

**Digital Imaging and Communications in Medicine (DICOM)**

*Supplement 246: DICOMweb Modality Workflow Service*

*Prepared by:*

**DICOM Standards Committee, Working Group 27**

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1

### Document History

2024.08	Version 00	JM, DK	Initial version with proposed document structure and content.
2024.11	Version 01	JM, DK	Extended with observations; alternative approach included.
2025.01	Version 02	JM, DK	Alternative approach promoted, extended with conformance.

2

### Open Issues

2	<p><b>Context:</b> The notified parties of the MPPS notification service as specified in <a href="#">PS3.4, F.9</a>.</p> <p><b>Issue:</b> This service does not specify how the MPPS Notification SCP knows what SCUs to notify on MPPS changes.</p> <p><b>Proposal:</b> Do not change the current way this behavior is specified; just add one or more notes to make clear that this aspect is something beyond the standard, and that a conceivable way to achieve this would be configuring the SCP with the SCUs to be notified.</p> <p><b>Decision:</b> [WGxx: YYYY-MM-DD] None yet.</p>

3

### Closed Issues

1	<p><b>Context:</b> The description of the work item proposal talked about adding the Modality Worklist and the Modality Performed Procedure Step services to DICOMweb, in principle based on the existing DICOMweb Worklist service. This was expected to boil down to creating an informative annex and any normative changes needed if gaps are discovered.</p> <p><b>Issue:</b> It proved very hard, if not impossible, to map MWL/MPPS to UPS, as, among other things, the two serve different purposes.</p> <p><b>Proposal:</b> Create new Modality Workflow Services resources instead of basing DICOMweb MWL/MPPS on UPS-RS.</p> <p><b>Decision:</b> [WG06: 2025-01-14] Agreed with proposal.</p>

4

5

6

## **Scope and Field of Application**

7 This supplement defines the means to perform modality workflow management in DICOMweb. The  
8 Modality Workflow Service enables a user agent to use and create workflow-related resources on the  
9 origin server.

10 The DICOMweb Modality Workflow Service is an extension to the existing DICOMweb services, provides  
11 an alternative RESTful interface to the Modality Worklist (MWL) and Modality Performed Procedure Step  
12 (MPPS) services that are already available in DIMSE. It has been designed with the intention of  
13 facilitating proxies from/to DIMSE to/from the DICOMweb Modality Workflow Service.

14

**Changes to NEMA Standards Publications PS 3.18**

**Add new section X Modality Workflow Service and Resources**

**X Modality Workflow Service and Resources**

**X.1 Overview**

The Modality Workflow Service provides modality-oriented workflow management for user agents. This service corresponds to both the DIMSE Modality Worklist (MWL) and DIMSE Modality Performed Procedure Step (MPPS) services as defined in Annexes K and F of PS3.4 respectively and has their semantics.

**Commented [JM1]:** Align with Scope

**X.1.1 Resource Descriptions**

The Modality Workflow Service manages a collection of Modality Scheduled Procedure Steps and a collection of Modality Performed Procedure Steps.

The Modality Workflow Service defines the two resources as given in Table X.1.1-1.

**Table X.1.1-1. Modality Workflow Service Resource Descriptions**

Resource	Support
/modality-scheduled-procedure-steps	The collection of Modality Scheduled Procedure Steps managed by the origin server.
/modality-performed-procedure-steps	The collection of Modality Performed Procedure Steps managed by the origin server.

**Commented [JM2]:** Use the template of 11 and 12, and see what fits best. Also, add CPs for the other sections.

Table X.1.1-2 lists the DIMSE Operations used in MWL and MPPS and their corresponding Modality Workflow Service Transactions.

**Table X.1.1-2. Mapping of DIMSE Operations and Modality Workflow Service Transactions**

Operation	Reference	DIMSE Service	Modality Workflow Service Transaction
Query Worklist	PS3.4, K.4	MWL C-FIND	Search
Create MPPS Instance	PS3.4, F.7.2.1	MPPS N-CREATE	Create
Set MPPS Information	PS3.4, F.7.2.2	MPPS N-SET	Update
Get MPPS Information	PS3.4, F.8.2.1	MPPS N-GET	Retrieve

**Commented [JM3]:** Flip from right to left.

**Commented [JM4R3]:** Possibly create CPs for adding this kind of tables sections 10 and 11 too.

**Commented [JM5R3]:** Possibly move to X.3, with next table, below overview table.

**Commented [JM6]:** Operation text should reflect what is mentioned in K and F.

**Note** As in DIMSE, the Transactions do *not* provide a complete CRUDL interface for the respective resources. For instance, it is not possible to create Modality Scheduled Procedure Steps using DICOM, neither with DIMSE, nor with DICOMweb. What DICOM *does* provide is access to scheduled and performed procedure steps at the level required for modalities.

**Commented [JM7]:** Q to WG06: should we provide a list of operations / methods that are *not* supported? (For reasons of clarity.)

Next to Operations, MPPS also knows about Notifications, which, together with their related Modality Services Transactions, are listed in Table X.1.1-3.

**Commented [JM8R7]:** Is table X.3-2 sufficient? Note that that one is not complete, as deletion is not covered.

40 **Table X.1.1-3. Relation between DIMSE Notifications and Modality Workflow Service Transactions**

Notification	Reference	DIMSE Service	Modality Workflow Service Transaction
Receive Event Notification	PS3.4, F.9.2.1	N-EVENT-REPORT	Subscribe
Provide Event Notification	PS3.4, F.9.2.2		Unsubscribe

41

42 Note The pair of Notifications relate to the pair of Transactions; there is *no* one-to-one mapping between  
43 DIMSE Notifications and Modality Workflow Service Transactions. See also Section 8.10 for more  
44 information about how DICOMweb deals with Notifications.  
45

46 **X.1.2 Common Query Parameters**

47 The origin server shall support Query Parameters as required in Table X.1.2-1.

48 The user agent shall supply in the request Query Parameters as required in Table X.1.2-1.

49

**Table X.1.2-1. Common Query parameters**

Name	Value	Usage		Section
		User Agent	Origin Server	
Accept	media-type	O	M	Section 8.3.3.1
Accept-Charset	charset	O	M	Section 8.3.3.2

50

51 **X.1.3 Common Media Types**

52 The origin server shall support the media types specified as Default or Required in Table X.1.3-1.

53

**Table X.1.3-1. Default, Required, and Optional Media Types**

Media Type	Usage	Section
application/dicom+json	Default	<a href="#">Section 8.7.3.2</a>
application/dicom+xml	Required	Section 8.7.3.2
multipart/related; type="application/dicom+json"	Required	Section 8.7.3.2
multipart/related; type="application/dicom+xml"	Required	Section 8.7.3.2

54

55 **X.2 Conformance**

56 An origin server conforming to the Modality Workflow Service shall, ~~next to the Retrieve Capabilities~~  
57 ~~Transaction (see Section 8.9 and Annex H)~~, support at least one of the optional Transactions listed in  
58 Table X.2-1 and adhere to the condition mentioned next to that Transaction.

59

**Table X.2-1. Required and Optional Transactions**

Transaction	Support	Condition	Section
Retrieve Capabilities	Required		Section 8.9
Search	Optional		Section X.4
Create	Optional	Requires support of the Update Transaction	Section X.5
Update	Optional	Requires support of the Create Transaction	Section X.6

**Commented [JM9]:** There might be a CP on this one changing the language.

**Commented [JM10]:** Also CP for section 13.1.3.

**Commented [JM11]:** Split into Modality Worklist Service and Modality PPS Service.

Transaction	Support	Condition	Section
Retrieve	Optional	Requires support of the Create Transaction	Section X.7
Subscribe	Optional	Requires support of the Create and the Unsubscribe Transactions	Section X.8
Unsubscribe	Optional	Requires support of the Create and the Subscribe Transactions	Section X.9

60  
61 Implementations shall specify in their Conformance Statement (see PS3.2) and the Retrieve Capabilities  
62 Transaction the supported Transactions and the implementations' role: origin server, user agent, or both.

