DICOM Correction Proposal

|  |  |
| --- | --- |
| STATUS | New |
| Date of Last Update | 2016/06/01 |
| Person Assigned | Jim Philbin (jfphilbin@gmail.com) |
| Submitter Name | Jim Philbin (jfphilbin@gmail.com) |
| Submission Date | 2016/04/21 |

|  |
| --- |
| Correction Number CPXXXX |
| Log Summary: Update RESTful UPS to be more RESTful |
| Name of Standard  PS3.18 2016a |
| Rationale for Correction:  Make UPS more RESTful with the following changes:   1. Rename transactions of the from <verb>UPS to <verb> Workitem.    1. CreateUPS -> Create Workitem   Resource: /worklist{/uid}  The current definition has the user agent provide the Affected SOP Instance UID in the target URI. If the user agent supplies the UID it should provide it in the SOP Instance; however, it is safer, and more RESTful, to have the origin server create it. Rather than returning the UID, the origin server should return a URL in the form: /worklist/{uid} that references the created Workitem.  The Affected SOP Instance UID is no longer a query parameter, and is not required in the dataset in the payload.  Returns the Workitem URL in the Location header field. Might also return a different URL in the Content-Location header field.  ~~Open Issue: should a single transaction be able to create more than one workitem?~~   * 1. RetrieveUPS -> Retrieve Workitem   2. UpdateUPS ->      1. Update Workitem (POST)   Payload contains only attributes to be added or modified. (what about deleted?)   * + 1. Replace Workitem (PUT) (Open)   Payload contains the entire workitem modified as desired, which also allows deletion.  These two transactions use the Workitem URL (/workitem/{uid}) resource when the workitem is in the Scheduled state, and the Claim URL when it is the Claimed state.  Returns the Workitem URL in the Location header field. Might also return a different URL in the Content-Location header field.  No Transaction UID is necessary.   * 1. SearchForUPS -> Search Worklist   Uses same parameters as Studies Search   1. Remove ChangeUPS State and replace with:    1. Claim Workitem   POST /worklist/{workitem}/claim -> claim URL in Location  Which on success now returns a new opaque URL that is used to Complete or Cancel the claimed workitem, only the claimer has this URL.  The payload of this transaction is now empty   * 1. Complete Workitem   POST /worklist/{claim}/complete (Note: claim = Transaction UID)  Requires the Claim URL only. No query parameters  The payload may contain an Update (POST) payload or a Replace (PUT) payload   * 1. Cancel Workitem, which handles both (claim      1. State change   /worklist/{claim}/cancel   * + 1. Request Cancellation   /worklist/{workitem}/cancel  Requests that the origin server cancel.  The payload may contain attributes that contain the reason for cancellation |
| Correction Wording: |
|  |

*Update PS3.18, Table 6.5.8-2as follows:*

**Changes**

* + - 1. Create Workitem transaction has the following changes
         1. The Affected Sop Instance query parameters is replace by an optional {/uid} resource. This corresponds more closely with the resource definitions used in other RS services.

**CPXXXX Update to UPS RS Worklist Service**

**The Worklist Service defines a RESTful interface to the Unified Procedure Step Service SOP Classes defined in** [**PS3.3**](file:///C:\Users\jfp\Documents\DICOM\WG-27\Supplements\Re-Doc%20Part%2018\part03.pdf#PS3.3)**, Section XX and** [**PS3.4**](file:///C:\Users\jfp\Documents\DICOM\WG-27\Supplements\Re-Doc%20Part%2018\part04.pdf#PS3.4)**, Section XX.**

**The Worklist Service manages a single Worklist containing a sequence of Workitems. User agents can create, retrieve, update, claim, complete, cancel, and search for Workitems in the Worklist.**

**[Note: FHIR:** <https://hl7-fhir.github.io/task.html>, https://hl7-fhir.github.io/operations.html]

**Things to be noted:**

* **The Worklist Service does not support Bulkdata. All Instances transmitted contain the entire dataset.**

Create Workitem Modifications

* Takes an optional {workitem} resource that specifies the Affected SOP Instance UID of the Payload, if any
* The Workitem is not required to specify an Affected SOP Instance UID. If it is not specified, the origin server shall create it and return it in the Location header field of the response.
* The response has a Location header field containing the URL of the created resource. The Content-Location header field is optional.

Retrieve Workitem Modifications

* The workitem URL is opaque and does not need to contain a UID; however, if the Worklist Service is a proxy, the origin server should create and include a Affected SOP Instance UID in the Workitem.

Update Workitem Modifications

* The Target URI is either the Workitem URI or the Claimed URI
* The transaction UID is not used, but should be supported by a proxy server.

**6.9 UPS-RS Worklist Service**

This DICOM Web Service defines a RESTful interface to the UPS SOP Classes (see [PS3.3](file:///C:\Users\admin\Downloads\part03.pdf#PS3.3) and [PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#PS3.4)). It consists of the following **trans**action types:

1. Create**~~UPS~~ Workitem**

This **transaction ~~action~~** requests the creation of a UPS Instance on the Origin-Server. It corresponds to the UPS DIMSE N-CREATE operation.

1. Update**~~UPS~~ Workitem**

This **transaction ~~action~~** sets the attributes of a UPS Instance managed by the Origin-Server. It corresponds to the UPS DIMSE N-SET operation.

1. Search**~~ForUPS~~ Worklist**

This **transaction**action searches for UPS Instances known to the Origin-Server. It corresponds to the UPS DIMSE C-FIND operation.

1. Retrieve**~~UPS~~ Workitem**

This **transaction**action retrieves a UPS Instances. It corresponds to the UPS DIMSE N-GET operation.

1. **~~ChangeUPSState~~**

**~~This action sets the state of a UPS Instance managed by the Origin-Server. It corresponds to the UPS DIMSE N-ACTION operation "Change UPS State".~~**

1. **Claim Workitem**
2. **Complete Workitem**
3. **Cancel Workitem**
4. Request**~~UPS~~** **Workitem** Cancellation

This **transaction**action requests the cancellation of a UPS Instance managed by the Origin-Server. It corresponds to the UPS DIMSE N-ACTION operation "Request UPS Cancel".

