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Digital Imaging and Communications in Medicine (DICOM)

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Supplement 203: Thumbnail Resources for DICOMweb

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Scope and Field of Application of this Supplement

40   This supplement affects Part 18 of the DICOM standard.

This supplement defines Thumbnail resources on the WADO-RS Study, Series, Instance, and Frame resources in the DICOM RESTful web services standard. These resources provide representative images that reflect the content of the parent resources. The origin server determines the pixel content of the Thumbnail.

The primary use cases are Thumbnails for:

45   1.   image viewers, or
        2.   EMR/EHRs, e.g., as referenced from HL7 FHIR Imaging Study resources.

This resource allows a web client to retrieve a representative image without having to retrieve a full study structure.

Insert the following at the appropriate place in Section 3.7.

50 **3.9   DICOM Web Services**

       …

       Thumbnail

              A single frame image that is representative of the content of a DICOM Study, Series, Instance, or Frame. It
              is encoded in a Rendered Media Type. See Sections 8.7.4 and 10.4.4.

55   …

Insert the following in Section 3.5.1.3

8.3.5.1.3   Viewport Scaling

The "viewport" parameter specifies a rectangular region of the source image(s) or video to be cropped, and a
60 rectangular region corresponding to the size of the user agent's viewport to which the cropped image or video should
be scaled.

The syntax of this parameter for a Presentation State Instance **or a Thumbnail** is:

        %s"viewport=" vw "," vh

Otherwise it is:

65   %s"viewport=" vw "," vh **[** "," [sx] "," [sy] "," [sw] "," [sh] **]**

    . . .

If any of the following are true:

        •   This parameter specifies viewport dimensions that are either ill-formed or not supported
        •   The Target Resource is a Presentation State **or Thumbnail** and anything other than vw and vh are specified

70   . . .

Insert the following as Section 8.3.5.2

8.3.5.2   Query Parameters for Thumbnails

Table 8.3.5-2 shows the Query Parameters that may be used when requesting a Thumbnail representation.

Table 8.3.5-2. Retrieve Rendered Query Parameters

Key	Values	Target Resource Category	Section
accept	Rendered Media Type	All	11.4.1.2.1.1
charset	character set token	All	11.4.1.2.1.2
viewport	vw, vh	All	11.4.1.2.2.3

75   The Viewport parameter only has width and height values. If no viewport parameter is provided the origin server will
        determine the size of the thumbnail.

Update Section 10.1 as follows:

10.1   Overview

80   The Studies Resource enables a user agent to store, retrieve, update, and search an origin server for DICOM
        Studies, Series, and Instances – along with their /metadata, ~~and~~ /rendered**, and /thumbnail** variants; as well as
        Frames and Bulkdata.

        …

Update Table 10.1-1 as follows:

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85   **Table 10.1-1. Resources and Descriptions**

Resource	Description
Studies Service	The Base URI of the Studies Service.
All Studies	The All Studies resource references the entire collection of Studies contained in the Studies Service.
Study	The Study resource references a single Study.
Study Metadata	The Study Metadata resource references the Metadata of a single Study.
Rendered Study	The Study Rendered resource references a Study to be rendered.
Study Thumbnail	**The Study Thumbnail resource references a thumbnail image of a Study.**
Study's Series	The Study's Series resource references the collection of all Series contained in a Study.
Study's Instances	The Study's Instances resource references the collection of all Instances in a single Study.
All Series	The All Series resource references the collection of all Series in all Studies contained in the Studies Service.
Series	The Series resource references a single Series.
Series Metadata	The Series Metadata resource contains the Metadata of a single Series in a Study.
Rendered Series	The Series Rendered resource references a Series to be rendered.
Series Thumbnail	**The Series Thumbnail resource references a thumbnail image of a Series.**
Series' Instances	The Series' Instances resource references the collection of all Instances in a single Series.
All Instances	The All Instances resource references the collection of all Instances in all Series in all Studies contained in the Studies Service.
Instance	The Instance resource references a single Instance.
Instance Metadata	The Instance Metadata resource contains the Metadata of a single Instance.
Rendered Instance	The Rendered Instance resource references an Instance to be rendered.
Instance Thumbnail	**The Instance Thumbnail resource references a thumbnail image of an Instance.**
Frames	The Frames resource references an ordered collection of frames in a single multi-frame Instance.
Rendered Frames	The Rendered Frames resource references an ordered collection of frames of a single multi-frame Instance, to be rendered.
Frame Thumbnail	**The Frame Thumbnail resource references a thumbnail image for frames within an Instance.**
Bulkdata	The Bulkdata resource contains one or more Bulkdata Values.

