

# DICOM Correction Proposal

STATUS	Voting Packet
Date of Last Update	2019/06/14
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Submission Date	2018/11/08

Correction Number	CP-1868
Log Summary:	Update PS3.18 Status Codes to be correct HTTP
Name of Standard	PS 3.18 2019
Rationale for Correction:	Several of the HTTP status codes used in PS3.18 are incorrect and some of the Status Code Meaning tables should have additional codes added. For example, 206 should only be used if the request included Range request header fields.
Correction Wording:	

*Update PS3.18 Section 8.5 as follows:*

## 8.5 Status Codes

**Each response message contains a status code.**

~~The most common HTTP status codes used are listed in Table 8.5-1. Most of these codes are described in detail in [RFC7231]. IANA maintains the HTTP Status Code Registry [IANA HTTP Status Code Registry], which contains a complete list of registered status codes.~~

**Status Codes are returned in response messages. They have the following types: Informational (1xx), Success (2xx), Redirection (3xx), Client Errors (4xx), or Server Errors (5xx). See [RFC7231].**

**When a web server determines that a user agent should not receive certain information, the web server must choose the status code and the contents of a Status Report carefully. For example, local policy may dictate that the web service returns a 404 (Not Found) rather than a 401 (Unauthorized) status code to avoid allowing the user agent to infer the existence of a resource. The status code and payload of the response needs to be controlled by policy and context, balancing usability of the returned result against appropriate protection in order to avoid information leakage.**

**The following are from the various HTTP RFCs.**

**Table 8.5-1. Status Code Meaning**

Status	Code	Description
Success		The 2xx (Successful) class of status code indicates that the client's request was successfully received, understood, and accepted.

Status	Code	Description
	200 (Success)	All Target Resource representations are contained in the payload. See <a href="#">[RFC7231] Section 6.3.1</a> .
	201 (Created)	The request has been fulfilled and has resulted in one or more new resources being created. See <a href="#">[RFC7231] Section 6.3.2</a> .
	202 (Accepted)	The request has been accepted for processing, but the processing has not been completed. The payload of this response should contain a Status Report. <a href="#">[RFC7231] Section 6.3.3</a> .  The user agent may be able to inspect relevant resources to determine the status at some later time.
	203 (Non-Authoritative Information)	The request was successful, but the enclosed payload has been modified from that of the origin server's 200 (OK) response by a transforming proxy. See <a href="#">[RFC7230] Section 5.7.2</a> and <a href="#">[RFC7230] [RFC7231] Section 6.3.4</a> .
	204 (No-Content)	The server has successfully fulfilled the request and there is no additional content to send in the response payload body. This should be the response when content is successfully uploaded, and the response has no payload.  For example, this status code is used in the response to a Conditional Retrieve request), when the Target Resource has not been modified. See <a href="#">[RFC7231] Section 6.3.5</a> .
	205 (Reset Content)	The server has fulfilled the request and desires that the user agent reset the "document view", which caused the request to be sent, to its original state as received from the origin server.
	206 (Partial Content)	The 206 (Partial Content) status code indicates that the server is successfully fulfilling a range request for the Target Resource by transferring one or more parts of the selected representation that correspond to the satisfiable ranges found in the request's Range header field.  This status code shall only be used with Range Requests. See <a href="#">[RFC7233]</a> .  Note  This status code was previously (erroneously) used to indicate that only some of a payload was stored.
Redirection	The 3xx (Redirection) class of status code indicates that further action needs to be taken by the user agent to fulfill the request.	
	301 (Moved Permanently)	The origin server has assigned the Target Resource to a new permanent URI, indicated in a Location header field.  This status is typically needed when the resource has been moved from one service to another, for example during a migration.
	303 (See Other)	The origin the server is redirecting the user agent to a different resource, as indicated by a URI in the Location header field, which will provide a response to the original request.
	304 (Not Modified)	The origin server has received a conditional GET or HEAD request that would have resulted in a 200 (OK) response if it were not for the fact that the condition evaluated to false.
Client Error	The 4xx (Client Error) class of status code indicates that the user agent has erred.	