1. ~~CreateSubscription~~ Subscribe

This **transaction**action subscribes to a UPS Instance or the Global Worklist managed by the Origin-Server. It corresponds to the UPS DIMSE N-ACTION operation "Subscribe to Receive UPS Event Reports".

1. **~~SuspendGlobalSubscription~~**

**~~This action suspends an existing subscription to the Global Worklist managed by the Origin-Server. It corresponds to the UPS DIMSE N-ACTION operation "Suspend Global Subscription".~~**

1. **~~DeleteSubscription~~**

**~~This action cancels an existing subscription to a UPS Instance or the Global Worklist managed by the Origin-Server. It corresponds to the UPS DIMSE N-ACTION operation "Unsubscribe from Receiving UPS Event Reports".~~**

1. **Unsubscribe**

**This transaction deletes the target subscription, and no future Event Notifications related to the Workitem will be sent to the subscription holder.**

1. OpenEventChannel

This **transaction**action initiates a WebSocket connection to allow the User-Agent to start receiving Event Report messages.

1. SendEventReport

This **transaction**action sends an Event Report using an open WebSocket connection. It corresponds to the UPS DIMSE N-EVENT-REPORT operation.

An Origin-Server shall support all of the above **transaction**action types.

The requirements for a UPS-RS Origin-Server that is also a Unified Worklist and Procedure Step SCP are described in [Section CC.1 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.1)

**~~Table 6.9-1. UPS Interface Mapping~~**

| **~~Action Type~~** | **~~Section~~** | **~~Method & Resource~~** |
| --- | --- | --- |
| **~~CreateUPS~~** | **~~[6.9.1](#sect_6_9_1)~~** | **~~POST {+SERVICE}/workitems{?AffectedSOPInstanceUID}~~** |
| **~~UpdateUPS~~** | **~~[6.9.2](#sect_6_9_2)~~** | **~~POST {+SERVICE}/workitems/{UPSInstanceUID}{?transaction}~~** |
| **~~SearchForUPS~~** | **~~[6.9.3](#sect_6_9_3)~~** | **~~GET {+SERVICE}/workitems{?query\*}~~** |
| **~~RetrieveUPS~~** | **~~[6.9.4](#sect_6_9_4)~~** | **~~GET {+SERVICE}/workitems/{UPSInstanceUID}~~** |
| **~~ChangeUPSState~~** | **~~[6.9.5](#sect_6_9_5)~~** | **~~PUT {+SERVICE}/workitems/{UPSInstanceUID}/state~~** |
| **~~RequestUPSCancellation~~** | **~~[6.9.6](#sect_6_9_6)~~** | **~~POST {+SERVICE}/workitems/{UPSInstanceUID}/cancelrequest~~** |
| **~~CreateSubscription~~** | **~~[6.9.7](#sect_6_9_7)~~** | **~~POST {+SERVICE}/workitems/{UPSInstanceUID}/subscribers/{AETitle}{?deletionlock}~~**  **~~POST {+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5/~~**  **~~subscribers/{AETitle}{?deletionlock}~~**  **~~POST {+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5.1/~~**  **~~subscribers/{AETitle}{?deletionlock,query\*}~~** |
| **~~SuspendGlobalSubscription~~** | **~~[6.9.8](#sect_6_9_8)~~** | **~~POST {+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5/~~**  **~~subscribers/{AETitle}/suspend~~**  **~~POST {+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5.1/~~**  **~~subscribers/{AETitle}/suspend~~** |
| **~~DeleteSubscription~~** | **~~[6.9.9](#sect_6_9_9)~~** | **~~DELETE {+SERVICE}/workitems/{UPSInstanceUID}/~~**  **~~subscribers/{AETitle}~~** |
| **~~OpenEventChannel~~** | **~~[6.9.10](#sect_6_9_10)~~** | **~~GET {+WSSERVICE}/subscribers/{AETitle}~~** |
| **~~SendEventReport~~** | **~~[6.9.11](#sect_6_9_11)~~** | **~~N/A~~** |

**Table 11.2-2 shows the method, resource, request and response payloads and the corresponding DIMSE action for the transactions defined by this service. The DIMSE column contains links to the corresponding DIMSE service specifications in PS3.3.**

Table 11.2-2: Transactions and Characteristics

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Transaction | Method | Resource | Success Payload | | DIMSE |
| Request | Response |
| **Create Workitem** | **POST** | **/worklist{/workitem}** | **workitem** | **N/A** | **N-CREATE** |
| **Retrieve Workitem** | **GET** | **/worklist/{workitem}** | **N/A** | **workitem** | **N-GET** |
| **Update Workitem** | **POST / PUT** | **/worklist/{workitem}**  **/worklist/{claim}** | **dataset / workitem** | **N/A** | **N-SET** |
| **Claim WorkItem** | **GET** | **/worklist/{workitem}/claim** | **N/A N/A** | **workitem** | **N-ACTION** |
| **Complete Workitem** | **POST / PUT** | **/worklist/{claim}/complete** | **dataset / workitem** | **N/A** | **N-ACTION** |
| **Cancel Workitem** | **POST / PUT** | **/worklist/{claim}/cancel** | **dataset / workitem** | **N/A** | **N-ACTION** |
| **Request Workitem Cancellation** | **POST** | **/worklist/{workitem}/cancel** | **dataset / workitem** | **N/A** | **N-ACTION** |
| **Search Worklist** | **GET** | **/worklist{?parameters\*}** | **parameters** | **results** | **C-FIND** |
| ***Notification Sub-Service*** | | | | | |
| **Subscribe** | **POST** | **/worklist/subscriptions{/workitem}{?retain}{&filter\*}** | **N/A** | **N/A** | **N-ACTION** |
| **Unsubscribe** | **DELETE** | **/{subscription}** | **N/A** | **N/A** | **N-ACTION** |

The Origin-Server shall comply with all requirements placed on the SCP for the corresponding services in [Annex CC “Unified Procedure Step Service and SOP Classes (Normative)” in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#chapter_CC).

**6.9.1 ~~CreateUPS~~ Create Workitem Transaction**

This resource allows a User-Agent to instruct an Origin-Server to create a UPS instance.