Update Table 10.3-2 as follows:

Table 10.3-2. Resources by Transaction

Resource	Retrieve	Store	Search
Studies Service			

All Studies		M	M
Study	M	M	M
Study Metadata	M		
Study Bulkdata	M		
Rendered Study	M		
Study Thumbnail	**O**		
Study's Series			M
Study's Instances			M
All Series			M
Series	M		M
Series Metadata	M		
Series Bulkdata	M		
Series' Instances			M
Rendered Series	M		
Series Thumbnail	**O**		
All Instances			M
Instance	M		M
Instance Metadata	M		
Instance Bulkdata	M		
Rendered Instance	M		
Instance Thumbnail	**O**		
Frames	M		
Rendered Frames	M		
Frames Thumbnail	**O**		
Bulkdata	M	M	

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Update Section 10.4 as follows:

10.4   Retrieve Transaction

This Transaction uses the GET method to retrieve the Target Resource. The media type in the response payload will depend on the Target URI and the Query Parameters; for example, Instances as application/dicom, Metadata as
95   application/dicom+json or rendered Instances as application/jpeg images.

The retrieve transaction supports DICOM, ~~and~~ Rendered**, and Thumbnail** resources.

Insert the following as Section 10.4.1.1.4.

10.4.1.1.4   Thumbnail Resources

100   A Retrieve Transaction on a Thumbnail resource will return a response that contains a rendered representation of its parent DICOM Resource.

Table 10.4.1-4 shows the Thumbnail resources supported by the Retrieve transaction along with their associated URI templates.

Table 10.4.1-4. Retrieve Transaction Thumbnail Resources

Target Resource	Resource URI Template
Study Thumbnail	/studies/{study}/thumbnail
Series Thumbnail	/studies/{study}/series/{series}/thumbnail
Instance Thumbnail	/studies/{study}/series/{series}/instances/{instance}/thumbnail
Frame Thumbnail	/studies/{study}/series/{series}/instances/{instance}/frames/{frames}/thumbnail

105   The representation returned in the response to a Retrieve Thumbnail resource request shall be in a Rendered Media Type. The Thumbnail shall not contain any Patient Identifying Information. Only a single image shall be returned.

If the origin server supports any of the Thumbnail resources, it shall support all of them.

The origin server will determine what constitutes a meaningful representation.

The origin server may return a redirection response (HTTP status code 302) to a rendered resource instead of
110   returning a rendered image.

There is no requirement that Thumbnail resources be related to any Icon Image Sequence (0088,0200) encoded in
Instances or returned in query responses.

Update Section 10.4.1.2 as follows:

115   **10.4.1.2   Query Parameters**

The origin server shall support Query Parameters as required in Table 10.4.1-5.

The user agent shall supply in the request Query Parameters as required in Table 10.4.1-5.

10.4.1-5. Query Parameters by Resource

Key	Resource Category	Usage		Section
		User Agent	**Origin Server**	
accept	All	O	M	8.3.3.1
charset	Text	O	M	8.3.3.2
annotation	Rendered	O	M	8.3.5.1.1
quality	Rendered	O	M	8.3.5.1.2
viewport	Rendered	O	M	8.3.5.1.3
	Thumbnail	O	O	
window	Rendered	O	M	8.3.5.1.4
iccprofile	Rendered	O	O	8.3.5.1.5

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120   Update Section 10.4.3.3 as follows:

10.4.3.3   Response Payload

A success response shall have a payload containing one or more representations of the Target Resource in an
Acceptable Media Type. The payload may be single part or multipart depending on the media type.

A failure response payload should contain a Status Report describing any failures, warnings, or other useful
125   information.

Table 10.4.3.-3 shows the media type category for each resource type. The origin server shall support the default and
required media types in the media type category specified.

Table 10.4.3-3. Resource Media Types

Resource	Section	Media Type Category
DICOM Resources	10.4.1.1.1	DICOM Media Types
Metadata Resources	10.4.1.1.2	DICOM Media Types
Rendered Resources	10.4.1.1.3	Rendered Media Types
Thumbnail Resources	**10.4.1.1.4**	**Rendered Media Types**

DICOM Media Types are described in Section 8.7.3. Rendered Media Types are described in Section 8.7.4

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Add the following to the end of Section 10.4.5:

- **If Thumbnails are supported:**
  - **A high-level description of the method used to render thumbnails for the study, series, or instance**

135   **Note**

          The description could indicate, for example, whether a representative instance is chosen from a series, and how that instance is selected, or that per-modality fixed content is used.

  - **The minimum and maximum sizes for thumbnails**

- o **Character sets supported for Thumbnail resources (if other than UTF-8).**

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