Status	Code	Description
		For all these error codes the origin server should return a payload containing an explanation of the error situation, and whether it is a temporary or permanent condition, except when responding to a HEAD request.
	400 (Bad Request)	The server cannot or will not process the request due to something that is perceived to be a client error (e.g., malformed request syntax, invalid request â€œ).
	401 (Unauthorized)	The request has not been fulfilled because it lacks valid authentication credentials for the service or Target Resource. The server generating a 401 response shall send a WWW-Authenticate header field ([RFC7235] Section 4.1) containing at least one challenge applicable to the server or Target Resource.
	403 (Forbidden)	The origin server understood the request, but refused to authorize it (e.g., an authorized user with insufficient privileges). If authentication credentials were provided in the request, the server considers them insufficient to grant access. The origin server may respond with a 404 (Not Found) if not permitted to use this status code.
	404 (Not Found)	The origin server did not find a representation for the Target Resource or is not willing to disclose that one exists. This might be a temporary condition. If the origin server knows that the resource has been deleted, the 410 (Gone) status code shall be returned rather than 404.
	405 (Method Not Allowed)	The method in the request is known by the origin server but not supported by the target service or resource. The origin server shall include an Allow header field in a 405 response containing a list of the target service or resource's currently supported methods.
	406 (Not Acceptable)	The Target Resource does not have a representation that would be acceptable to the user agent, per the content negotiation header fields in the request, and the server is unwilling to supply a default representation.  The origin server should return a payload that lists the available media types and corresponding resource identifiers.
	409 (Conflict)	The request could not be completed due to a conflict with the current state of the Target Resource. This code is used in situations where the user agent might be able to resolve the conflict and resubmit the request. The origin server should return a payload containing enough information for the user agent to recognize the source of the conflict.  In the DICOM context, this code might indicate that the origin server was unable to store any Instances due to a conflict in the request (e.g., unsupported SOP Class or Instance mismatch).
	410 (Gone)	Access to the Target Resource is no longer available at the origin server and this condition is likely to be permanent. If the origin server does not know, or has no facility to determine, whether the condition is permanent, the 404 (Not Found) status code should be used instead.
	411 (Length Required)	The origin server refuses to accept the request because the Content-Length header field was not specified.
	413 (Payload Too Large)	The server is refusing to process the request because the request payload is larger than the server is willing or able to process.
	414 (URI Too Long)	The server is refusing to service the request because the request-target ([RFC7230] Section 5.3) is longer than the server is willing to interpret.

Status	Code	Description
	415 (Unsupported Media Type)	The origin server does not support the Content-Type in the request payload. This error typically occurs when the user agent is trying to create or update a resource.  The origin server should return a payload that lists the available media types and corresponding resource identifiers.  Note  This is different from 406 (Not Acceptable).
Server Error	The 5xx (Server Error) class of status code indicates that the server is aware that it has erred or is incapable of performing the requested method.  For all these error codes, the server should send an explanation of the error situation, and whether it is a temporary or permanent condition, except when responding to a HEAD request.	
	500 (Internal Server Error)	The server encountered an unexpected condition that prevented it from fulfilling the request.
	501 (Not Implemented)	The server does not support the functionality required to fulfill the request.  In the DICOM context, this status code shall be used for SOP Class Not Supported errors.
	503 (Service Unavailable)	The origin server is currently unable to handle the request due to a temporary overload or scheduled maintenance, which will likely be alleviated after some delay.
	505 (HTTP Version Not Supported)	The origin server does not support, or refuses to support, the major version of HTTP that was used in the request message.

When a web server determines that a user agent should not receive certain information, the web server must choose the status code and the contents of a Status Report carefully. For example, local policy may dictate that the web service returns a 404 (Not Found) rather than a 401 (Unauthorized) status code to avoid allowing the user agent to infer the existence of a resource. The status code and payload of the response needs to be controlled by policy and context, balancing usability of the returned result against appropriate protection. See also [FHIR Access Denied] and [OWASP Information Leakage].

**The following Subsections list common status codes for Retrieve, Store, and Search Transactions.**

**8.5.1 Retrieve Response Status Codes**

**Table 8.5-2 shows some common status codes for Retrieve transactions.**

**Table 8.5-2. Retrieve Status Codes and Meaning**

<u>Status</u>	<u>Code</u>	<u>Meaning</u>
<u>Success</u>	<u>200 (OK)</u>	<u>The Target Resource was successfully retrieved.</u>
	<u>204 (No Content)</u>	<u>The server has successfully fulfilled the request and there is no additional content to send in the response payload body. This should be the response when content is successfully uploaded, and the response has no payload. For example, this status code is used in the response to a Conditional Retrieve request), when the Target Resource has not been modified. See [RFC7231] Section 6.3.5.</u>
<u>Failure</u>	<u>400 (Bad Request)</u>	<u>The origin server did not store any of the representations contained in the request payload because of errors in the request message. For example, an invalid Query Parameter or an invalid SOP instance.</u>