**6.9.1.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems**{/uid}** **~~{?AffectedSOPInstanceUID}~~**

where

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* **~~{AffectedSOPInstanceUID}~~ {/uid}** **optionally** specifies the SOP Instance UID of the UPS Instance to be created
* Method
* POST
* Headers
* Content-Type - The representation scheme being posted to the RESTful service. The types allowed for this request header are as follows:
* application/dicom+xml

Specifies that the post is DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML metadata. See [Section 6.9.1.1.1](#sect_6_9_1_1_1).

* application/json

Specifies that the post is DICOM [PS3.18](#PS3_18) JSON metadata. See [Section 6.9.1.1.1](#sect_6_9_1_1_1).

* **~~The request body shall convey a single Unified Procedure Step Instance. The instance shall comply with all requirements in the Req. Type N-CREATE column of~~** [**~~Table CC.2.5-3 in PS3.4~~**](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.5-3)**~~.~~**

**The payload shall have a single part, containing a single Workitem encoded in the media type specified in the Content-Type header field. The payload shall contain all data elements to be stored, with the possible exception of the Affected SOP Instance UID (0000,1000). If no Affected SOP Instance UID is specified, the origin server will create and assign a new UID to the created Workitem.**

**The Workitem shall comply with all instance requirements in the Req. Type N-CREATE column of Table CC.2.5-3 in PS3.4.**

**6.9.1.1.1 Request Message**

The Request Message has a single part body.

* Content-Type:
* application/dicom+xml
* application/**dicom+**json
* The request body contains all attributes to be stored **~~in either DICOM~~** [**~~PS3.19~~**](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) **~~XML or DICOM JSON~~**. Any binary data contained in the message shall be inline.

**6.9.1.2 Behavior**

**~~The Origin-Server shall create and maintain UPS instances as instructed by CreateUPS requests and as specified by the SCP behavior in~~** [**~~Section CC.2.5.3 in PS3.4~~**](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.5.3)**~~.~~**

**If the target resource does not specify a UID and no Affected SOP Instance UID is contained in the Workitem in the request payload, the origin server shall create a new UID for the Workitem, and inserts it into the Affected SOP Instance UID of the Workitem. It then inserts the Workitem into the Worklist in the Scheduled state and returns a URI that references the newly created Workitem in the Location header field of the response.**

**The origin server shall create and maintain the Workitem as specified in the request, and as specified by the SCP behavior defined in** [**PS3.4 Section CC.2.5.3**](file:///C:\Users\jfp\Documents\DICOM\WG-27\Supplements\Re-Doc%20Part%2018\part04.pdf#sect_CC.2.5.3)**.**

The Origin-Server shall return the HTTP/1.1 Status Line applicable to the associated request.

**6.9.1.3 Response**

**~~The Origin-Server shall return an HTTP/1.1 response message.~~**

**The response has the following format:**

**version SP status-code SP reason-phrase CRLF**

**Location: url CRLF**

**\*(header-field CRLF)**

**CRLF**

**[status-details]**

**Where**

**url is a URI-reference to the resource corresponding to the newly created Workitem.**

**Typically, the URL is opaque defined by the origin server; however, if the origin server is a proxy service for a DIMSE service, then the origin server should create an Affected SOP Instance UID if the workitem does not have one.**

**6.9.1.3.1 Response Status Line**

If the Create request is successful, the Origin-Server shall return an **~~HTTP/1.1 "201 - Created"~~** **201 (Created)** response code.

If the request fails, the **~~Origin-Server~~** **origin server** shall return an appropriate failure status **~~line with a response~~** code from [Table 6.9.1-1](#table_6_9_1_1).

**Table 6.9.1-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 201 | Created | The UPS instance was created and the new resource can be retrieved at the Content-Location specified in the response |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the **~~query~~** **search** (e.g., an authenticated user with insufficient privileges). |
| 409 | Conflict | The UID of the posted UPS Instance corresponds to an existing UPS Instance. |
| 503 | Busy | Service is unavailable. |

**6.9.1.3.2 Response Headers**

If the request is successful, the **~~HTTP/1.1~~** response message shall include the following **~~HTTP/1.1~~** header **field**:

* Content-Location: {+WorkitemURL}

Where {+WorkitemURL} is the URL from which the created UPS Instance can be retrieved (see [Section 6.9.4](#sect_6_9_4))

If the **~~UPS instance~~** **Workitem** was created with modifications, the response message shall include the following **~~HTTP/1.1~~** header **field**:

* Warning: 299 {+SERVICE}: The **~~UPS~~** **Workitem** was created with modifications.

**6.9.1.3.3 Response Message Body**

The response message body shall be empty.

**6.9.2 Update~~UPS~~ Workitem**

**~~This resource supports the modification of attribute values of an existing UPS Instance.~~**

**The transaction modifies an existing Workitem, which shall be in the Scheduled or In-Progress state. If the Workitem is in the Scheduled state then the target URI is the normal URI of the Workitem; otherwise, the Workitem shall be in the In-Progress state and the target URI shall be the Claimed Workitem URI that was returned in the response to the Claim Transaction.**

**This transaction shall use the Conditional Update mechanism described in [RFC7232].**

**There are two forms of this transaction:**

1. **The first uses the POST method and the payload contains a dataset with the data elements to be updated.**
2. **The second uses the PUT method and the payload contains a workitem that replaces the existing Workitem in the Worklist.**

**The origin server shall process this request atomically, that is once the origin server begins processing the request, all of the updates shall be applied to the target Workitem, or the entire Workitem shall be replaced, before any other transaction may access the target Workitem.**

**6.9.2.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems/**~~{UPSInstanceUID}{?transaction}~~{workitem}**

where

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* **~~{UPSInstanceUID}~~** **{workitem}** is the UID of the **~~Unified Procedure Step Instance~~ workitem.**
* **~~{transaction} specifies the Transaction UID / Locking UID for the specified Unified Procedure Step Instance~~**

**~~If the UPS instance is currently in the SCHEDULED state, {transaction} shall not be specified.~~**

**~~If the UPS instance is currently in the IN PROGRESS state, {transaction} shall be specified.~~**

* Method
* POST
* Headers
* Content-Type - The representation scheme being posted to the RESTful service. The types allowed for this request header are as follows:
* application/dicom+xml

**~~Specifies that the post is DICOM~~** [**~~PS3.19~~**](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) **~~XML metadata. See~~** [**~~Section 6.9.2.1.1~~**](#sect_6_9_2_1_1)**~~.~~**

* application/**dicom+**json

**~~Specifies that the post is DICOM~~** [**~~PS3.18~~**](#PS3_18) **~~JSON metadata. See~~** [**~~Section 6.9.2.1.1~~**](#sect_6_9_2_1_1)**~~.~~**

* The request body describes changes to a single Unified Procedure Step Instance. It shall include all Attributes for which Attribute Values are to be set. The changes shall comply with all requirements described in [Section CC.2.6.2 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.6.2).
* Because the request will be treated as atomic (indivisible) and idempotent (repeat executions have no additional effect), all changes contained in the request shall leave the UPS instance in an internally consistent state.

