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Information technology — JPEG 2000 image coding system: Interactivity tools, APIs and protocols —

Part 9:

AMENDMENT 1: APIs, metadata, and editing

Technologies de l'information — Système de codage d'images JPEG 2000: Outils d'interactivité, interfaces de programmes d'application et protocoles —

Partie 9:

AMENDEMENT 1: API, métadonnées et rédaction

Reference number
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INTERNATIONAL STANDARD
ITU-T RECOMMENDATION

Information technology – JPEG 2000 image coding system: Interactivity tools, APIs and protocols

Amendment 1

APIs, metadata and editing

1) Subclause 5.1

Add after TOKEN *definition:*

```
TEXT-LABEL = DQUOTE TOKEN DQUOTE
```

2) Annex C.5.1

Replace the last sentence:

This Recommendation | International Standard does not advise on what constitutes the implicit MJ2 metadata for view-window requests, however, this may be defined in a future standard.

with:

For MJ2 files, the following metadata elements shall be considered to be requested along with the view-window:

- JP2 signature ("jP")
- File type ("ftyp")
- "mvhd"
- For tracks that are relevant with the view-window request:
  - "tkhd"
  - edts[0]. Only the TBox field is useful, and a placeholder signals that no access is provided to the original content of the box.
  - "mdhd"
  - "hdlr"
  - "vmhd" if present in the original MJ2 file.
  - "stsd"
  - "stts"
  - either:
    - a placeholder for "stco" or "stco64" (depending on which of them is present in the original MJ2 file) indicating that the content of the box is provided by one or more incremental codestreams;
    - or the entire "stsc", "stsz" and "stco" or "stco64" boxes.

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3) Annex C.2.1

Rewrite the 3rd sentence of the 3rd paragraph as follows (with the changes underlined):

If the Target field is not specified and the request is carried over HTTP (or HTTPS), then the JPIP request shall be directed to the resource specified through the path component of the JPIP request URL.

4) Annex C.3.3

Rewrite the 1st sentence of the second paragraph as follows (with the changes underlined):

The value string identifies the names of one or more transport protocols that the client is willing to accept. This Recommendation | International Standard defines only the transport names, "http", "https" and "http-tcp," although it is anticipated that other transports, such as "udp", may be defined elsewhere.

5) Annex C.4.7

a) Rewrite line 2 as follows (new portions underlined):

```
context-range = jpxl-context-range / mj2t-context / jpm-context / reserved-context
```

b) Add the following after the line beginning "`reserved context`*":*

```
jpm-context = "jpmp" "<" jpm-pages ">" [ jpm-objects ]
jpm-pages = [ jpm-page-collection ":" ] jpm-sampled-range
jpm-objects = "[" jpm-object-range "]"
jpm-page-collection = object-id
jpm-sampled-range = page-object-range [ ":" sampling-factor ]
page-object-range = 1#(object-id [ "-" [ object-id ] ])
jpm-object-range = UINT-RANGE ":" jpm-object-type / UINT-RANGE
                                    /":" jpm-object-type
jpm-object-type = "mask" / "image" / "nostrm"
object-id = UINT / TEXT-LABEL
```

c) Rewrite the first line of paragraph 4 as follows (with the changes underlined):

This Recommendation | International Standard defines ~~two~~ three specific types of `context-range`, which are intended to address the needs of the JPX ~~and MJ2~~, MJ2, and JPM file formats.

d) Add the following after the paragraph beginning "NOTE 2":

The third type of context-range described by this Recommendation | International Standard, `jpm-context`, allows clients to request specific layout objects from a JPM file. The simplest usage allows a request to be made for all the items needed to render a single page. More complex usage allows only some of the layout objects or only one type of object to be requested. The `jpm-context` always contains a request for specific pages, it may also contain a specification for page collections, a list of layout objects, and object types.

If `jpm-context` has no `jpm-page-collection` item then the main page collection is assumed. If `TEXT-LABEL` is specified in the `jpm-page-collection` item it must correspond to a label of a page collection box in the target JPM file. If `UINT` is specified in the `jpm-page-collection` item it indicates the page collection box in that position in file, where page collection boxes are numbered from 0.

A range of pages is a required part of the `jpm-context`. The page range could be "0-" which would specify all the pages in the page collection. Pages are numbered by following the page collections and pages in the JPM file, and assigning the number 0 to the first page in a depth first tree walk. The root of the tree is given by the jpm-page-collection item or the main page collection if no jpm-page-collection is part of the request. Loops in the page collection tree should be detected and an error condition returned.

If a "sampling-factor" is used as part of the jpm-sampled-range, the client desires pages starting with the first number in each range, and less than or equal to the last number in the range, and at all integer multiples of the sampling-factor plus the initial page number. Thus two sampling ranges it is possible to request even and odd number pages using a sampling-factor of 2, by starting each range with an even or odd number.

If the `jpm-context` has no `jpm-object-range` item then it is considered to be "1-" which corresponds to all objects on the page except the thumbnail. If the thumbnail image for a page is needed then the `jpm-object-range` item shall

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include zero. The jpm-object-range indicates which of the layout objects on all pages in the jpm-page-range are requested.