Status	Code	Meaning
	<b>404 (Not Found)</b>	<u>The origin server did not find a current representation for the target resource or is not willing to disclose that one exists. For example, an unsupported IOD, or SOP Instance not on server.</u>
	<b>406 (Not Acceptable)</b>	<u>The origin server does not support any of the Acceptable Media Types.</u>
	<b>409 (Conflict)</b>	<u>The request could not be completed due to a conflict with the current state of the Target Resource. This code is used in situations where the user agent might be able to resolve the conflict and resubmit the request. The origin server should return a payload containing enough information for the user agent to recognize the source of the conflict.</u>  <u>In the DICOM context, this code might indicate that the origin server was unable to store any representations due to a conflict in the request. For example, if the Target Resource is locked for update or offline.</u>
	<b>410 (Gone)</b>	<u>Access to the Target Resource is no longer available at the origin server and this condition is likely to be permanent. If the origin server does not know, or has no facility to determine, whether the condition is permanent, the 404 (Not Found) status code should be used instead.</u>

### 8.5.2 Store Response Status Codes

Table 8.5-3 shows some common status codes for Store transactions.

Table 8.5-3. Store Status Codes and Meaning

Status	Status Code	Meaning
<b>Success</b>	<b>200 (OK)</b>	<u>The origin server successfully stored one or more representations in the request payload; however, some of the representations were modified or had failures or warnings associated with them.</u>  <u>The response payload shall include a Store Instances Response Dataset describing errors, warnings, and modifications. See Annex I.</u>
	<b>201 (Created)</b>	<u>The origin server successfully stored one or more representations in the request payload, and all stored representations were newly created.</u>  <u>If all the representations were stored without modification the response will have no payload; otherwise, the response payload shall include a Store Instances Response Dataset describing errors, warnings, and modifications. See Annex I.</u>
	<b>202 (Accepted)</b>	<u>The origin server stored some of the Instances, but warnings or failures exist for others.</u> <u>Additional information regarding this error may be found in the response message body.</u>
	<b>204 (No Content)</b>	<u>The origin server has successfully stored all representations in the request payload without modification.</u>
<b>Failure</b>	<b>400 (Bad Request)</b>	<u>The origin server was unable to store any instances due to bad syntax.</u>
	<b>409 (Conflict)</b>	<u>The request was formed correctly but the origin server was unable to store any instances due to a conflict in the request (e.g., unsupported SOP Class or Study UID mismatch).</u>  <u>This may also be used to indicate that the origin server was unable to store any instances for a variety of reasons.</u>  <u>Additional information regarding the instance errors may be found in the payload.</u>

	<u>413 (Payload Too Large)</u>	<u>The server is refusing to process the request because the request payload is larger than the server is willing or able to process.</u>
	<u>415 (Unsupported Media Type)</u>	<u>The origin server does not support the media type specified in the Content-Type header field of the request</u>

### 8.5.3 Search Response Status Codes

Table 8.5-4 shows some common status codes for Search transactions.

**Table 8.5-4. Search Status Codes and Meaning**

<u>Status</u>	<u>Code</u>	<u>Description</u>
<b>Success</b>	<u>200 (OK)</u>	<u>The search was successful, and the matches are contained in the response payload.</u>
	<u>202 (Accepted)</u>	<u>The search as accepted for processing, but it is taking too long to process. The response will be sent over the Notification Connection. This status code shall only be returned if the user agent has a Notification Connection open.</u>
	<u>204 (No Content)</u>	<u>The request was successful, but there were no matching resources.</u>
<b>Failure</b>	<u>400 (Bad Request)</u>	<u>The request message contained an error. For example, the method, Target Resource, or Query Parameters were invalid.</u>
	<u>406 (Not Acceptable)</u>	<u>The origin server does not support any of the Acceptable Media Types.</u>
	<u>409 (Conflict)</u>	<u>The request could not be completed due to a conflict with the current state of the Target Resource. This code is used in situations where the user agent might be able to resolve the conflict and resubmit the request. The origin server should return a payload containing enough information for the user agent to recognize the source of the conflict.</u>  <u>In the DICOM context, this code might indicate that the origin server was unable to store any Instances due to a conflict in the request. For example, the target resource is locked for update or is currently offline.</u>

