Hyperlinking to time offsets: The temporal URI specification

W3C Video Workshop

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Motivation

- Hyperlinking to video offsets or segments directly (“deep hyperlinking”)
- Without transferring irrelevant part of resource
- Use cases:
  - Playlists of video highlights (e.g. news bulletin)
  - Search results
  - Mashups without touching/changing original
  - Caching Web proxies

Temporal URI examples

- Time offset addressing:
  http://www.foo.bar/video.anx?t=85.28

- Time segment addressing:
  http://www.foo.bar/video.anx?t=85.28/102.20

- Named event addressing:
  http://www.foo.bar/video.anx?id=wedding

Deep Hyperlinking

- Difference to indirect hyperlinking through XPointer in a XML description container (e.g. MPEG-7, SMIL, MPEG-21)
- Method of WWW: URIs (RFC 3986)

Restrictions of RFC 3986

- http://www.ietf.org/rfc/rfc3986.txt
- "… any operation associated with a URI reference is defined by the protocol element, data format attribute, or natural language text in which it appears."
- Want to use http
- Data offset operation is data format specific

Types of Addressing

- Addressing a time offset
- Addressing a time segment
- Adressing a named event

Keep them uniform

What format?

- “making use of a URI in order to retrieve a representation of its associated resource”

```
foo://example.com:8042/over/there?name=ferret#nose
 \_/   \_____________/\_________/ \_________/ \__/
  |           |           |           |        |
scheme     authority      path       query   fragment
```

- Query or fragment to specify subcomponent

Query or Fragment?

- Fragment: “indirect identification of a secondary resource”
- Query: “serves to identify a resource”
- “Fragment identifiers have a special role in information retrieval systems as the primary form of client-side indirect referencing, allowing an author to specifically identify aspects of an existing resource that are only indirectly provided by the resource owner.”
- I.e. fragments are resolved on client-side only

Temporal URI spec

- Use both: fragment and query
- Semantics:
  - Fragment: client-side offsets / filtering
  - Query: server-side resource composition
- Specific data format: Annodex files (ogg + skeleton + cmml)

Annodex

- Ogg files: Ogg is container format
- Skeleton: logical bitstream that identifies contained tracks
- CMML: annotation track that names sections

Temporal URI examples

- Time offset addressing:
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  http://www.foo.bar/video.anx#t=85.28
- Time segment addressing:
  http://www.foo.bar/video.anx?t=85.28/102.20
  http://www.foo.bar/video.anx#t=85.28/102.20
- Named event addressing:
  http://www.foo.bar/video.anx?id=wedding
  http://www.foo.bar/video.anx#id=wedding

Time specs in URI queries

Accessing a time interval of an Annodex file:

- temporal URI query parameter (CGI conformant)

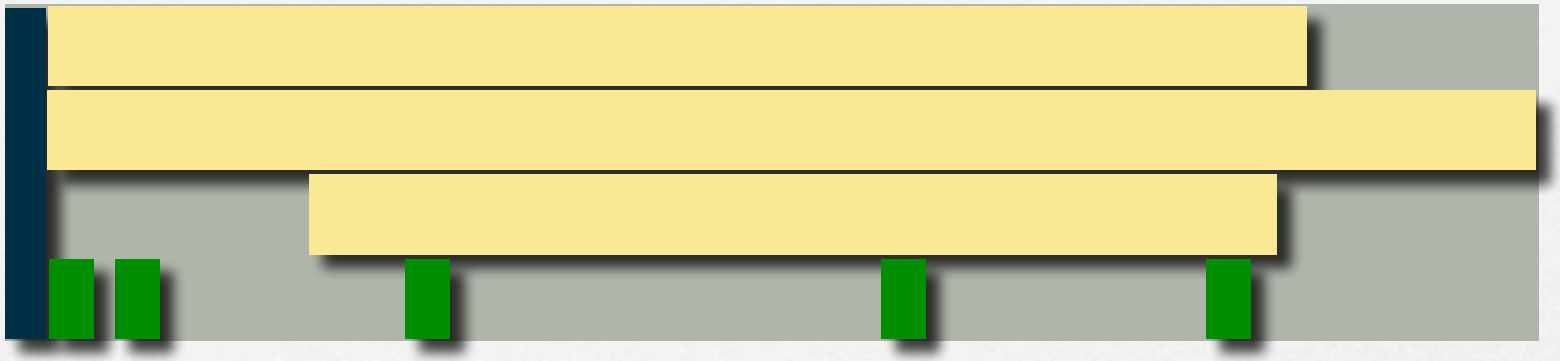
  `t=[time-scheme:]time-interval`

- http://www.foo.bar/csiro.anx?t=85.28
- http://www.foo.bar/csiro.anx?t=smpte-25:00:01:25:07
- http://www.foo.bar/csiro.anx?t=npt:85.28-105/290-300
- http://www.foo.bar/csiro.anx?t=clock:20040114T153045.25Z