63 In addition, for each supported Transaction they shall specify:

- 64 • The supported Query Parameters, including optional Attributes, if any.
- 65 • The supported DICOM Media Types.
- 66 • The supported character sets (if other than UTF-8).

67 **X.3 Transactions Overview**

68 The Modality Workflow Service consists of the Transactions listed in Table X.3-1.

69 **Table X.3-1. Modality Services Transactions**

Transaction Name	Method	Payload		Description
		Request	Success Response	
Search	GET	none	dataset according to PS3.4, Table K.6-1	Searches for Modality Scheduled Procedure Steps
Create	PUT	dataset according to PS3.4, Table F.7.2-1 (N-CREATE)	none	Creates a new Modality Performed Procedure Step
Update	PATCH	dataset according to PS3.4, Table F.7.2-1 (N-SET)	none	Updates the target Modality Performed Procedure Step
Retrieve	GET	none	dataset according to PS3.4, Table F.8.2-1	Retrieves the target Modality Performed Procedure Step
Subscribe	POST	none	none	Subscribes to state changes of the target Modality Performed Procedure Step
Unsubscribe	DELETE	none	none	Unsubscribes to state changes of the target Modality Performed Procedure Step

Commented [JM12]: Rob will send a text on this one.

70  
71 In Table X.3-2, the Target Resources permitted for each transaction are marked with M if support is  
72 mandatory for the origin server and O if it is optional. A blank cell indicates that the resource is not  
73 allowed in the transaction.

74

**Table X.3-2. Resources by Transaction**

Resource	Search	Create	Update	Retrieve	Subscribe	Unsubscribe
Modality Scheduled Procedure Step	O					
Modality Performed Procedure Step		O	O	O	O	O

75

76 See Table X.2-1 for the dependencies between the support of transactions.

77 **X.4 Search Transaction**

78 This Transaction searches the Modality Scheduled Procedure Steps for scheduled procedure steps that  
79 match the specified Query Parameters and returns a list of matching scheduled procedure steps. Each  
80 scheduled procedure step in the returned list includes return Attributes specified in the request. The  
81 Transaction corresponds to the DIMSE MWL C-FIND Operation (see PS3.4, Section K.4.1).

82 **X.4.1 Request**

83 The request shall have the following syntax:

```
84 GET SP /modality-scheduled-procedure-
85 steps?{%match*}{&includefield}{&fuzzymatching}{&offset}{&limit} SP version CRLF
86 Accept: 1#media-type CRLF
87 *(header-field CRLF)
88 CRLF
```

89 **X.4.1.1 Target Resources**

90 The Target Resource for this Transaction is the Modality Scheduled Procedure Steps.

91 **X.4.1.2 Query Parameters**

92 The origin server shall support Query Parameters as required in Table 8.3.4-1.

93 The user agent shall supply in the request Query Parameters as required in Table 8.3.4-1.

94 **X.4.1.3 Request Header Fields**

95 The origin server shall support header fields as required in Table X.4.1-1.

96 The user agent shall supply in the request header fields as defined in Table X.4.1-1.

97

**Table X.4.1-1. Request Header Fields**

Name	Values	Usage		Description
		User Agent	Origin Server	
Accept	media-type	M	M	The Acceptable Media Types of the response payload.

98

99 See also Section 8.4.

100 **X.4.1.4 Request Payload**

101 The request shall have no payload.

102 **X.4.2 Behavior**

103 The origin server shall perform a search according to the requirements specified in Section 8.3.4.

104 For each matching Modality Scheduled Procedure Step, the origin server shall include in the results:

- 105 • All Attributes in Table K.6-1 "Attributes for the Modality Worklist Information Model" in PS3.4 with a  
106 Return Key Type of 1 or 2.
- 107 • All Attributes in Table K.6-1 "Attributes for the Modality Worklist Information Model" in PS3.4 with a  
108 Return Key Type of 1C for which the conditional requirements are met.
- 109 • All other Attributes passed as match parameters that are supported by the origin server as either  
110 matching or return Attributes.
- 111 • All other Attributes passed as includefield parameter values that are supported by the origin server as  
112 return Attributes.

**Commented [JM13]:** Q for WG06: What about 2C?  
(The text in this section has been copied and adapted  
from 11.9.2, and there 2C is not mentioned either. That  
is peculiar.)

**Commented [JM14R13]:** Go ahead, but see whether  
there are JSON issues with empty sequences. WG20.  
Annex F.

### 113 X.4.3 Response

114 The response shall have the following syntax:

```
115 version SP status-code SP reason-phrase CRLF
116 CRLF
117 [payload]
```

#### 118 X.4.3.1 Status Codes

119 Table X.4.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5  
120 for additional status codes.

121 **Table X.4.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server returns the matching results.
	204 (No Content)	The origin server has no matching results.
Failure	400 (Bad Request)	The origin server cannot handle the search request because of errors in the request headers or parameters.
	413 (Payload Too Large)	The origin server cannot return the results, as their combined size exceeds the maximum payload size supported. The user agent may repeat the request with paging or with a narrower query to reduce the size.
	503 (Service Unavailable)	The origin server cannot handle the query; this may be a temporal or permanent state.

**Commented [JM15]:** Check on what is used currently  
in PS3.18. Temporary is better here. If temporal is used:  
CP or so.

#### 123 X.4.3.2 Response Header Fields

124 The origin server shall support header fields as required in Table X.4.3-2.

125 **Table X.4.3-2. Response Header Fields**

Name	Values	Origin Server Usage	Description
Content-Type	media-type	C	See section 8.4.2.
Content-Encoding	encoding	C	See section 8.4.2.
Content-Length	Uint	C	See section 8.4.3.

126  
127 All success responses shall also contain the Content Representation (see Section 8.4.2) and Payload  
128 header fields (see Section 8.4.3) with appropriate values.

129 It is recommended that the text returned in the Warning header field (see [RFC7234] Section 5.5) contain  
130 a DICOM Status Code (see PS3.4 and Annex C "Status Type Encoding (Normative)" in PS3.7) and  
131 descriptive reason. For example:

132 Warning: A700 <service>: Out of memory

**Commented [JM16]:** This Warning header field is  
deprecated in RFC9111, so PS3.18 needs to be  
updated in all areas where this is used.  
Alternative to be looked up (Age?!).

**Commented [JM17R16]:** Steve will mail the CP  
numbers for warning header fields 2292.

133 **X.4.3.3 Response Payload**

134 A success response shall contain a dataset according to PS3.4, Table K.6-1. It shall contain the search  
135 results in an Acceptable Media Type. See Section 8.7.5.

136 A failure response payload may contain a Status Report describing any failures, warnings, or other useful  
137 information.

138 **X.5 Create Transaction**

139 This Transaction creates a Modality Performed Procedure Step with the given Attributes. It corresponds  
140 to the DIMSE MPPS N-CREATE Operation (see PS3.4, Section F.7.2.1).

141 **X.5.1 Request**

142 The request shall have the following syntax:

```
143 PUT SP /modality-performed-procedure-steps/{mppsUID} SP version CRLF
144 Accept: 1#media-type CRLF
145 *(header-field CRLF)
146 CRLF
147 payload
```

148 **X.5.1.1 Target Resource**

149 The Target Resource of this transaction is an individual Modality Performed Procedure Step identified by  
150 its MPPS UID.