Update PS 3.18 Section 9.4.3.1 as follows:

#### 9.4.3.1 Status Codes

~~Table 9.4.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

**Table 9.4.3-1. Status Code Meaning**

<b>Status</b>	<b>Code</b>	<b>Meaning</b>
<b>Success</b>	<b>200 (OK)</b>	<del>The Instance was successfully retrieved.</del>
<b>Failure</b>	<b>400 (Bad Request)</b>	<del>There was a problem with the request.</del>
	<b>404 (Not Found)</b>	<del>The resource corresponding to the UIDs in the Query Parameters was not found.</del>
	<b>410 (Gone)</b>	<del>The resource corresponding to the UIDs in the Query Parameters, once existed, but no longer exists.</del>

See Section 8.5.1.

Update PS 3.18 Section 9.5.3.1 as follows:

### 9.5.3.1 Status Codes

~~Table 9.5.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

~~Table 9.5.3-1. Status Code Meaning~~

Status	Code	Meaning
Success	200 (OK)	All instances were successfully rendered and retrieved.
Failure	400 (Bad Request)	There was a problem with the request.

See Section 8.5.1.

Update PS 3.18 Section 10.4.3.1 as follows:

### 10.4.3.1 Status Codes

~~Table 10.4.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

~~Table 10.4.3-1. Status Code Meaning~~

Status	Code	Meaning
Success	200 (OK)	The response payload contains representations for all of the Target Resource(s)
	206 (Partial Content)	The response payload contains representations for some, but not all, of the Target Resource(s)
Failure	400 (Bad Request)	The origin cannot process the request because of errors in the request headers or parameters.
	404 (Not Found)	The Target Resource does not exist
	406 (Not Acceptable)	The origin server does not support any of the Acceptable Media Types
	410 (Gone)	The Target Resource has been deleted
	413 (Payload Too Large)	The Target Resource is too large to be returned by the origin server.

See Section 8.5.1.

Update PS 3.18 Section 10.5.3.1 as follows:

### 10.5.3.1 Status Codes

~~Table 10.5.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

~~Table 10.5.3-1. Status Code Meaning~~

Status	Code	Description
Success	200 (OK)	The origin server successfully stored all instances.

Status	Code	Description
Success	202 (Accepted)	The origin server stored some of the instances but warnings or failures exist for others.  Additional information regarding this error may be found in the response message body.
Failure	400 (Bad Request)	The origin server was unable to store any instances due to bad syntax.
	409 (Conflict)	The request was formed correctly but the origin server was unable to store any instances due to a conflict in the request (e.g., unsupported SOP Class or Study Instance UID mismatch).  This may also be used to indicate that the origin server was unable to store any instances for a mixture of reasons.  Additional information regarding the instance errors may be found in the payload.
	415 (Unsupported Media Type)	The origin server does not support the media type specified in the Content-Type header field of the request

See Section 8.5.2.

Update PS 3.18 Section 10.6.3.1 as follows:

#### 10.6.3.1 Status Codes

~~Table 10.6.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

**Table 10.6.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The search completed successfully, and the results are contained in the payload. If there are additional results available or there are warnings the Warning header field shall contain a URL referencing a Search Status report.
	204 (No Content)	The search completed successfully, but there were zero results.
Failure	400 (Bad Request)	There was a problem with the request. For example, the Query Parameter syntax is incorrect.
	413 (Payload Too Large)	The search was too broad, and the body of the response should contain a Status Report with additional information about the failure.

See Section 8.5.3.

Update PS 3.18 Section 11.4.3.1 as follows:

#### 11.4.3.1 Status Codes

~~Table 11.4.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

**Table 11.4.3-1. Status Code Meaning**

Status	Code	Meaning
Success	201 (Created)	The Target Workitem was successfully added to the Worklist.
Failure	400 (Bad Request)	There was a problem with the request. For example, the request payload did not satisfy the requirements of the Req. Type N-CREATE column of Table CC.2.5-3 “UPS SOP Class N-CREATE/N-SET/N-GET/C-FIND Attributes” in PS3.4.
	409 (Conflict)	The Target Workitem already exists.

See Section 8.5.2.

Update PS 3.18 Section 11.5.3.1 as follows:

**11.5.3.1 Status Codes**

Table 11.5.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.

