8.3.5.1 Query Parameters for Rendered Resources

The Query Parameters defined in this section specify various rendering transformations to be applied to the DICOM images, video, and text contained in the parent DICOM Resource.

The following rules pertain to all parameters defined in this section:

1. All parameters are optional for the user agent.
2. Not all parameters are required to be supported by the origin server.
3. These parameters only apply to resources that are images and video.

**Rendered images shall contain no more than 8 bits per channel.**

The set of transformations specified by the parameters in this section shall be applied to the images as if the parameters were a Presentation State, that is, in the order specified by the applicable image rendering pipeline specified in PS3.4. Presentation State transformations are applied using the appropriate rendering pipeline specified in PS3.4 Section N.2.4. Any Source Image Region parameters are applied after any Presentation State parameters. Any Viewport parameters are applied after any Source Image Region.

**Even if the output of the image is defined in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), or contains an ICC profile, the grayscale or color space for the rendered image is not defined by this Standard.**

Table 8.3.5-1 shows the Query Parameters that may be used when requesting a Rendered Representation.

...
8.3.5.1.6 Presentation State

If a target resource is a Presentation State Instance, that instance may contain references to one or more series, each of which may contain one or more instances, each of which may contain one or more frames. The response shall return rendered versions of all supported Instances and frames referenced by the Presentation State Instance.

For example, if the Presentation State instance references a multi-frame image, then the response will contain all frames specified by the target resource, or if the Presentation State instance references a series, then the response will contain all instances contained in that series.

If the Presentation State Instance contains a Blending Sequence, then the rendered images in the response shall correspond to the frames of the input that have a Blending Sequence Item with a Blending Position (0070,0405) value of UNDERLYING. See Section C.11.14.1.1 “Blending Sequence” in PS3.3.

The origin server shall render all of the images referenced by the Presentation State in an Acceptable Media Type using the rendering pipeline specified in PS3.4 Section N.2.

If there is more than one image in the response they shall be ordered according to the:

1. Dimension Index Values (0020,9157) attribute, if present
2. Image Position (Patient) (0020,0032) attribute, if present
3. Image Position Volume (0020,9301), if present
4. Order of the instance references in the presentation state

If the above does not fully specify the ordering of the frames, then the origin server shall resolve any remaining ambiguity in the ordering.

If the Presentation Size Mode is TRUE SIZE, it shall be treated as SCALE TO FIT.

If the Presentation Size Mode is SCALE TO FIT, the origin server shall scale the Specified Displayed Area in the Presentation State, maintaining its original aspect ratio, until either the rendered image width is the same as the viewport width or the rendered image height is the same as the viewport height, whichever comes first. In other words, viewport scaling makes the displayed area selection as large as possible, within the viewport, without overflowing the viewport area and without distorting the image. If the viewport parameter is not present, the returned images shall have the dimensions of the Specified Displayed Area.

If the Presentation Size Mode is MAGNIFY, then the referenced images shall be scaled to the Specified Displayed Area in the Presentation State, and then they shall be cropped to the size specified by the "viewport" parameter. If the request does not contain a "viewport" parameter, then the referenced images shall not be cropped.

Any Specified Displayed Area relative annotations in the Presentation State shall be rendered relative to the Specified Displayed Area within the Presentation State, not the size of the viewport.

Though the output of the Presentation State is defined in DICOM to be in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), the grayscale or color space for the rendered images is not defined by this Standard.

However, if any of the following are true:

- the Windowing parameters are present,
• the Presentation Series UID does not correspond to an existing Presentation Series on the origin server, or

• the Presentation UID does not correspond to an existing Presentation Instance on the origin server

the origin server shall return a 400 (Bad Request) response and may include a payload containing an appropriate error message.

****

If the Target Resource is a Presentation State Instance and If the Presentation Size Mode is SCALE TO FIT or TRUE SIZE, then the displayed area specified in the Presentation State shall be scaled, maintaining the aspect ratio, to fit the size specified by the Source Image Region parameters if present, otherwise the displayed area selected in the presentation state will be returned without scaling.

Note

1. The intent of the TRUE SIZE mode in the presentation state cannot be satisfied, since the physical size of the pixels displayed by the web browser is unlikely to be known. If the Presentation Size Mode in the presentation state is MAGNIFY, then the displayed area specified in the presentation shall be magnified (scaled) as specified in the presentation state. It will then be cropped to fit the size specified by the viewport parameters, if present.