151 **X.5.1.2 Query Parameters**

152 The request has no Query Parameters.

153 **X.5.1.3 Request Header Fields**

154 The origin server shall support Request Header Fields as required in Table X.5.1-1.

155 The user agent shall supply Request Header Fields as required in Table X.5.1-1.

156 **Table X.5.1-1. Request Header Fields**

Name	Values	Usage		Description
		User Agent	Origin Server	
Accept	media-type	M	M	The Acceptable Media Types of the response payload.

157

158 **X.5.1.4 Request Payload**

159 The request payload shall be present and shall contain one representation consistent with the Content-  
160 Type header field. The representation shall conform to Media Types described in Section 8.7.3 DICOM  
161 Media Type Sets. The payload shall conform to Section 8.6 Payloads.

162 The request payload shall contain the Modality Performed Procedure Step attributes with which the user  
163 agent requests the origin server to create a Modality Performed Procedure Step resource.

164 The request payload shall contain a dataset according to PS3.4, Table F.7.2-1, requirement type N-  
165 CREATE (SCU).

166 **X.5.2 Behavior**

167 The origin server shall create a Modality Performed Procedure Step identified by the provided MPPS UID  
168 and filled with the provided attributes in the payload.

**Commented [JM18]:** Look at 11.4.1.4 for language. 162 and 164 suggests there are two things in the dataset.

**Commented [JM19R18]:** Continue to look at those sections for the sections below.

169 **X.5.3 Response**

170 The response shall have the following syntax:

```
171 version SP status-code SP reason-phrase CRLF
172 CRLF
173 [payload]
174
```

175 **X.5.3.1 Status Codes**

176 Table X.5.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5  
177 for additional status codes.

178 **Table X.5.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server has created the requested Modality Performed Procedure Step with the provided attributes.
Failure	400 (Bad Request)	The origin server cannot handle the create request because of errors in the request headers or parameters.
	409 (Conflict)	The origin server cannot create the target Modality Performed Procedure Step because the provided Modality Performed Procedure Step UID is already in use.
	503 (Service Unavailable)	The origin server cannot handle the creation of the Modality Performed Procedure Step; this may be a temporal or permanent state.

179

180 **X.5.3.2 Response Header Fields**

181 The origin server shall support header fields as required in Table X.5.3-2.

182 **Table X.5.3-2. Response Header Fields**

Name	Values	Origin Server Usage	Description
Content-Type	media-type	C	See section 8.4.2.
Content-Encoding	encoding	C	See section 8.4.2.
Content-Length	uint	C	See section 8.4.3.

183

184 All success responses shall also contain the Content Representation (see Section 8.4.2) and Payload  
185 header fields (see Section 8.4.3) with appropriate values.

186 It is recommended that the text returned in the Warning header field (see [RFC7234] Section 5.5) contain  
187 a DICOM Status Code (see PS3.4 and Annex C "Status Type Encoding (Normative)" in PS3.7) and  
188 descriptive reason. For example:

```
189 Warning: A700 <service>: Out of memory
```

190 **X.5.3.3 Response Payload**

191 A success response shall have no payload.

192 A failure response payload may contain a **Status Report** describing any failures, warnings, or other useful  
193 information.

**Commented [JM20]:** Is Status Report defined as a separate entity? If so, then change payload in the syntax to status report.

194 **X.6 Update Transaction**

195 This Transaction sets Attributes of an existing Modality Performed Procedure Step. It corresponds to the  
196 DIMSE MPPS N-SET Operation (see PS3.4, Section F.7.2.2).

197 **X.6.1 Request**

198 The request shall have the following syntax:

```
199 PATCH SP /modality-performed-procedure-steps/{mppsUID} SP version CRLF
200 Accept: 1#media-type CRLF
201 *(header-field CRLF)
202 CRLF
203 payload
```

204 **X.6.1.1 Target Resources**

205 The Target Resource of this transaction is an individual Modality Performed Procedure Step identified by  
206 its MPPS UID.

207 **X.6.1.2 Query Parameters**

208 The request has no Query Parameters.

**Commented [JM21]:** Is it needed to refer to Common Query Parameters?

209 **X.6.1.3 Request Header Fields**

210 The origin server shall support Request Header Fields as required in Table X.6.1-1.

211 The user agent shall supply Request Header Fields as required in Table X.6.1-1.

212 **Table X.6.1-1. Request Header Fields**

Name	Values	Usage		Description
		User Agent	Origin Server	
Accept	media-type	M	M	The Acceptable Media Types of the response payload.

213

214 **X.6.1.4 Request Payload**

215 The request payload shall be present and shall contain one representation consistent with the Content-  
216 Type header field. The representation shall conform to Media Types described in Section 8.7.3 DICOM  
217 Media Type Sets. The payload shall conform to Section 8.6 Payloads.

218 The request payload shall contain the Modality Performed Procedure Step attributes with which the user  
219 agent requests the origin server to **create-update** a Modality Performed Procedure Step resource.

220 The request payload shall contain a dataset according to PS3.4, Table F.7.2-1, requirement type N-SET  
221 (SCU).

222 **X.6.2 Behavior**

223 The origin server shall update the Modality Performed Procedure Step identified by the provided MPPS  
224 UID with the provided attributes in the payload.

225 **X.6.3 Response**

226 The response shall have the following syntax:

```
227 version SP status-code SP reason-phrase CRLF
228 CRLF
229 [payload]
230
```

231 **X.6.3.1 Status Codes**

232 Table X.6.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5  
233 for additional status codes.

234 **Table X.6.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server has updated the Modality Performed Procedure Step with the provided attributes.
Failure	400 (Bad Request)	The origin server cannot handle the update request because of errors in the request headers or parameters.
	404 (Not Found)	The origin server has no knowledge about the target Modality Performed Procedure Step.
	409 (Conflict)	The origin server cannot update the target Modality Performed Procedure Step, for instance because the changes provided are incompatible with the data of the target Modality Performed Procedure Step.
	410 (Gone)	The origin server knows that the target Modality Performed Procedure Step did exist but has been deleted.
	503 (Service Unavailable)	The origin server cannot handle the creation of the Modality Performed Procedure Step; this may be a temporal or permanent state.

235  
236 **Note** When it is requested that attributes are to be updated while these have not been made available at  
237 creation time, a 409 (Conflict) can be returned; this is the case when PS3.4, Table F.7.2-1 specifies that  
238 these attributes should have been made available at creation time.  
239

240 **X.6.3.2 Response Header Fields**

241 The origin server shall support header fields as required in Table X.6.3-2.

242 **Table X.6.3-2. Response Header Fields**

Name	Values	Origin Server Usage	Description
Content-Type	media-type	C	See section 8.4.2.
Content-Encoding	encoding	C	See section 8.4.2.
Content-Length	uint	C	See section 8.4.3.

243  
244 All success responses shall also contain the Content Representation (see Section 8.4.2) and Payload  
245 header fields (see Section 8.4.3) with appropriate values.

246 It is recommended that the text returned in the Warning header field (see [RFC7234] Section 5.5) contain  
247 a DICOM Status Code (see PS3.4 and Annex C "Status Type Encoding (Normative)" in PS3.7) and  
248 descriptive reason. For example:

249 Warning: A700 <service>: Out of memory

250 **X.6.3.3 Response Payload**

251 A success response should have no payload.

252 A failure response payload may contain a Status Report describing any failures, warnings, or other useful  
253 information.