Annodex Web server

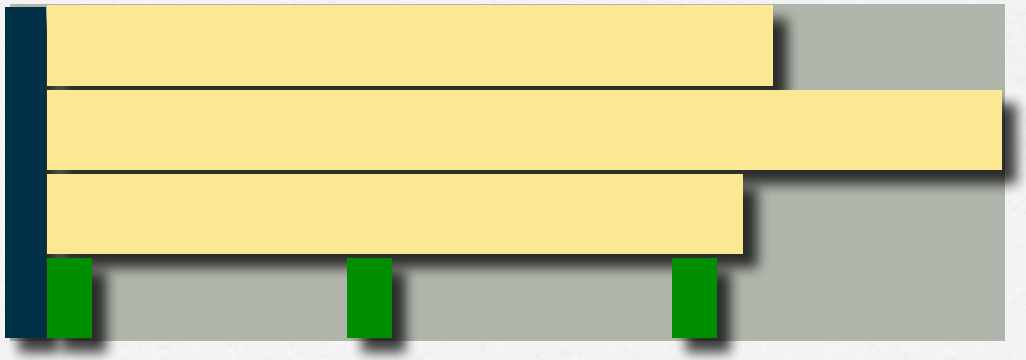
Time query processing

Annodex file on server



⇩ `http://www.foo.bar/fish.anx?t=7`

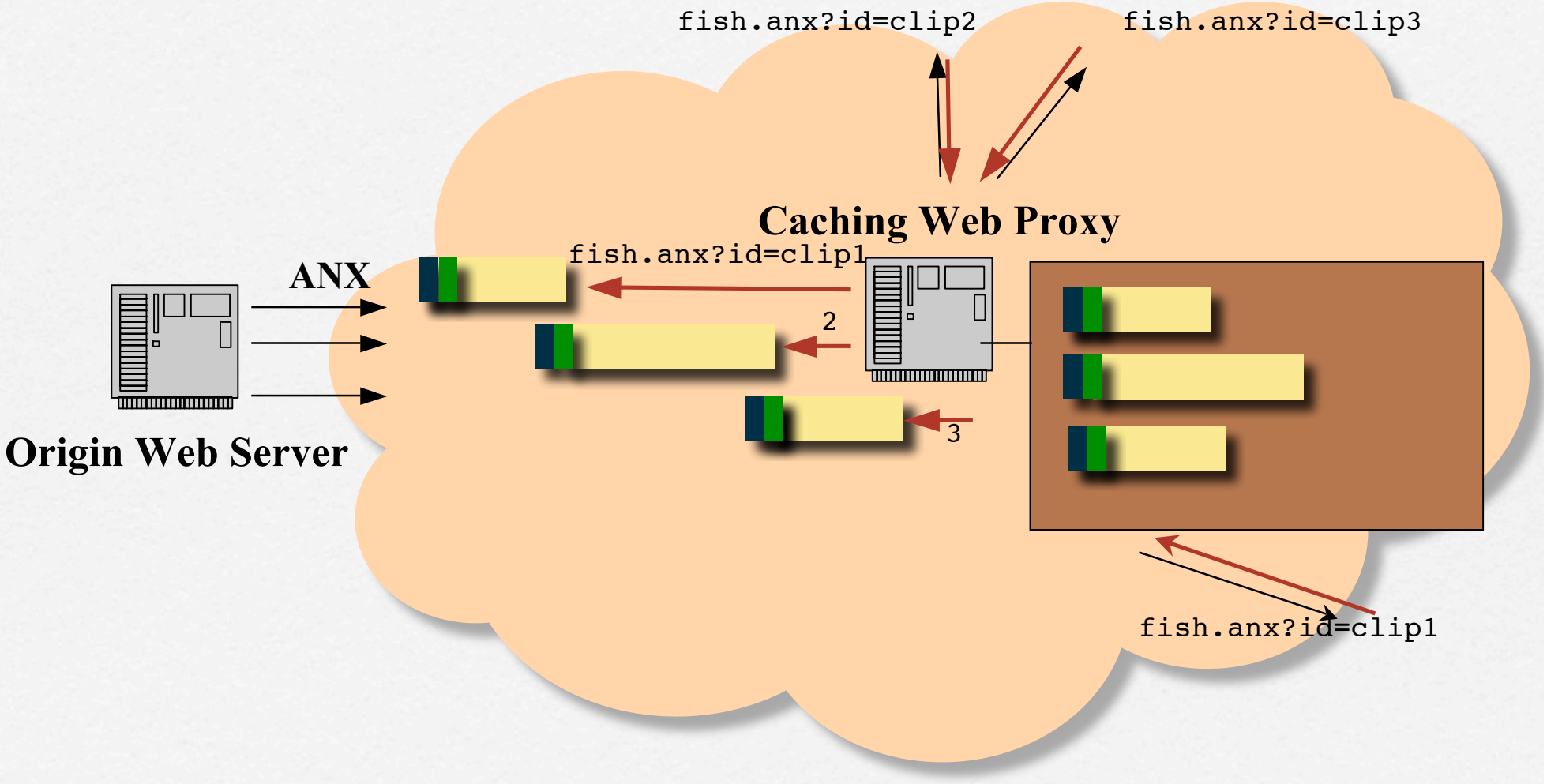
* retain BOS pages
* retain secondary header pages
* copy active clip tags
* retain EOS pages