2. Any Displayed Area relative annotations specified in the presentation state are rendered relative to the Specified Displayed Area within the presentation state, not the size of the returned image.

Although the output of the presentation state is defined in DICOM to be in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), the grayscale or color space for the images returned by the request is not defined by this standard.

However, if any of the following are true:

• the Windowing parameters are present,

• the Presentation Series UID does not correspond to an existing Presentation Series on the origin server, or

• the Presentation UID does not correspond to an existing Presentation Instance on the origin server

the origin server shall return a 400 (Bad Request) response and may include a payload containing an appropriate error message.

8.3.5.2.3 Presentation State

If a target resource is a Presentation State Instance, that instance may contain references to one or more series, each of which may contain one or more instances, each of which may contain one or more frames. The response shall return rendered versions of all supported Instances and frames referenced by the Presentation State Instance.

For example, if the Presentation State instance references a multi-frame image, then the response will contain all frames specified by the target resource, or if the Presentation State instance references a series, then the response will contain all instances contained in that series.

If the target resource is a Presentation State Instance, then only the Charset, Annotation, Quality, and Viewport parameters may also be present. If any other Retrieve Rendered Transaction Query Parameters are present the response shall be 400 (Bad Request) and should include a payload containing an appropriate error message.
If the Presentation State Instance contains a Blending Sequence, then the rendered images in the response shall correspond to the frames of the input that have a Blending Sequence Item with a Blending Position (0070,0405) value of UNDERLYING. See Section C.11.14.1.1 “Blending Sequence” in PS3.3.

The origin server shall render all of the images referenced by the Presentation State in an Acceptable Media Type using the rendering pipeline specified in PS3.4 Section N.2.

If there is more than one image in the response they shall be ordered according to the:

5. Dimension Index Values (0020,9157) attribute, if present
6. Image Position (Patient) (0020,0032) attribute, if present
7. Image Position Volume (0020,9301), if present
8. Order of the instance references in the presentation state

If the above does not fully specify the ordering of the frames, then the origin server shall resolve any remaining ambiguity in the ordering.

If the Presentation Size Mode is TRUE SIZE, it shall be treated as SCALE TO FIT.

If the Presentation Size Mode is SCALE TO FIT, the origin server shall scale the Specified Displayed Area in the Presentation State, maintaining its original aspect ratio, until either the rendered image width is the same as the viewport width or the rendered image height is the same as the viewport height, whichever comes first. In other words, viewport scaling makes the displayed area selection as large as possible, within the viewport, without overflowing the viewport area and without distorting the image. If the viewport parameter is not present, the returned images shall have the dimensions of the Specified Displayed Area.

If the Presentation Size Mode is MAGNIFY, then the referenced images shall be scaled to the Specified Displayed Area in the Presentation State, and then they shall be cropped to the size specified by the "viewport" parameter. If the request does not contain a "viewport" parameter, then the referenced images shall not be cropped.

Any Specified Displayed Area relative annotations in the Presentation State shall be rendered relative to the Specified Displayed Area within the Presentation State, not the size of the viewport.

Though the output of the Presentation State is defined in DICOM to be in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), the grayscale or color space for the rendered images is not defined by this Standard.

Update PS3.18 Section 9.5.2 as follows:

9.5.2 Behavior

The Target Resource shall be rendered as specified in Section 8.3.5.1.

A success response shall contain the Target Resource in an Acceptable Rendered Media Type. See Section 8.7.4.

The Target Resource shall be rendered and returned as specified in the Query Parameters. Presentation State transformations are applied using the appropriate rendering pipeline specified in Section N.2 “Pixel Transformation Sequence” in PS3.4. Any Source Image Region parameters are applied after any Presentation State parameters. Any Viewport parameters are applied after any Source Image Region.
Even if the output of the image is defined in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), or contains an ICC profile, the grayscale or color space for the rendered image is not defined by this Standard.

Update PS3.18 Section 9.5.2.3 as follows:

9.5.2.3 Presentation State

If the Target Resource is a Presentation State and If the Presentation Size Mode is SCALE TO FIT or TRUE SIZE, then the displayed area specified in the Presentation State shall be scaled, maintaining the aspect ratio, to fit the size specified by the rows and columns parameters if present, otherwise the displayed area selected in the presentation state will be returned without scaling.