254 **X.7 Retrieve Transaction**

255 This Transaction retrieves an existing Modality Performed Procedure Step. It corresponds to the MPPS  
256 DIMSE N-GET Operation (see PS3.4, Section F.8.2.1).

257 **X.7.1 Request**

258 The request shall have the following syntax:

```
259 GET SP /modality-performed-procedure-steps/{mppsUID} SP version CRLF
260 Accept: 1#media-type CRLF
261 *(header-field CRLF)
262 CRLF
```

264 **X.7.1.1 Target Resources**

265 The Target Resource of this transaction is an individual Modality Performed Procedure Step identified by  
266 its MPPS UID.

267 **X.7.1.2 Query Parameters**

268 The request has no Query Parameters.

269 **X.7.1.3 Request Header Fields**

270 The origin server shall support Request Header Fields as required in Table X.7.1-1.

271 The user agent shall supply Request Header Fields as required in Table X.7.1-1.

272 **Table X.7.1-1. Request Header Fields**

Name	Values	Usage		Description
		User Agent	Origin Server	
Accept	media-type	M	M	The Acceptable Media Types of the response payload.

273

274 **X.7.1.4 Request Payload**

275 The request shall have no payload.

276 **X.7.2 Behavior**

277 If the Modality Performed Procedure Step exists on the origin server, this shall be returned in an  
278 Acceptable Media Type (see Section 8.7.4).

279 **X.7.3 Response**

280 The response shall have the following syntax:

```
281 version SP status-code SP reason-phrase CRLF
282 CRLF
283 [payload]
284
```

285 **X.7.3.1 Status Codes**

286 Table X.7.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5  
287 for additional status codes.

288 **Table X.7.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server returned the target Modality Performed Procedure Step.

Failure	400 (Bad Request)	The origin server cannot handle the retrieve request because of errors in the request headers or parameters.
	404 (Not Found)	The origin server has no knowledge about the target Modality Performed Procedure Step.
	410 (Gone)	The origin server knows that the target Modality Performed Procedure Step did exist but has been deleted.
	503 (Service Unavailable)	The origin server cannot handle the retrieval of the target Modality Performed Procedure Step; this may be a temporal or permanent state.

289

### 290 X.7.3.2 Response Header Fields

291 The origin server shall support header fields as required in Table X.7.3-2.

292

**Table X.7.3-2. Response Header Fields**

Name	Values	Origin Server Usage	Description
Content-Type	media-type	C	See section 8.4.2.
Content-Encoding	encoding	C	See section 8.4.2.
Content-Length	uint	C	See section 8.4.3.

293

294 All success responses shall also contain the Content Representation (see Section 8.4.2) and Payload  
295 header fields (see Section 8.4.3) with appropriate values.

296 It is recommended that the text returned in the Warning header field (see [RFC7234] Section 5.5) contain  
297 a DICOM Status Code (see PS3.4 and Annex C "Status Type Encoding (Normative)" in PS3.7) and  
298 descriptive reason. For example:

299 Warning: A700 <service>: Out of memory

### 300 X.7.3.3 Response Payload

301 A success response ~~should have~~ **has** a payload containing the requested Modality Performed Procedure  
302 Step in the Selected Media Type.

303 A failure response payload may contain a Status Report describing any failures, warnings, or other useful  
304 information.

## 305 X.8 Subscribe Transaction

306 This Transaction creates a Subscription to an existing Modality Performed Procedure Step resource. It  
307 relates to the DIMSE MPPS N-EVENT-REPORT Notification (see PS3.4, Section F.9.1).

308 Once a Subscription has been created, the user agent will receive notifications regarding the state of the  
309 associated Modality Performed Procedure Step. To receive the notifications generated by Subscriptions,  
310 the user agent must first open a Notification Connection between itself and the origin server using the  
311 Open Notification Connection Transaction; see Section 8.10.4.

### 312 X.8.1 Request

313 The request shall have the following syntax:

314 POST SP /modality-performed-procedure-steps/{mppsUID}/subscribers/{aetitle} SP version  
315 CRLF  
316 Accept: 1#media-type CRLF  
317 \*(header-field CRLF)

**Commented [JM22]:** Check whether this is done consistently. (11.4.3.3).

**Commented [JM23]:** Add Open Issue: do we want to do unsolicited communication? Do we want subscription?

318 CRLF

319

320 **X.8.1.1 Target Resources**

321 The Target Resource of this transaction is an individual Modality Performed Procedure Step identified by  
322 its MPPS UID.

323 **X.8.1.2 Query Parameters**

324 The origin server shall support Query Parameters as required in Table 8.3.4-1.

325 The user agent shall supply in the request Query Parameters as required in Table 8.3.4-1.

326 **X.8.1.3 Request Header Fields**

327 The origin server shall support header fields as required in Table X.8.1-1.

328 The user agent shall supply in the request header fields as defined in Table X.8.1-1.

329

**Table X.8.1-1. Request Header Fields**

Name	Values	Usage		Description
		User Agent	Origin Server	
Accept	media-type	M	M	The Acceptable Media Types of the response payload.

330

331 **X.8.1.4 Request Payload**

332 The request shall have no payload.

333 **X.8.2 Behavior**

334 The origin server shall create and manage a Subscription to the Target Modality Performed Procedure  
335 Step for the user agent. It will notify the user agent when changes occur, see Section 8.10.

336 **X.8.3 Response**

337 The response shall have the following syntax:

338 `version SP status-code SP reason-phrase CRLF`

339 `CRLF`

340 `[payload]`

341 **X.8.3.1 Status Codes**

342 Table X.8.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5  
343 for additional status codes.

344

**Table X.8.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server subscribed the user agent to the target Modality Performed Procedure Step. In case the user agent was already subscribed to this Modality Performed Procedure Step, there is no change.
Failure	400 (Bad Request)	The origin server cannot handle the subscription request because of errors in the request headers or parameters.
	404 (Not Found)	The origin server has no knowledge about the target Modality Performed Procedure Step.

	410 (Gone)	The origin server knows that the target Modality Performed Procedure Step did exist but has been deleted.
	503 (Service Unavailable)	The origin server cannot handle the subscription to the target Modality Performed Procedure Step; this may be a temporal or permanent state.

345

346 **X.8.3.2 Response Header Fields**

347 The origin server shall support header fields as required in Table X.8.3-2.

348

**Table X.8.3-2. Response Header Fields**

Name	Values	Origin Server Usage	Description
Content-Type	media-type	C	See section 8.4.2.
Content-Encoding	encoding	C	See section 8.4.2.
Content-Length	uint	C	See section 8.4.3.

349

350 All success responses shall also contain the Content Representation (see Section 8.4.2) and Payload  
351 header fields (see Section 8.4.3) with appropriate values.

352 It is recommended that the text returned in the Warning header field (see [RFC7234] Section 5.5) contain  
353 a DICOM Status Code (see PS3.4 and Annex C "Status Type Encoding (Normative)" in PS3.7) and  
354 descriptive reason. For example:

355 Warning: A700 <service>: Out of memory

356 **X.8.3.3 Response Payload**

357 A success response shall have no payload.

358 A failure response payload may contain a Status Report describing any failures, warnings, or other useful  
359 information.

360 **X.9 Unsubscribe Transaction**

361 This Transaction removes a Subscription to a Modality Performed Procedure Step resource. It relates to  
362 the DIMSE MPPS N-EVENT-REPORT Notification (see PS3.4, Section F.9.1).