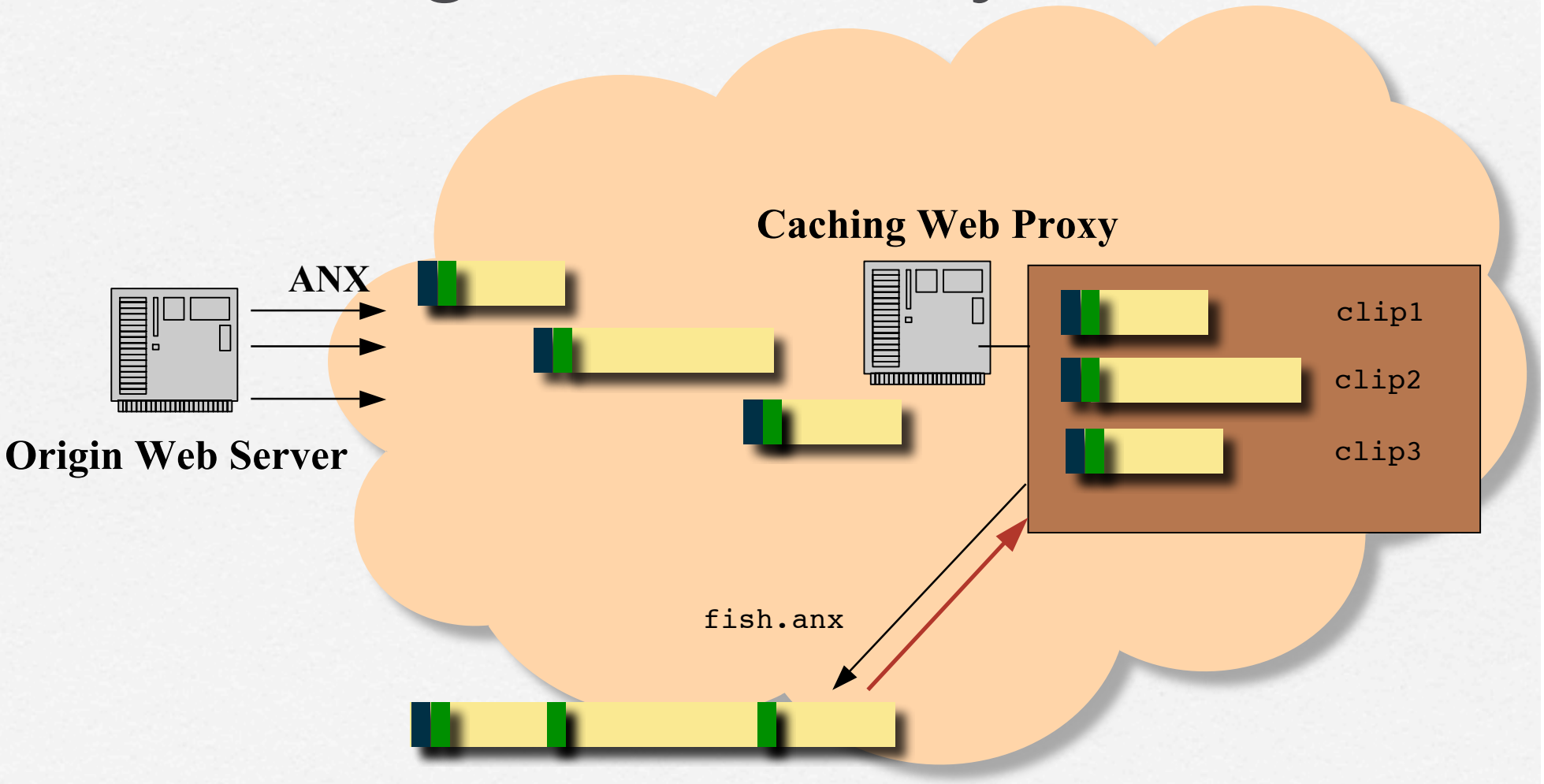
Annodex Server Module

- MIME types: application/annodex
- Apache module: mod_annodex
- module provides temporal and clip URI query handling by recomposing valid ANX resource

Caching Web Proxy



Caching Web Proxy



Summary

- Challenges to address:
  - Get syntax right
  - Definition is data format specific
  - Semantics on server
  - Other implications on Web infrastructure