**6.9.2.1.1 Request Message**

The Request Message has a single part body.

* Content-Type:
* application/dicom+xml
* application/**dicom+**json
* The request body contains all the attributes to be updated **~~in either DICOM~~** [**~~PS3.19~~**](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) **~~XML or DICOM~~** [**~~PS3.18~~**](#PS3_18) **~~JSON~~**. Any binary data contained in the message shall be inline.

**6.9.2.2 Behavior**

**~~The Origin-Server shall support the Attribute changes to the UPS instance specified by the User-Agent in the UpdateUPS request and as specified by the SCP behavior in~~** [**~~Section CC.2.6.3 in PS3.4~~**](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.6.3)**~~.~~**

**~~The Origin-Server shall return the HTTP/1.1 Status applicable to the associated request.~~**

**The origin server shall modify or replace the target Workitem as specified by the request, in a manner consistent with the SCP behavior specified in** [**PS3.4 Section CC.2.6.3**](file:///C:\Users\jfp\Documents\DICOM\WG-27\Supplements\Re-Doc%20Part%2018\part04.pdf#sect_CC.2.6.3)**.**

**6.9.2.3 Response**

**~~The Origin-Server shall return an HTTP/1.1 response message.~~**

**The response shall have the following syntax:**

**version SP status-code SP reason-phrase CRLF**

**Location: workitem CRLF**

**[Content-Location: workitem CRLF]**

**[ETag: entity-tag CRLF]**

**\*(header-field CRLF)**

**CRLF**

**[status-details]**

**6.9.2.3.1 Response Status Line**

If the **~~Set~~** request is successful, the **~~Origin-Server~~** **origin server** shall return an **~~HTTP/1.1 "200 - OK" response~~** **200 (OK) response** **~~code~~**.

If the request fails, the **~~Origin-Server~~** **origin server** shall return an appropriate failure status **~~line with a response~~** code from [Table 6.9.2-1](#table_6_9_2_1).

**Table 6.9.2-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 200 | OK | The UPS instance was updated |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the **~~query~~** **search** (e.g., an authenticated user with insufficient privileges). |
| 404 | Not found | The specified UPS Instance does not exist or is not managed by this Origin-Server. |
| 409 | Conflict | The request cannot be performed for one of the following reasons:   * the submitted request is inconsistent with the current state of the UPS Instance * the Transaction UID is missing * the Transaction UID is incorrect |
| 503 | Busy | Service is unavailable. |

**6.9.2.3.2 Response Headers**

If the UPS instance was updated but with modifications made by the Origin-Server, the response message shall include the following **~~HTTP/1.1~~** header **field**:

* Warning: 299 {+SERVICE}: The UPS was created with modifications.

If optional attributes were rejected, the response message shall include the following **~~HTTP/1.1~~** Warning header field:

* Warning: 299 {+SERVICE}: Requested optional Attributes are not supported.

If the request was rejected with an **~~HTTP/1.1~~** 409 **(Conflict)** status code, the response **~~message~~** shall include one of following messages encoded in an **~~HTTP/1.1~~** Warning header field describing the nature of the conflict:

* Warning: 299 {+SERVICE}: The **~~Transaction UID~~** **target Workitem UID** is missing.
* Warning: 299 {+SERVICE}: The **~~Transaction UID~~** **target Workitem UID** is **~~incorrect~~** **invalid**.
* Warning: 299 {+SERVICE}: The submitted request is inconsistent with the current state of the **~~UPS Instance~~ Workitem**.

**6.9.2.3.3 Response Message Body**

The response message body shall be empty.

**6.9.3 Search~~ForUPS~~ Worklist**

This resource returns a list of **~~UPS Instances~~** **Workitems** that match **the** specified search **~~query parameters~~** **Query Parameters** along with requested attributes for each Instance.

**6.9.3.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems/{?**~~query~~parameter**\*}

where

* {+SERVICE} is the base URL for the service. **~~This may be a combination of protocol (either HTTP or HTTPS), authority and path.~~**
* Method
* GET
* Headers
* Accept - The representation scheme in which the RESTful service is requested to return the results. The types allowed for this request header are as follows:
* multipart/related; type="application/dicom+xml"; boundary={messageBoundary}

Specifies that the results should be DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML metadata.

* application/**dicom+**json

Specifies that the results should be DICOM [PS3.18](#PS3_18) JSON metadata.

* Cache-control: no-cache (recommended)

If included, specifies that search results returned should be current and not cached.

* **~~{query}~~** **{?parameter\*}**
* {attributeID}={value}

0-n / {attributeID}={value} pairs allowed

* include**~~field~~**={attributeID} | all

0-n include**~~field~~** / {attributeID} pairs allowed, where "all" indicates that all attributes with values should be included for each response.

Each {attributeID} shall refer to an attribute of the Unified Procedure Step IOD (see [Section B.26.2 in PS3.3](file:///C:\Users\admin\Downloads\part03.pdf#sect_B.26.2)).

See [Section 6.7.1.1](#sect_6_7_1_1) for {attributeID} and {value} encoding rules

* fuzzy**~~matching~~**=true | false
* limit={maximumResults}
* offset={skippedResults}

**6.9.3.2 Behavior**

The Origin-Server shall perform a search according the requirements for the QIDO-RS services (see [Section 6.7.1.2](#sect_6_7_1_2)).