363 **X.9.1 Request**

364 The request shall have the following syntax:

```
365 DELETE SP /modality-performed-procedure-steps/{mppsUID}/subscribers/{aetitle} SP
366 version CRLF
367 Accept: 1#media-type CRLF
368 *(header-field CRLF)
369 CRLF
370
```

371 **X.9.1.1 Target Resources**

372 The Target Resource of this transaction is an individual Modality Performed Procedure Step identified by  
373 its MPPS UID.

374 **X.9.1.2 Query Parameters**

375 The origin server shall support Query Parameters as required in Table 8.3.4-1.

376 The user agent shall supply in the request Query Parameters as required in Table 8.3.4-1.

377 **X.9.1.3 Request Header Fields**

378 The origin server shall support header fields as required in Table X.9.1-1.

379 The user agent shall supply in the request header fields as defined in Table X.9.1-1.

380 **Table X.9.1-1. Request Header Fields**

Name	Values	Usage		Description
		User Agent	Origin Server	
Accept	media-type	M	M	The Acceptable Media Types of the response payload.

381

382 **X.9.1.4 Request Payload**

383 The request shall have no payload.

384 **X.9.2 Behavior**

385 Upon receipt of an Unsubscribe request, the origin server shall remove the Modality Performed Procedure Step Subscription.

387 **X.9.3 Response**

388 The response shall have the following syntax:

389 `version SP status-code SP reason-phrase CRLF`  
 390 `CRLF`  
 391 `[payload]`

392 **X.9.3.1 Status Codes**

393 Table X.9.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5  
 394 for additional status codes.

395 **Table X.9.3-1. Status Code Meaning**

Status	Code	Meaning
Success	200 (OK)	The origin server unsubscribed the user agent from the target Modality Performed Procedure Step. In case the user agent was already not subscribed to this Modality Performed Procedure Step, there is no change.
Failure	400 (Bad Request)	The origin server cannot handle the unsubscribe request because of errors in the request headers or parameters.
	404 (Not Found)	The origin server has no knowledge about the target Modality Performed Procedure Step.
	410 (Gone)	The origin server knows that the target Modality Performed Procedure Step did exist but has been deleted.
	503 (Service Unavailable)	The origin server cannot handle the unsubscribe request for the target Modality Performed Procedure Step; this may be a temporal or permanent state.

396

397 **X.9.3.2 Response Header Fields**

398 The origin server shall support header fields as required in Table X.9.3-2.

399

**Table X.9.3-2. Response Header Fields**

Name	Values	Origin Server Usage	Description
Content-Type	media-type	C	See section 8.4.2.
Content-Encoding	encoding	C	See section 8.4.2.
Content-Length	uint	C	See section 8.4.3.

400

401 All success responses shall also contain the Content Representation (see Section 8.4.2) and Payload  
402 header fields (see Section 8.4.3) with appropriate values.

403 It is recommended that the text returned in the Warning header field (see [RFC7234] Section 5.5) contain  
404 a DICOM Status Code (see PS3.4 and Annex C "Status Type Encoding (Normative)" in PS3.7) and  
405 descriptive reason. For example:

406 Warning: A700 <service>: Out of memory

407 **X.9.3.3 Response Payload**

408 A success response shall have no payload.

409 A failure response payload may contain a Status Report describing any failures, warnings, or other useful  
410 information.

411 **X.10 Modality Performed Procedure Step Event Reports**

412 The origin server uses the Send Event Report Transaction (see Section 8.10.5) to send a Modality  
413 Performed Procedure Step Event Report, containing the details of any state change in the Modality  
414 Performed Procedure Step to the user agent.

415 The origin server shall send Modality Performed Procedure Step Event Reports as described in Section  
416 F.9.2 in PS3.4.

417 The Event Report shall contain all mandatory Attributes described in Table F.9.2-1 "Performed Procedure  
418 Step Notification Event Information" in PS3.4 and Table 10.3-2 "N-EVENT-REPORT-RSP Message  
419 Fields" in PS3.7.

420 The following is an example application/dicom+json Modality Performed Procedure Step Event Report  
421 payload:

```
422 {
423   "00000002": {"vr": "UI", "Value": ["1.2.840.10008.5.1.4.34.6.4"] },
424   "00000110": {"vr": "US", "Value": [23] },
425   "00001000": {"vr": "UI", "Value": ["1.2.840.10008.5.1.4.34.6.4.2.3.44.22231"] },
426   "00001002": {"vr": "US", "Value": [2] }
427 } CRLF
```

428

429 **Update Section 4 Symbols and Abbreviated Terms: add CRUDL, MPPS, MWL, and UPS**

430 **4 Symbols and Abbreviated Terms**

431 ...

432 **ABNF** Augmented Backus-Naur Form. See [RFC5234] and [RFC7405].

433 **CRUDL** Create, Read, Update, Delete, List; basic operations/actions on objects.

434 **DICOM** Digital Imaging and Communications in Medicine

435 ...

436 **JSON** JavaScript Object Notation

437 **MPPS** Modality Performed Procedure Step service. See PS3.4, Annex F.

438 **MWL** Modality Worklist service (also known as Basic Worklist service). See PS3.4, Annex K.

439 **QIDO-RS** Query based on ID for DICOM Objects by RESTful Services

440 ...

441 **UID** Unique (DICOM) Identifier

442 **UPS** Unified Procedure Step service. See PS3.4, Annex CC.

443 **UPS-RS** Unified Procedure Step by RESTful Services

444 ...

445

446

**Update Section B Examples: add new examples for the Modality Workflow Service**

447

**B Examples (Informative)**

**Commented [JM24]:** Q to WG06: What examples do you think would be useful to add?  
•HTTP calls/messages & replies  
•Proxy flows  
•...

448

...

449

**B.X1 Scheduled Modality Workflow**

450

**B.X1.1 Get Applicable Workitems**

451

As on git.

452

**B.X1.2 Create Workitem Report**

453

454

**B.X1.3 Report Progress**

455

456

**B.X1.4 Complete Workitem**

457

458

**B.X2 Bi-directional Proxy for Modality Workflow**

459

460

**B.X3 Notifications in Modality Workflow**

461

462

463 **Update Table H-1 Resources and Methods: add new resources and methods for Modality**  
464 **Workflow Service**

465 **H Capabilities Description**

Service	Resource	Transactions	Reference
...			
Storage Commitment Requests (see Section 13.1.1)			
	commitment-requests	Request	Section 13.4
		Result Check	Section 13.5
<b>Modality Workflow Service (see Section X.1.1)</b>			
	<u>modality-scheduled-procedure-steps</u>	<b>Search</b>	<b>Section X.4</b>
	<u>modality-performed-procedure-steps</u>	<b>Create</b>	<b>Section X.5</b>
		<b>Update</b>	<b>Section X.6</b>
		<b>Retrieve</b>	<b>Section X.7</b>
		<b>Subscribe</b>	<b>Section X.8</b>
		<b>Unsubscribe</b>	<b>Section X.9</b>

466

467

**Changes to NEMA Standards Publications PS 3.2**

468

**Add new section to N.1.3 for Modality Workflow Service**

469

**N.1 Overview**

470

...

471

**N.1.3 DICOM Web Services**

472

...

473

**N.1.3.X Modality Workflow Service**

474

Table N.1.3.X-1 lists details on the support of the Modality Workflow Service.

475

*[Complete Table N.1.3.X-1 to indicate support for the Modality Workflow Web Service]*

476

**Table N.1.3.X-1 Modality Workflow Service**

Service	Transaction	Resource	User Agent	Origin Server
Modality Workflow Service	<i>Search</i>	modality-scheduled-procedure-steps		
	<i>Create</i>	modality-performed-procedure-steps		
	<i>Update</i>			
	<i>Retrieve</i>			
	<i>Subscribe</i>			
	<i>Unsubscribe</i>			

477

478

**Add a new subsection on the Modality Workflow Service to section N.5.3 Supported DICOM Web Services**

479

480

**N.5 Service and Interoperability Description**

481

...