If the jpm-context has no jpm-object-type then all types are used. If the jpm-object-type is "mask" only mask objects are of interest for the request. If the jpm-object-type is "image" only image objects are of interest. If the jpm-object-type is "nostrm" then boxes for both mask and image are of interest.

If the jpm-context parameter appears in a request without a Frame Size request (fsiz) then the Frame Size values fx and fy are set to the page width and page height. If the jpm-context parameter appears in a request without a Region Size request (rsiz) then the Region Size values rx and ry are set to the frame size values fx and fy (after fx and fy have been set to the page width and height if necessary).

When the jpm-context parameter is used, the requested corresponds to the view-window applied to each page independently. The Frame Size values fx and fy are mapped to the page width and height as specified by the Pwidth and Pheight elements of the Page Header Box of the JPM standard ISO/IEC 15444-6.

A layout object within a page is considered part of the request if and only if all of the following are true:

```
ox' <= LHoff + LWidth      ox' + sx' >= LHoff
oy' <= LVoff + LHeight     oy' + sy' >= LVoff
```

where:

```
Ox' = ox * Pwidth / fx
oy' = oy * Pheight / fy
sx' = sx * Pwidth / fx
sy' = sy * Pheight / fy
```

and fx, fy, ox, oy, sx, and sy are from the view window requests, LHoff, LVoff, LHeight, and LWidth are from the Layout Object Header Box of 15444-6.

Layout object 0 is reserved for a thumbnail image of the page, it should be considered part of the request regardless of the view-window if and if 0 is included in jpm-object-range.

The client is considered to have requested any codestream associated with the mask or image which intersects the view-window unless jpm-object-type is "nostrm". If the codestream is not compressed with JPEG 2000 then the request is for the complete codestream. If the codestream is compressed with JPEG 2000 then an equivalent view-window can be determined for the specific codestream by mapping the request window on the page to the request window on the object as follows:

```
fx' = fx * Lwidth / Pwidth
fy' = fy * Lheight / Pheight

ox' = MAX( ox - LHoff * fx / Pwidth , 0)
oy' = MAX( oy - LVoff * fy / Pheight, 0)

sx' = MIN ( ox + sx - LHoff * fx / Pwidth, Lwidth * fx / Pwidth) - ox'
sy' = MIN ( oy + sy - LVoff * fy /Pheight, Lheight * fy / Pheight) - oy'
```

Note that it may be necessary to issue a frame-size request with values larger than the width and height of the page in order to obtain a full resolution JPEG 2000 codestream if the JPEG 2000 file contains data at a higher resolution than the page. Alternatively, the client could determine the codestream number and issue a request directly on that codestream with a view-window chosen appropriately.

e) Add after EXAMPLE 2:

EXAMPLE 3: "context=jpmp<0-10,21-30:2>[1-3:mask]"

In this case, the server is requested to return all data corresponding to mask objects in the first three layout objects on the pages 0, 2, 4, 6, 8, 10, 21, 23, 25, 27, and 29. This request includes all boxes necessary to render the desired region, e.g. Page Boxes, Layout Object Boxes, as well as any codestreams referenced by those objects.

f) Add the following:

For JPM files, the following metadata elements shall be considered to be requested along with the view-window:

- JP2 signature ("jP")
- File type ("ftyp")
- Compound Image Header ("mhdr")

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- Page Collection box ("pcol")
- Page Table box ("pagt")
- Page box ("page")
- For pages that are relevant with the view-window request:
  - Page Header box ("phdr")
  - Layout Object box ("lobj")
  - Layout Object Header box ("lhdr")
  - Object box ("objc")
  - Object Header box ("ohdr")
  - Object Scale box ("scal")
  - Base Colour box ("bclr")

6) Annex F.1

Rewrite the 2nd sentence of the second paragraph as follows (with the changes underlined):

Note that the text and examples in this annex describe the use of JPIP over HTTP. ~~It is expected that t~~The same binding ~~can~~shall be used for secure HTTP (or HTTPS).

7) Annex F.3

Rewrite the section as follows (with the changes underlined):

A session-based HTTP (or HTTPS) session is established by using the New Channel request field with a value of `"http"` (or `"https"`), i.e., `"cnew=http"` (or `"cnew=https"`) as part of a request. This request is typically delivered by HTTP (or HTTPS). The request may contain a view-window request that becomes the first request in the new channel. The response to this request is returned on the same connection as the request was made.

A client may open an HTTP (or HTTPS) connection and issue a request which includes the HTTP (or HTTPS) header `"Connection: keep-alive"`. This is useful for efficient sessions, but it is neither necessary nor sufficient to have a session. A single HTTP (or HTTPS) connection may be used for traffic for different targets, different channels, or even non-JPIP traffic, e.g. requests for HTML files. A JPIP request that is part of a session may arrive on HTTP (or HTTPS) connections other than the HTTP (or HTTPS) connection used to request and issue the new channel, although this is discouraged.

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