**6.9.3.2.1 Matching**

An Origin-Server shall support matching against all Unified Procedure Step Instance Attributes in [Table CC.2.5-3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.5-3) with a Match Key Type value of U, R or \*.

See [Section 6.7.1.2.1](#sect_6_7_1_2_1) for matching behavior.

**6.9.3.3 Response**

**~~The Origin-Server shall return an HTTP/1.1 response message.~~**

**6.9.3.3.1 Response Status Line**

If the **~~SearchForUPS~~** **Search Worklist** request is successful, the **~~Origin-Server~~** **origin server** shall return **~~an HTTP/1.1 "200 - OK"~~ 200 (OK)** response **~~code~~**.

If the request fails, the **~~Origin-Server~~** **origin server** shall return an appropriate failure status **~~line with a~~** response **~~code~~** from [Table 6.9.3-1](#table_6_9_3_1).

**Table 6.9.3-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 200 | OK | The **~~query~~** **search** completed and any matching results are returned in the message body. |
| 206 | Partial Content | Only some of the **~~query~~** **search** results were returned and the rest can be requested through the appropriate UPS-RS request. |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to perform the **~~query~~** **search** because the Service Provider cannot understand the query component. |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to perform the **~~query~~** **search** because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the **~~query~~** **search** (e.g., an authenticated user with insufficient privileges). |
| 413 | Request entity too large | The **~~query~~** **search** was too broad and a narrower **~~query~~** **search** or paging should be requested. |
| 503 | Busy | Service is unavailable. |

**6.9.3.3.2 ~~Query~~ Search Result Attribute**

For each matching UPS Instance, the Origin-Server shall return:

* All Unified Procedure Step Instance Attributes in [Table CC.2.5-3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.5-3) with a Return Key value of 1 and 2.
* All Unified Procedure Step Instance Attributes in [Table CC.2.5-3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.5-3) with a Return Key value of 1C for which the conditional requirements are met.
* All other Unified Procedure Step Instance Attributes passed as {attributeID} **~~query~~** **search** keys that are supported by the Origin-Server as matching or return attributes
* All other Unified Procedure Step Instance Attributes passed as "include**~~field~~**" **~~query~~** **search** values that are supported by the Origin-Server as return attributes.

**6.9.3.3.3 Response Message**

The response message body contains the results.

The format of the response message body shall contain one of the Media Types specified by the request Accept header field. An Origin-Server shall support all Media-Types allowed in the request.

**6.9.3.3.3.1 XML Response Message**

* Content-Type:
* multipart/related; type=application/dicom+xml
* The response is a multipart message body where each part is a DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML DicomNativeModel element containing the attributes for one matching UPS Instance (see [Section A.1 in PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#sect_A.1)).
* If there are no matching results, the message body shall be empty.
* Each part in the multipart body includes the following HTTP/1.1 headers:
* Content-Type: application/dicom+xml

**6.9.3.3.3.2 JSON Response Message**

* Content-Type:
* application/json
* The response is a DICOM JSON message containing a DICOM JSON property for each matching UPS Instance containing sub-properties describing the matching attributes for each UPS Instance (see [Section F.2](#sect_F_2)).
* If there are no matching results, the JSON message shall be empty.

**6.9.4 Retrieve~~UPS~~ Workitem**

This resource supports the retrieval of a UPS Instance.

**6.9.4.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems/**~~{UPSInstanceUID}~~ {workitem}**

where

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* **~~{UPSInstanceUID}~~** **{workitem}** is the **~~UID~~** **URL** of the **~~Unified Procedure Step~~** **workitem** Instance
* Method
* GET
* Headers
* Accept - The representation scheme in which the RESTful service is requested to return the result. The types allowed for this request header are as follows:
* application/dicom+xml

Specifies that the result should be DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML metadata.

* application/json

Specifies that the result should be DICOM [PS3.18](#PS3_18) JSON metadata.

* Cache-control: no-cache (recommended)

If included, specifies that results returned should be current and not cached.

**6.9.4.2 Behavior**

**~~The Origin-Server shall return, via the HTTP/1.1 response, the indicated Unified Procedure Step Instance to the User-Agent.~~**

**The origin server shall return the specified Workitem in the Selected Media Type. However, the returned Workitem shall not contain the Transaction UID (0008,1195) attribute of the Workitem, since that is an access lock that should only be known to the user agent that requested the lock.**

Note

The requirement for the Origin-Server to respond to GET requests for UPS Instances that have moved to the COMPLETED or CANCELED state is limited. See [Section CC.2.1.3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.1.3).

The Origin-Server shall not return the Transaction UID (0008,1195) Attribute. This is necessary to preserve this Attribute's role as an access lock.

**~~The Origin-Server shall return the HTTP/1.1 Response a Status Code applicable to the associated request.~~** **The response shall have an appropriate status code.** A Failure Code shall indicate that the Origin-Server has not returned the SOP Instance.

**6.9.4.3 Response**

**~~The Origin-Server shall return an HTTP/1.1 response message.~~**

**6.9.4.3.1 Response Status Line**

If the Retrieve request is successful, the Origin-Server shall return an HTTP/1.1 "200 - OK" response code.

If the request fails, the Origin-Server shall return an appropriate failure status line with a response code from [Table 6.9.4-1](#table_6_9_4_1).

**Table 6.9.4-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 200 | OK | The requested instance is returned. |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to perform the **~~query~~** **search** because the Service Provider cannot understand the query component. |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to perform the query because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the **~~query~~** **search** (e.g., an authenticated user with insufficient privileges). |
| 404 | Not found | The specified UPS Instance does not exist or is not managed by this Origin-Server. |
| 503 | Busy | Service is unavailable. |

**6.9.4.3.2 Response Message**

The response message body contains the results.

The format of the response message body shall contain one of the Media Types specified by the request Accept header field. An Origin-Server shall support all Media-Types allowed in the request.

**6.9.4.3.2.1 XML Response Message**

* Content-Type:
* application/dicom+xml
* The response contains a DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML DicomNativeModel element containing the attributes for the requested UPS Instance (see [Section A.1 in PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#sect_A.1)).

**6.9.4.3.2.2 JSON Response Message**

* Content-Type:
* application/json
* The response is a DICOM JSON array containing a DICOM JSON representation of the requested UPS Instance (see [Section F.2](#sect_F_2)).

