a flag, a dCDN is able to determine whether the request concerns segmented content, and thus whether a new token needs to be attached with the 200 OK

Example


User Agent
CDN
CSP
HTTP GET '…/mpd.xml' (trusted)
HTTP 302 Redirect (+ token[1])
HTTP GET '…/mpd.xml' (token[1])
HTTP 200 OK (MPD + token[2])
HTTP GET '…/seg1.mp4' (token[2])
HTTP 200 OK (segment + token[3])
Access Control

What would need to be added to URI Signing draft

- Add ‘path_pattern’ and ‘time_increment’ Information Elements
- Define signing using ‘path_pattern’ instead of request URI
- Add flag elements for indicating to CDN that it should use ‘URI-signing for segmented content’

- In case of Cookie-based solution
  - Define cookie-based authentication in addition to URI-based authentication

- In case of URI-based solution
  - Define HTTP header for communicating Token in HTTP 200 OK

Questions…

- Do we want to make sure that URI Signing also works for segmented content?

- If so, do we want to solve that in the current URI Signing draft, or in a new draft?

- Is the proposal on the previous slides an acceptable solution, or do we see other, preferable, ones?