482

**N.5.3 Supported DICOM Web Services**

483

...

484

**N.5.3.X Modality Workflow Web Service**

485

This section provides details regarding the Modality Workflow Web Service. For an overview of supported Transactions and resources see Table N.1.3.X-1 Modality Workflow Service.

486

487

**N.5.3.X.1 Search Transaction – Modality Workflow Service**

488

*[If your system does not support the Modality Workflow Web Service Search Transaction, you can indicate that this section is not applicable and remove the subsections below.]*

489

490

**N.5.3.X.1.1 User Agent**

491

The Search Transaction user agent can request resources listed in Table N.5.3.X.1.1-1.

492

*[List the supported resources for your Modality Worklist Search Transaction user agent. Remove the non-supported resources rows. Fill in information on your implementation in the Comments column when necessary.]*

493

494

**Table N.5.3.X.1.1-1: Resources for Search Transaction – User Agent**

Resource	Comments
----------	----------

	See Resources path in table X.1.1-1 in PS3.18
<i>modality-scheduled-procedure-steps</i>	

495

496 The Search Transaction user agent supports Header Fields listed in Table N.5.3.X.1.1-2.

497 [List the supported Header Fields and their supported Values. Fill in information on your implementation in the  
498 "Comments" column when necessary.]

499 **Table N.5.3.X.1.1-2: Header Fields for Search Transaction – User Agent**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json (Default)</i> <i>application/dicom+xml</i> <i>multipart/related;</i> <i>type="application/dicom+json"</i> <i>multipart/related;</i> <i>type="application/dicom+xml"</i>	
Content-Length		[If Content-Encoding is not present]
Content-Encoding		[If Content-Length is not present]

500

501 **N.5.3.X.1.2 Origin Server**

502 The Search Transaction origin server receives GET requests to search for modality scheduled procedure  
503 steps.

504 The user agent specifies the Target Resource as part of the URI and the acceptable Content-Type in the  
505 HTTP header (i.e. XML or JSON).

506 The URI is composed by a Base URI: see Base URI for the origin server in Section N.6.3.X.

507 The Request Transaction origin server supports resources listed in Table N.5.3.X.1.2-1.

508 [Fill in information on your implementation in the Comments column when necessary.]

509 **Table N.5.3.X.1.2-1: Resources for Search Transaction – Origin Server**

Resource	Comments
	See Resources path in Table X.1.1-1 in PS3.18
<i>modality-scheduled-procedure-steps</i>	

510

511 The Search Transaction origin server supports Header Fields listed in Table N.5.3.X.1.2-2.

512 [List the supported Header Fields and their supported Values. Fill in information on your implementation in the  
513 "Comments" column when necessary.]

514 **Table N.5.3.X.1.2-2: Header Fields for Search Transaction – Origin Server**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json</i> <i>application/dicom+xml</i> <i>multipart/related;</i> <i>type="application/dicom+json"</i>	

	<i>multipart/related; type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

515

516 **N.5.3.X.2 Create Transaction – Modality Workflow Service**

517 *[If your system does not support the Modality Workflow Web Service Create Transaction, you can indicate*  
518 *that this section is not applicable and remove the subsections below.]*

519 **N.5.3.X.2.1 User Agent**

520 The Create Transaction user agent can request to create resources listed in Table N.5.3.X.2.1-1.

521 *[List the supported resources for your Modality Worklist Create Transaction user agent. Remove the non-supported*  
522 *resources rows. Fill in information on your implementation in the Comments column when necessary.]*

523 **Table N.5.3.X.2.1-1: Resources for Create Transaction – User Agent**

Resource	Comments
	See Resources path in table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

524

525 The Create Transaction user agent supports Header Fields listed in Table N.5.3.X.2.1-2.

526 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
527 *"Comments" column when necessary.]*

528 **Table N.5.3.X.2.1-2: Header Fields for Create Transaction – User Agent**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json (Default)</i>  <i>application/dicom+xml</i>  <i>multipart/related; type="application/dicom+json"</i>  <i>multipart/related; type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

529

530 **N.5.3.X.2.2 Origin Server**

531 The Create Transaction origin server receives PUT requests to create a modality performed procedure  
532 step.

533 The user agent specifies the Target Resource as part of the URI and the acceptable Content-Type in the  
534 HTTP header (i.e. XML or JSON).

535 The URI is composed by a Base URI: see Base URI for the origin server in Section N.6.3.X.

536 The Create Transaction origin server supports resources listed in Table N.5.3.X.2.2-1.

537 *[Fill in information on your implementation in the Comments column when necessary.]*

538 **Table N.5.3.X.2.2-1: Resources for Create Transaction – Origin Server**

Resource	Comments
	See Resources path in Table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

539

540 The Create Transaction origin server supports Header Fields listed in Table N.5.3.X.2.2-2.

541 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
542 *"Comments" column when necessary.]*

543 **Table N.5.3.X.2.2-2: Header Fields for Create Transaction – Origin Server**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json</i>  <i>application/dicom+xml</i>  <i>multipart/related;</i> <i>type="application/dicom+json"</i>  <i>multipart/related;</i> <i>type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

544

545 **N.5.3.X.3 Update Transaction – Modality Workflow Service**

546 *[If your system does not support the Modality Workflow Web Service Update Transaction, you can*  
547 *indicate that this section is not applicable and remove the subsections below.]*

548 **N.5.3.X.3.1 User Agent**

549 The Update Transaction user agent can request to update resources listed in Table N.5.3.X.3.1-1.

550 *[List the supported resources for your Modality Worklist Update Transaction user agent. Remove the non-supported*  
551 *resources rows. Fill in information on your implementation in the Comments column when necessary.]*

552 **Table N.5.3.X.3.1-1: Resources for Update Transaction – User Agent**

Resource	Comments
	See Resources path in table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

553

554 The Update Transaction user agent supports Header Fields listed in Table N.5.3.X.3.1-2.

555 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
556 *"Comments" column when necessary.]*

557 **Table N.5.3.X.3.1-2: Header Fields for Update Transaction – User Agent**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json (Default)</i>  <i>application/dicom+xml</i>  <i>multipart/related;</i> <i>type="application/dicom+json"</i>	

	<i>multipart/related; type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

558

559 **N.5.3.X.3.2 Origin Server**

560 The Update Transaction origin server receives PATCH requests to update a modality performed  
561 procedure step.

562 The user agent specifies the Target Resource as part of the URI and the acceptable Content-Type in the  
563 HTTP header (i.e. XML or JSON).