**Table 11.5.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	All instances were successfully retrieved.
Failure	400 (Bad Request)	There was a problem with the request.
	404 (Not Found)	The origin server has no knowledge of the Target Workitem. See <u>Section CC.2.1.3 “Service Class Provider Behavior”</u> in PS3.4.
	409 (Conflict)	The request cannot be performed for one of the following reasons: <ul style="list-style-type: none"> <li>• the submitted request is inconsistent with the current state of the Target Workitem</li> <li>• the Transaction UID is missing</li> <li>• the Transaction UID is incorrect</li> </ul>
	410 (Gone)	The origin server knows that the Target Workitem did exist but has been deleted.

See Section 8.5.1.

Update PS 3.18 Section 11.6.3.1 as follows:

**11.6.3.1 Status Codes**

The response shall contain an appropriate status code.

Table 11.6.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.

**Table 11.6.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The Target Workitem was updated.
Failure	400 (Bad Request)	There was a problem with the request. For example: <ul style="list-style-type: none"> <li>the Target Workitem was in the COMPLETED or CANCELED state</li> <li>the Transaction UID is missing</li> <li>the Transaction UID is incorrect, or</li> <li>the dataset did not conform to the requirements</li> </ul>
	404 (Not Found)	The Target Workitem was not found.
	409 (Conflict)	The request is inconsistent with the current state of the Target Workitem
	410 (Gone)	The Target Workitem once existed, but no longer exists.

See Section 8.5.2.

Update PS 3.18 Section 11.9.3.1 as follows:

#### 11.9.3.1 Status Codes

~~Table 11.9.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

**Table 11.9.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The search completed successfully, and the matching results are returned in the message body.
	204 (No Content)	The search completed successfully, but there were no matching results.
	206 (Partial Content)	Only some of the search results were returned, and the rest can be requested through the appropriate request.
Failure	400 (Bad Request)	The was a problem with the request. For example, invalid Query Parameter syntax.
	413 (Payload Too Large)	The size of the results exceeds the maximum payload size supported by the origin server. The user agent may repeat the request with paging or with a narrower query to reduce the size of the result.

See Section 8.5.3.

Update PS 3.18 Section 12.4.3.1 as follows:

#### 12.4.3.1 Status Codes

~~Table 12.4.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.~~

**Table 12.4.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The instance was successfully retrieved.
Failure	400 (Bad Request)	There was a problem with the request.
	404 (Not Found)	The origin server did not find a current representation for the Target Resource or is not willing to disclose that one exists. For example, an unsupported IOD, or Instance not on server.
	406 (Unsupported Media Type)	The origin server does not support any of the Acceptable Media Types.

See Section 8.5.1.

Update PS 3.18 Section 12.5.3.1 as follows:

### 12.5.3.1 Status Codes

Table 12.5.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.

**Table 12.5.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server successfully stored or created at least one of the representations contained in the request payload and is returning a response payload.
	202 (Accepted)	The origin server successfully validated the request message but has not yet stored or created the representations in the request payload. The origin server may or may not have validated the payload.  The user agent can use a Query or Retrieve transaction later to determine if the request has completed.
Failure	400 (Bad Request)	The was a problem with the request. For example: <ul style="list-style-type: none"> <li>• the origin server did not store any of the representations contained in the request payload because of errors in the request message,</li> <li>• the request contained an invalid Query Parameter,</li> <li>• the request referenced an invalid instance.</li> </ul>
	404 (Not Found)	The origin server did not find a current representation for the Target Resource or is not willing to disclose that one exists. For example, an unsupported IOD, or Instance not on server.
	409 (Conflict)	The request could not be completed due to a conflict with the current state of the Target Resource.
	415 (Unsupported Media Type)	The origin server does not support the media type specified in the Content-Type header field of the request, and none of the representations contained in the request were processed or stored.

See Section 8.5.2.

Update PS 3.18 Section 12.6.3.1 as follows:

### 12.6.3.1 Status Codes

Table 12.6.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.

**Table 12.6.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The query completed and any matching results are returned in the message body.
Failure	400 (Bad Request)	The request message contained an error. For example, the Query Parameters were invalid
	406 (Unsupported Media Type)	The origin server does not support any of the Acceptable Media Types.
	413 (Payload Too Large)	The search was too broad, and the body of the response should contain a Status Report with additional information about the failure.

See Section 8.5.3.