Note

1. The intent of the TRUE SIZE mode in the presentation state cannot be satisfied, since the physical size of the pixels displayed by the web browser is unlikely to be known. If the Presentation Size Mode in the presentation state is MAGNIFY, then the displayed area specified in the presentation shall be magnified (scaled) as specified in the presentation state. It will then be cropped to fit the size specified by the viewport parameters, if present.

2. Any Displayed Area relative annotations specified in the presentation state are rendered relative to the Specified Displayed Area within the presentation state, not the size of the returned image.

Though the output of the presentation state is defined in DICOM to be in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), the grayscale or color space for the images returned by the request is not defined by this standard.

See Section 8.3.5.1.6.

However, if any of the following are true:

• the Frame Number or Windowing parameters are present,

• the Presentation Series UID does not correspond to an existing Presentation Series on the origin server, or

• the Presentation UID does not correspond to an existing Presentation Instance on the origin server

the origin server shall return a 400 (Bad Request) response and may include a payload containing an appropriate error message.

Update PS3.18 Section 10.4.1.2 as follows:

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.
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</table>

10.4.2 Behavior

The Target Resource shall be rendered as specified in Section 8.3.5.1.

A success response shall contain the Target Resource in an Acceptable Media Type. See Section 8.7.4.

10.4.2.1 Rendered Resources

If the target resource(s) is a rendered resource it is rendered according to the query parameters, by applying the transformations according to the appropriate rendering pipeline specified in Section N.2 "Pixel Transformation Sequence" in PS3.4.

If the target resource is not a single instance, Presentation State Instances contained in the target resource shall not be rendered.

Rendered images shall contain no more than 8 bits per channel.

10.4.2.1 Presentation State Instance

If the target resource is a Presentation State Instance, that instance may contain references to one or more series, each of which may contain one or more instances, each of which may contain one or more frames. The response shall return rendered versions of all supported Instances and frames referenced by the Presentation State Instance.

For example, if the Presentation State instance references a multi-frame image, then the response will contain all frames specified by the target resource, or if the Presentation State instance references a series, then the response will contain all instances contained in that series.

If the target resource is a Presentation State Instance, then only the Charset, Annotation, Quality, and Viewport parameters may also be present. If any other Retrieve Rendered Transaction Query Parameters
are present the response shall be 400 (Bad Request), and should include a payload containing an appropriate error message.

If the Presentation State Instance contains a Blending Sequence, then the rendered images in the response shall correspond to the frames of the input that have a Blending Sequence Item with a Blending Position (0070,0405) value of UNDERLYING. See Section C.11.14.1.1 “Blending Sequence” in PS3.3.

The origin server shall render all of the images referenced by the Presentation State in an Acceptable Media Type using the rendering pipeline specified in PS3.4.

If there is more than one image in the response they shall be ordered according to the:

9. Dimension Index Values (0020,9157) attribute, if present
10. Image Position (Patient) (0020,0032) attribute, if present
11. Image Position Volume (0020,9301), if present
12. Order of the instance references in the presentation state

If the above does not fully specify the ordering of the frames, then the origin server shall resolve any remaining ambiguity in the ordering.

If the Presentation Size Mode is TRUE SIZE, it shall be treated as SCALE TO FIT.

If the Presentation Size Mode is SCALE TO FIT, the origin server shall scale the Specified Displayed Area in the Presentation State, maintaining its original aspect ratio, until either the rendered image width is the same as the viewport width or the rendered image height is the same as the viewport height, whichever comes first. In other words, viewport scaling makes the displayed area selection as large as possible, within the viewport, without overflowing the viewport area and without distorting the image. If the viewport parameter is not present, the returned images shall have the dimensions of the Specified Displayed Area.

If the Presentation Size Mode is MAGNIFY, then the referenced images shall be scaled to the Specified Displayed Area in the Presentation State, and then they shall be cropped to the size specified by the "viewport" parameter. If the request does not contain a "viewport" parameter, then the referenced images shall not be cropped.

Any Specified Displayed Area relative annotations in the Presentation State shall be rendered relative to the Specified Displayed Area within the Presentation State, not the size of the viewport.

Though the output of the Presentation State is defined in DICOM to be in P-Values (grayscale values intended for display on a device calibrated to the DICOM Grayscale Standard Display Function PS3.14), the grayscale or color space for the rendered images is not defined by this Standard.