564 The URI is composed by a Base URI: see Base URI for the origin server in Section N.6.3.X.

565 The Update Transaction origin server supports resources listed in Table N.5.3.X.3.2-1.

566 *[Fill in information on your implementation in the Comments column when necessary.]*

567 **Table N.5.3.X.3.2-1: Resources for Update Transaction – Origin Server**

Resource	Comments
	See Resources path in Table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

568

569 The Update Transaction origin server supports Header Fields listed in Table N.5.3.X.3.2-2.

570 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
571 *"Comments" column when necessary.]*

572 **Table N.5.3.X.3.2-2: Header Fields for Update Transaction – Origin Server**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json</i>  <i>application/dicom+xml</i>  <i>multipart/related; type="application/dicom+json"</i>  <i>multipart/related; type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

573

574 **N.5.3.X.4 Retrieve Transaction – Modality Workflow Service**

575 *[If your system does not support the Modality Workflow Web Service Retrieve Transaction, you can*  
576 *indicate that this section is not applicable and remove the subsections below.]*

577 **N.5.3.X.4.1 User Agent**

578 The Retrieve Transaction user agent can request to retrieve resources listed in Table N.5.3.X.4.1-1.

579 *[List the supported resources for your Modality Workflow Retrieve Transaction user agent. Remove the non-supported*  
580 *resources rows. Fill in information on your implementation in the Comments column when necessary.]*

581 **Table N.5.3.X.4.1-1: Resources for Retrieve Transaction – User Agent**

Resource	Comments
	See Resources path in table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

582

583 The Retrieve Transaction user agent supports Header Fields listed in Table N.5.3.X.4.1-2.

584 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
585 *"Comments" column when necessary.]*

586 **Table N.5.3.X.4.1-2: Header Fields for Retrieve Transaction – User Agent**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json (Default)</i> <i>application/dicom+xml</i> <i>multipart/related;</i> <i>type="application/dicom+json"</i> <i>multipart/related;</i> <i>type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

587

588 **N.5.3.X.4.2 Origin Server**

589 The Retrieve Transaction origin server receives GET requests to retrieve a modality performed procedure  
590 step.

591 The user agent specifies the Target Resource as part of the URI and the acceptable Content-Type in the  
592 HTTP header (i.e. XML or JSON).

593 The URI is composed by a Base URI: see Base URI for the origin server in Section N.6.3.X.

594 The Retrieve Transaction origin server supports resources listed in Table N.5.3.X.4.2-1.

595 *[Fill in information on your implementation in the Comments column when necessary.]*

596 **Table N.5.3.X.4.2-1: Resources for Retrieve Transaction – Origin Server**

Resource	Comments
	See Resources path in Table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

597

598 The Retrieve Transaction origin server supports Header Fields listed in Table N.5.3.X.4.2-2.

599 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
600 *"Comments" column when necessary.]*

601 **Table N.5.3.X.4.2-2: Header Fields for Retrieve Transaction – Origin Server**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json</i> <i>application/dicom+xml</i>	

	<i>multipart/related; type="application/dicom+json"</i>	
	<i>multipart/related; type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

602

603 **N.5.3.X.5 Subscribe Transaction – Modality Workflow Service**

604 *[If your system does not support the Modality Workflow Web Service Subscribe Transaction, you can*  
605 *indicate that this section is not applicable and remove the subsections below.]*

606 **N.5.3.X.5.1 User Agent**

607 The Subscribe Transaction user agent can request resources listed in Table N.5.3.X.5.1-1.

608 *[List the supported resources for your Modality Worklist Subscribe Transaction user agent. Remove the non-*  
609 *supported resources rows. Fill in information on your implementation in the Comments column when necessary.]*

610 **Table N.5.3.X.5.1-1: Resources for Subscribe Transaction – User Agent**

Resource	Comments
	See Resources path in table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

611

612 The Subscribe Transaction user agent supports Header Fields listed in Table N.5.3.X.5.1-2.

613 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
614 *"Comments" column when necessary.]*

615 **Table N.5.3.X.5.1-2: Header Fields for Subscribe Transaction – User Agent**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json (Default)</i>  <i>application/dicom+xml</i>  <i>multipart/related; type="application/dicom+json"</i>  <i>multipart/related; type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

616

617 **N.5.3.X.5.2 Origin Server**

618 The Subscribe Transaction origin server receives POST requests to subscribe to changes of a modality  
619 performed procedure step.

620 The user agent specifies the Target Resource as part of the URI and the acceptable Content-Type in the  
621 HTTP header (i.e. XML or JSON).

622 The URI is composed by a Base URI: see Base URI for the origin server in Section N.6.3.X.

623 The Subscribe Transaction origin server supports resources listed in Table N.5.3.X.5.2-1.

624 *[Fill in information on your implementation in the Comments column when necessary.]*

625 **Table N.5.3.X.5.2-1: Resources for Subscribe Transaction – Origin Server**

Resource	Comments
	See Resources path in Table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

626

627 The Subscribe Transaction origin server supports Header Fields listed in Table N.5.3.X.5.2-2.

628 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
629 *“Comments” column when necessary.]*

630 **Table N.5.3.X.5.2-2: Header Fields for Retrieve Transaction – Origin Server**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json</i>  <i>application/dicom+xml</i>  <i>multipart/related;</i> <i>type="application/dicom+json"</i>  <i>multipart/related;</i> <i>type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

631

632 **N.5.3.X.6 Unsubscribe Transaction – Modality Workflow Service**

633 *[If your system does not support the Modality Workflow Web Service Unsubscribe Transaction, you can*  
634 *indicate that this section is not applicable and remove the subsections below.]*

635 **N.5.3.X.6.1 User Agent**

636 The Unsubscribe Transaction user agent can request resources listed in Table N.5.3.X.6.1-1.

637 *[List the supported resources for your Modality Worklist Unsubscribe Transaction user agent. Remove the non-*  
638 *supported resources rows. Fill in information on your implementation in the Comments column when necessary.]*

639 **Table N.5.3.X.6.1-1: Resources for Unsubscribe Transaction – User Agent**

Resource	Comments
	See Resources path in table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

640

641 The Unsubscribe Transaction user agent supports Header Fields listed in Table N.5.3.X.6.1-2.

642 *[List the supported Header Fields and their supported Values. Fill in information on your implementation in the*  
643 *“Comments” column when necessary.]*

644 **Table N.5.3.X.6.1-2: Header Fields for Unsubscribe Transaction – User Agent**

Header Field	Supported Values	Comments
--------------	------------------	----------

Content-Type	<i>application/dicom+json (Default)</i> <i>application/dicom+xml</i> <i>multipart/related;</i> <i>type="application/dicom+json"</i> <i>multipart/related;</i> <i>type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

645

**N.5.3.X.6.2 Origin Server**

646

The Unsubscribe Transaction origin server receives DELETE requests to unsubscribe from changes of a modality performed procedure step.

647

The user agent specifies the Target Resource as part of the URI and the acceptable Content-Type in the HTTP header (i.e. XML or JSON).

649

The URI is composed by a Base URI: see Base URI for the origin server in Section N.6.3.X.

650

The Unsubscribe Transaction origin server supports resources listed in Table N.5.3.X.6.2-1.

651

*[Fill in information on your implementation in the Comments column when necessary.]*

652

**Table N.5.3.X.6.2-1: Resources for Subscribe Transaction – Origin Server**

Resource	Comments
	See Resources path in Table X.1.1-1 in PS3.18
<i>modality-performed-procedure-steps</i>	

653

The Unsubscribe Transaction origin server supports Header Fields listed in Table N.5.3.X.6.2-2.

655

*[List the supported Header Fields and their supported Values. Fill in information on your implementation in the "Comments" column when necessary.]*

656

**Table N.5.3.X.6.2-2: Header Fields for Retrieve Transaction – Origin Server**

Header Field	Supported Values	Comments
Content-Type	<i>application/dicom+json</i> <i>application/dicom+xml</i> <i>multipart/related;</i> <i>type="application/dicom+json"</i> <i>multipart/related;</i> <i>type="application/dicom+xml"</i>	
Content-Length		<i>[If Content-Encoding is not present]</i>
Content-Encoding		<i>[If Content-Length is not present]</i>

657

658

659

660

**Add a new subsection on the Modality Workflow Service to section N.7.3.3 DICOM Web Services.**

**N.7 Network and Media Communication Details**

...

**N.7.3 Status Codes**

...

**N.7.3.3 DICOM Web Services**

...