**6.9.5 ChangeUPSState**

This resource supports the modification of the state of an existing UPS Instance.

**6.9.5.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems/{UPSInstanceUID}/state

where:

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* {UPSInstanceUID} is the UID of the Unified Procedure Step Instance
* Method
* PUT
* Headers
* Content-Type - The representation scheme being posted to the RESTful service. The types allowed for this request header are as follows:
* application/dicom+xml

Specifies that the post is DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML metadata. See [Section 6.9.5.1.1](#sect_6_9_5_1_1).

* application/json

Specifies that the post is DICOM [PS3.18](#PS3_18) JSON metadata. See [Section 6.9.5.1.1](#sect_6_9_5_1_1).

* The request body describes a state change to a single Unified Procedure Step Instance. It shall include all Attributes required for an SCU in [Table CC.2.1-1 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.1-1).

**6.9.5.1.1 Request Message**

The Request Message has a single part body.

* Content-Type:
* application/dicom+xml
* application/json
* The request body contains attributes in either DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML or DICOM [PS3.18](#PS3_18) JSON format.

**6.9.5.2 Behavior**

The Origin-Server shall support the state changes to the UPS instance specified in the request as described by the SCP behavior in [Section CC.2.1.3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.1.3).

After completing the ChangeUPSState request, the Origin-Server shall return the HTTP/1.1 Response Line applicable to the associated request.

**6.9.5.3 Response**

The Origin-Server shall return an HTTP/1.1 response message.

**6.9.5.3.1 Response Status Line**

If the State Change was successful, the Service shall return an HTTP/1.1 "200 - OK" response code.

If the State Change fails, the Service shall return an appropriate failure status line with a response code from [Table 6.9.5-1](#table_6_9_5_1).

**Table 6.9.5-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 200 | OK | The UPS instance was updated |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the **~~query~~** **search** (e.g., an authenticated user with insufficient privileges). |
| 404 | Not found | The specified UPS Instance does not exist or is not managed by this Origin-Server. |
| 409 | Conflict | The request cannot be performed for one of the following reasons:   * the submitted request is inconsistent with the current state of the UPS Instance * the Transaction UID is missing * the Transaction UID is incorrect |
| 503 | Busy | Service is unavailable. |

**6.9.5.3.2 Response Headers**

If the User-Agent specifies a Procedure Step State (0074,1000) attribute with a value of "CANCELED" and the UPS Instance is already in that state, the response message shall include the following HTTP/1.1 Warning header field:

* Warning: 299 {+SERVICE}: The UPS is already in the requested state of CANCELED.

If the User-Agent specifies a Procedure Step State (0074,1000) attribute with a value of "COMPLETED" and the UPS Instance is already in that state, the response message shall include the following HTTP/1.1 Warning header field:

* Warning: 299 {+SERVICE}: The UPS is already in the requested state of COMPLETED.

If the request was rejected with an HTTP/1.1 409 status code, the response message shall include one of following messages in the HTTP/1.1 Warning header field describing the nature of the conflict:

* Warning: 299 {+SERVICE}: The Transaction UID is missing.
* Warning: 299 {+SERVICE}: The Transaction UID is incorrect.
* Warning: 299 {+SERVICE}: The submitted request is inconsistent with the current state of the UPS Instance.

**6.9.5.3.3 Response Message Body**

The response message body shall be empty.

**6.9.6 RequestUPSCancellation**

This resource records a request that the specified UPS Instance be canceled.

**6.9.6.1 Request**

* Resource
* {+SERVICE}/workitems/{UPSInstanceUID}/cancelrequest

where:

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* {UPSInstanceUID} is the UID of the Unified Procedure Step Instance
* Method
* POST
* Headers
* Content-Type - The representation scheme being posted to the RESTful service. The types allowed for this request header are as follows:
* application/dicom+xml

Specifies that the post is DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML metadata. See [Section 6.9.5.1.1](#sect_6_9_5_1_1).

* application/json

Specifies that the post is DICOM [PS3.18](#PS3_18) JSON metadata. See [Section 6.9.5.1.1](#sect_6_9_5_1_1).

* The request body describes a request to cancel a single Unified Procedure Step Instance. The request body shall comply with all attribute requirements described in [Table CC.2.2-1 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.2-1).

**6.9.6.1.1 Request Message**

The Request Message has a single part body.

* Content-Type:
* application/dicom+xml
* application/json
* The request body contains attributes in either DICOM [PS3.19](file:///C:\Users\admin\Downloads\part19.pdf#PS3.19) XML or DICOM [PS3.18](#PS3_18) JSON format.

**6.9.6.2 Behavior**

RequestUPSCancellation is used to request to the Origin-Server that the state of a UPS Instance be changed to CANCELED as shown in [Figure CC.1.1-1 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#figure_CC.1.1-1). The Origin-Server shall process the request as described by the SCP behavior in [Section CC.2.2.3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.2.3).

The request may include a Reason For Cancellation and/or a proposed Procedure Step Discontinuation Reason Code Sequence.

The request may also include a Contact Display Name and/or a Contact URI for the person with whom the cancel request may be discussed.

Note

An HTTP/1.1 Status Code indicating success means that the Request was accepted, not that the UPS has been canceled. The system performing the UPS is not obliged to honor the request to cancel and in some scenarios, may not even receive notification of the request. See [Section CC.2.4 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.4).

To cancel an IN PROGRESS UPS that the User-Agent is itself performing, the User-Agent shall instead use the ChangeUPSState action as described in [Section 6.9.5](#sect_6_9_5).

**6.9.6.3 Response**

The Origin-Server shall return an HTTP/1.1 response message.

**6.9.6.2.1 Response Status Line**

If the cancel request was accepted, the Service shall return an HTTP/1.1 "202 - Accepted" response code.

If the cancel request was rejected, the Service shall return an appropriate failure status line with a response code from [Table 6.9.6-1](#table_6_9_6_1).

**Table 6.9.6-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 202 | Accepted | The cancel request was accepted |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the **~~query~~** **search** (e.g., an authenticated user with insufficient privileges). |
| 404 | Not found | The specified UPS Instance does not exist or is not managed by this Origin-Server. |
| 409 | Conflict | The cancellation request is inconsistent with the current state of the UPS Instance |
| 503 | Busy | Service is unavailable. |

**6.9.2.5.2 Response Headers**

If the UPS Instance is already in a canceled state, the response message shall include the following HTTP/1.1 Warning header field:

* Warning: 299 {+SERVICE}: The UPS is already in the requested state of CANCELED.

**6.9.5.2.3 Response Message Body**

The response message body shall be empty.

**6.9.7 ~~CreateSubscription~~ Subscribe Transaction**

**~~This resource records subscribers to whom future events associated with the specified UPS Instances will be reported.~~**

**This transaction creates a subscription to a Worklist or Workitem resource. All subscribers to a resource will receive notifications containing event reports for any future events associated with the resource.**

**6.9.7.1 Request**

The request message shall be formed as follows:

* Resource
* **~~{+SERVICE}/workitems/{UPSInstanceUID}/subscribers/{AETitle}}{?deletionlock}~~**
* **{+SERVICE}/workitems/{workitem}/subscriptions{?retain}**
* **~~{+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5/subscribers/{AETitle}{?deletionlock}~~**
* **~~{+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5.1/subscribers/{AETitle}{?deletionlock,query\*}~~**
* **{+SERVICE}/workitems/subscriptions{?retain}{&filter\*}**

where

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* **~~{UPSInstanceUID}~~** **{workitem}** is the UID of the Unified Procedure Step Instance or a well-known UID
* **~~{AETitle} is an Application Entity Title that conforms to the "AE" Value Representation (see~~** [**~~Table 6.2-1 in PS3.5~~**](file:///C:\Users\admin\Downloads\part05.pdf#table_6.2-1)**~~) and identifies the Application Entity to be subscribed~~**
* **~~{deletionlock},~~** **{?retain}** if present, shall have a value of either "true" or "false", indicating whether or not the **~~User-Agent~~** **user agen**t is requesting a **~~Deletion~~** **Retention** Lock
* {**~~query~~&filter\***} specifies the query key/value pairs describing the filter parameters
* Method
* POST
* Headers
* **~~Content-Length: 0~~**
* **~~{query}~~ {?parameter\***}
* **~~Deletionlock~~** **retain**=true | false
* **{&filter\*} = "?"/ "&" \*(attribute "=" value)**
* {attributeID}={value}

0-n / {attributeID}={value} pairs allowed

Each {attributeID} shall refer to an attribute of the Unified Procedure Step IOD (see [Section B.26.2 in PS3.3](file:///C:\Users\admin\Downloads\part03.pdf#sect_B.26.2)).

See [Section 6.7.1.1](#sect_6_7_1_1) for {attributeID} and {value} encoding rules.

* **~~The request body shall be empty.~~**

**The request shall have no body.**

**\*\*\*\* JFP continue here \*\*\***

**6.9.7.2 Behavior**

The Origin-Server shall support the management of UPS instance subscriptions as specified by the SCP behavior in [Section CC.2.3.3 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#sect_CC.2.3.3).

Upon receipt of the CreateSubscription, SuspendGlobalSubscription or DeleteSubscription request, the Origin-Server shall attempt to update the Global Subscription State, Filtered Global Subscription and/or UPS Subscription State of the specified Application Entity with respect to the specified SOP Instance UID as described in [Table CC.2.3-2 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.3-2) and then return the appropriate HTTP/1.1 response.

**6.9.7.3 Response**

**6.9.7.3.1 Response Status Line**

The Service shall return an HTTP/1.1 status line, including a status code and associated reason phrase.

If the CreateSubscription request was successful, the Service shall return an "HTTP/1.1 201 - Created" response code. The response shall contain a "Content-Location" header of the following format:

* Content-Location: {WSSERVICE}

where:

* {WSSERVICE} is the base URL for the WebSocket service. This shall include the WebSocket protocol (either WS or WSS) and may include a combination of authority and path.

If the subscription fails, the Service shall return an appropriate failure status line with a response code from [Table 6.9.7-2](#table_6_9_7_2).

**Table 6.9.7-2. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 201 | Created | The subscription was created. |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the query (e.g., the Origin-Server does not support global subscription filtering or an authenticated user has insufficient privileges). |
| 404 | Not found | The specified UPS Instance or well-known UID does not exist or is not managed by this Origin-Server. |
| 409 | Conflict | Specified action not appropriate for specified instance. |
| 503 | Busy | Service is unavailable. |

**6.9.7.3.2 Response Headers**

If the CreateSubscriptionrequest was accepted but the deletion lock was not, the response message shall include the following HTTP/1.1 Warning header field:

* Warning: 299 {+SERVICE}: Deletion Lock not granted.

If the request was rejected with an HTTP/1.1 403 status code because Filtered Global Subscription is not supported, the response message shall include the following HTTP/1.1 Warning header field:

* Warning: 299 {+SERVICE}: The Origin-Server does not support Global Subscription Filtering.

**6.9.7.3.3 Response Message Body**

The response message body shall be empty.

**6.9.8 SuspendGlobalSubscription**

This resource suspends an existing Global Subscription or Filtered Global Subscription. The Origin-Server will no longer automatically subscribe the User-Agent to newly-created UPS Instances. This does not delete any existing subscriptions to specific UPS Instances.

**6.9.8.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5/subscribers/{AETitle}/suspend
* {+SERVICE}/workitems/1.2.840.10008.5.1.4.34.5.1/subscribers/{AETitle}/suspend

where

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* {AETitle} identifies the subscribed Application Entity.
* Method
* POST
* The request body shall be empty.

**6.9.8.2 Behavior**

The SuspendGlobalSubscription Origin-Server shall behave as described in [Section 6.9.7.2](#sect_6_9_7_2).

**6.9.8.3 Response**

**6.9.8.3.1 Response Status Line**

The Service shall return an HTTP/1.1 status line, including a status code and associated reason phrase.

If the SuspendGlobalSubscriptionrequest was successful, the Service shall return an HTTP/1.1 "200 - OK" response code.

If the subscription change fails, the Service shall return an appropriate failure status line with a response code from [Table 6.9.8-1](#table_6_9_8_1).