**N.7.3.3.X Modality Workflow Service**

**N.7.3.3.X.1 Search Transaction as Origin Server**

Table N.7.3.3.X.1-1 lists the Status Codes that an origin server supports for the Search Transaction of the Modality Workflow Service and the condition in which any of the listed Status Codes is sent.

*[Describe below the condition in which the application sends the specific Status Codes in the Search Transaction response as origin server.]*

**Table N.7.3.3.X.1-1: Status Codes of Origin Server for Search Transaction**

Status	Code	Condition
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
	503 (Service Unavailable)	

**N.7.3.3.X.2 Search Transaction as User Agent**

Table N.7.3.3.X.2-1 lists the Status Codes that a user agent supports for the Search Transaction of the Modality Workflow Service and defines the application behavior, when encountering any of the listed Status Codes.

*[Describe below the behavior of the application when it receives various Status Codes in the Search Transaction response]*

**Table N.7.3.3.X.2-1: Status Codes of User Agent for Search Transaction**

Status	Code	Behavior
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
*	Any other code	

684 **N.7.3.3.X.3 Create Transaction as Origin Server**

685 Table N.7.3.3.X.3-1 lists the Status Codes that an origin server supports for the Create Transaction of the  
686 Modality Workflow Service and the condition in which any of the listed Status Codes is sent.

687 *[Describe below the condition in which the application sends the specific Status Codes in the Create Transaction  
688 response as origin server.]*

689 **Table N.7.3.3.X.3-1: Status Codes of Origin Server for Create Transaction**

Status	Code	Condition
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
	503 (Service Unavailable)	

690

691 **N.7.3.3.X.4 Create Transaction as User Agent**

692 Table N.7.3.3.X.4-1 lists the Status Codes that a user agent supports for the Create Transaction of the  
693 Modality Workflow Service and defines the application behavior, when encountering any of the listed  
694 Status Codes.

695 *[Describe below the behavior of the application when it receives various Status Codes in the Create Transaction  
696 response]*

697 **Table N.7.3.3.X.4-1: Status Codes of User Agent for Create Transaction**

Status	Code	Behavior
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
*	Any other code	

698

699 **N.7.3.3.X.5 Update Transaction as Origin Server**

700 Table N.7.3.3.X.5-1 lists the Status Codes that an origin server supports for the Update Transaction of the  
701 Modality Workflow Service and the condition in which any of the listed Status Codes is sent.

702 *[Describe below the condition in which the application sends the specific Status Codes in the Update Transaction  
703 response as origin server.]*

704 **Table N.7.3.3.X.5-1: Status Codes of Origin Server for Update Transaction**

Status	Code	Condition
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	

Status	Code	Condition
	503 (Service Unavailable)	

705

706 **N.7.3.3.X.6 Update Transaction as User Agent**

707 Table N.7.3.3.X.6-1 lists the Status Codes that a user agent supports for the Update Transaction of the  
708 Modality Workflow Service and defines the application behavior, when encountering any of the listed  
709 Status Codes.

710 *[Describe below the behavior of the application when it receives various Status Codes in the Update Transaction  
711 response]*

712 **Table N.7.3.3.X.6-1: Status Codes of User Agent for Update Transaction**

Status	Code	Behavior
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
*	Any other code	

713

714 **N.7.3.3.X.7 Retrieve Transaction as Origin Server**

715 Table N.7.3.3.X.7-1 lists the Status Codes that an origin server supports for the Retrieve Transaction of  
716 the Modality Workflow Service and the condition in which any of the listed Status Codes is sent.

717 *[Describe below the condition in which the application sends the specific Status Codes in the Retrieve Transaction  
718 response as origin server.]*

719 **Table N.7.3.3.X.7-1: Status Codes of Origin Server for Retrieve Transaction**

Status	Code	Condition
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
	503 (Service Unavailable)	

720

721 **N.7.3.3.X.8 Retrieve Transaction as User Agent**

722 Table N.7.3.3.X.8-1 lists the Status Codes that a user agent supports for the Retrieve Transaction of the  
723 Modality Workflow Service and defines the application behavior, when encountering any of the listed  
724 Status Codes.

725 *[Describe below the behavior of the application when it receives various Status Codes in the Retrieve Transaction  
726 response]*

727

**Table N.7.3.3.X.8-1: Status Codes of User Agent for Retrieve Transaction**

Status	Code	Behavior
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
*	Any other code	

728

**N.7.3.3.X.9 Subscribe Transaction as Origin Server**

730 Table N.7.3.3.X.9-1 lists the Status Codes that an origin server supports for the Subscribe Transaction of  
731 the Modality Workflow Service and the condition in which any of the listed Status Codes is sent.

732 [Describe below the condition in which the application sends the specific Status Codes in the Subscribe Transaction  
733 response as origin server.]

734

**Table N.7.3.3.X.9-1: Status Codes of Origin Server for Subscribe Transaction**

Status	Code	Condition
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
	503 (Service Unavailable)	

735

**N.7.3.3.X.10 Subscribe Transaction as User Agent**

737 Table N.7.3.3.X.2-1 lists the Status Codes that a user agent supports for the Subscribe Transaction of the  
738 Modality Workflow Service and defines the application behavior, when encountering any of the listed  
739 Status Codes.

740 [Describe below the behavior of the application when it receives various Status Codes in the Subscribe Transaction  
741 response]

742

**Table N.7.3.3.X.10-1: Status Codes of User Agent for Subscribe Transaction**

Status	Code	Behavior
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
*	Any other code	

743

**N.7.3.3.X.11 Unsubscribe Transaction as Origin Server**

745 Table N.7.3.3.X.11-1 lists the Status Codes that an origin server supports for the Unsubscribe  
746 Transaction of the Modality Workflow Service and the condition in which any of the listed Status Codes is  
747 sent.

748 [Describe below the condition in which the application sends the specific Status Codes in the Unsubscribe  
749 Transaction response as origin server.]

750 **Table N.7.3.3.X.11-1: Status Codes of Origin Server for Unsubscribe Transaction**

Status	Code	Condition
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
	503 (Service Unavailable)	

751

752 **N.7.3.3.X.12 Unsubscribe Transaction as User Agent**

753 Table N.7.3.3.X.12-1 lists the Status Codes that a user agent supports for the Unsubscribe Transaction of  
754 the Modality Workflow Service and defines the application behavior, when encountering any of the listed  
755 Status Codes.

756 [Describe below the behavior of the application when it receives various Status Codes in the Unsubscribe  
757 Transaction response]

758 **Table N.7.3.3.X.12-1: Status Codes of User Agent for Unsubscribe Transaction**

Status	Code	Behavior
Success	200 (OK)	TO BE FILLED IN
	202 (Accepted)	
Failure	400 (Bad Request)	
	409 (Conflict)	
*	Any other code	

759

760

### Changes to NEMA Standards Publications PS 3.4

761 **Update section F.9 with a note of how an SCP knows what SCUs to notify about changes**

762 **F.9**

763 ...

764

765 Note

766 ...

767 2. The terms IS and PACS used in the previous example are provided for clarification purposes only. This  
768 document does not define nor constrain the purpose or role of any IS, PACS or acquisition Application Entity  
769 conforming to this Service Class Specification.

770 3. **It is beyond the scope of the specification to define how the SCP knows about what SCUs to notify about**  
771 **changes. A conceivable way would be to make this a configuration item of the SCP.**

772 ...

773

774

**Changes to NEMA Standards Publications PS 3.6**

775

*There are no new attributes to be added to table 6-1 of section 6.*

776

**Changes to NEMA Standards Publications PS 3.15**

777

*There are no new attributes to be added to table E.1-1 of annex E.*

778