**Table 6.9.8-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 200 | OK | The subscription was suspended. |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the query (e.g., an authenticated user with insufficient privileges). |
| 404 | Not found | The specified UPS Instance or well-known UID does not exist or is not managed by this Origin-Server. |
| 409 | Conflict | Specified action not appropriate for specified instance. |
| 503 | Busy | Service is unavailable. |

**6.9.8.2.2 Response Message Body**

The response message body shall be empty.

**6.9.9 DeleteSubscription**

This resource removes existing subscriptions from the specified UPS Instances.

**6.9.9.1 Request**

The request message shall be formed as follows:

* Resource
* {+SERVICE}/workitems/{UPSInstanceUID}/subscribers/{AETitle}

where

* {+SERVICE} is the base URL for the service. This may be a combination of protocol (either HTTP or HTTPS), authority and path.
* {UPSInstanceUID} is the UID of the Unified Procedure Step Instance or a well-known UID.
* {AETitle} identifies the subscribed Application Entity.
* Method
* DELETE
* The request body shall be empty.

**6.9.9.2 Behavior**

The DeleteSubscription Origin-Server shall behave as described in [Section 6.9.7.2](#sect_6_9_7_2).

**6.9.9.3 Response**

**6.9.9.3.1 Response Status Line**

The Service shall return an HTTP/1.1 status line, including a status code and associated reason phrase.

If the DeleteSubscriptionrequest was successful, the Service shall return an HTTP/1.1 "200 - OK" response code.

If the subscription fails, the Service shall return an appropriate failure status line with a response code from [Table 6.9.7-1](#table_6_9_9_1).

**Table 6.9.7-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 200 | OK | The subscription was removed. |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the query (e.g., an authenticated user with insufficient privileges). |
| 404 | Not found | The specified UPS Instance or well-known UID does not exist or is not managed by this Origin-Server. |
| 409 | Conflict | Specified action not appropriate for specified instance. |
| 503 | Busy | Service is unavailable. |

**6.9.9.3.2 Response Message Body**

The response message body shall be empty.

**6.9.10 OpenEventChannel**

This resource opens a WebSocket channel that will be used to send Event Reports to the client.

See [[RFC 6455]](#biblio_RFC_6455) for details on the WebSocket protocol.

**6.9.10.1 Request**

The request message shall be formed as follows:

* Resource
* {+WSSERVICE}/subscribers/{AETitle}

where

* {+WSSERVICE} is the base URL for the WebSocket service. This shall include the WebSocket protocol (either WS or WSS) and may include a combination of authority and path
* {AETitle} identifies the subscribed Application Entity.
* Method
* GET

**6.9.10.2 Behavior**

The Origin-Server maintains the active WebSocket connection and uses it to send Event Report messages for UPS Instances which have subscriptions association with {AETitle} (see [Section 6.9.7.2](#sect_6_9_7_2)).

If the WebSocket connection is lost at any point the User-Agent can re-establish it by repeating the request.

The state of a WebSocket connection does not affect subscriptions and an Origin-Server is not required to queue messages when the connection is down.

Note

A User-Agent will only receive the initial state of a newly-subscribed UPS Instance if the WebSocket connection was initiated before creating the subscription

**6.9.10.3 Response**

**6.9.10.3.1 Response Status Line**

The Service shall return an HTTP/1.1 status line, including a status code and associated reason phrase.

If the request was successful, the Service shall return an HTTP/1.1 "101 - Switching Protocols" response code.

If the request fails, the Service shall return an appropriate failure status line with a response code from [Table 6.9.10-1](#table_6_9_10_1).

**Table 6.9.10-1. Status Codes**

| **HTTP/1.1 Code** | **Reason Phrase** | **Description** |
| --- | --- | --- |
| 101 | Switching Protocols | The WebSocket connection was established. |
| 400 | Bad Request | The UPS-RS Origin-Server was unable to understand the request |
| 401 | Unauthorized | The UPS-RS Origin-Server refused to accept the request because the client is not authenticated. |
| 403 | Forbidden | The UPS-RS Origin-Server understood the request, but is refusing to perform the query (e.g., an authenticated user with insufficient privileges). |
| 503 | Busy | Service is unavailable. |

**6.9.10.3.2 Response Message Body**

The response message body shall be empty.

The connection remains open and may be used by the server to send Event messages (see [Section 6.9.11](#sect_6_9_11)).

**6.9.11 SendEventReport**

This operation sends an Event Report over an established WebSocket connection.

**6.9.11.1 Request**

The request message shall be formed as follows:

* Resource
* N/A
* Method
* WebSocket Data Frame transmission
* The Event Report shall contain all mandatory attributes described indescribed in [Table CC.2.4-1 in PS3.4](file:///C:\Users\admin\Downloads\part04.pdf#table_CC.2.4-1) and [Table 10.3-1 in PS3.7](file:///C:\Users\admin\Downloads\part07.pdf#table_10.3-1) for the event type.

**6.9.11.1.1 Request Message Body**

WebSocket Events are encoded as WebSocket data frames with an opcode of "%x1" (text).

The frame payload data shall be a DICOM JSON dataset containing the attributes of the Event Report.

Note

1. Example WebSocket payload:

{  
"00000002": { "vr" : "UI", [ "1.2.840.10008.5.1.4.34.​6.​4" ] },  
"00000100": { "vr" : "US", [ 256 ] },  
"00000110": { "vr" : "US", [ 23 ] },  
"00000800": { "vr" : "US", [ 0 ] },  
"00001000": { "vr" : "UI", [ "1.2.840.10008.5.1.4.34.​6.​4.2.3.44.22231" ] },  
"00001001": { "vr" : "US", [ 1 ] },  
"00741238": { "vr" : "CS", [ "SCHEDULED" ] },  
"00744041": { "vr" : "CS", [ "READY" ] }  
}

1. The WebSocket protocol does not allow content negotiation so it is not possible to support both XML and JSON encoding of Event Report messages without extending the protocol.

**6.9.11.2 Behavior**

[Section CC.2.4.3 in PS3.4](C:\\Users\\admin\\Downloads\\part04.pdf" \l "sect_CC.2.4.3) describes the scenarios in which an Origin-Server sends Event Reports to a subscriber and the content of the Event Report messages.

**6.9.11.3 Response**

None.