

DICOM Correction Proposal

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| STATUS | Letter Ballot |
| Date of Last Update | 2025/11/10 |
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| Submission Date | 2024/01/22 |

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| Correction Number | CP-2395 |
| Log Summary: | UPS-RS - Add Requesting AE Query Parameter |
| Name of Standard | PS3.18 |

Rationale for Correction:

Processing "Request Cancellation" requires the UPS service provider to verify whether the owner or performer of the workitem is reachable; otherwise, the transaction fails. The provider must assemble a "UPS Cancel Requested Event Report" with the mandatory attribute Requesting AE (0074,1236) and send it to subscribed UPS Event SCUs and Client Agents via WebSocket.

Relaxing the HTTP "Request Cancellation" requirement to allow requests without verifying connectivity does not resolve the issue. "Change Workitem State" to IN PROGRESS may be requested via RESTful service, but "Request Cancellation" is performed by the DULP service.

Therefore, the AE Title associated with the user agent, matching the AE Title of the DULP SCU, must be included in both "Change Workitem State" and "Request Cancellation" requests sent to the origin server.

The proposed solution adds a query parameter "requester" for the "Workitem State" and "Workitem Request Cancellation" resources of the Worklist Service. It also renames the AE Title path parameter in the Request transaction to "{subscriber}" to improve clarity.

This CP removes a note stating that "Request Cancellation" fails for workitems in the SCHEDULED state. Section CC.2.2.3 in PS3.4 allows Request Cancel for workitems in SCHEDULED state, making the note incorrect.

This CP also updates the Affected SOP Class UID (0000,0002) in the example application/dicom+json Workitem Event Report payload to "1.2.840.10008.5.1.4.34.6.1" to comply with Section CC.2.4.3 in PS3.4. It also replaces an Organizationally Derived UID with a UUID-derived UID for Affected SOP Instance UID (0000,1000).

Multiple solutions were evaluated to address the Requesting AE identification requirement. An authentication-based approach proposed utilizing mTLS certificates or OAuth JWT tokens to convey the User Agent's AE Title to the origin server. This was rejected, as it was determined to be impractical due to DICOM implementers' limited control over enterprise authentication infrastructure.

A path parameter implementation was also considered, which would have modified the URI templates to include the requester as a mandatory path component (e.g., `/workitems/{workitem}/state/{requester}`). This approach was rejected on the basis that requester information constitutes request metadata rather than resource identity, making it incompatible with RESTful design principles.

The current proposal implements a query parameter approach, treating the requesting AE as optional request metadata while maintaining backward compatibility and adherence to REST architectural constraints.

Correction Wording:

Modify PS3.18, Table 11.1.1-1. Resources, URI Templates and Descriptions, as follows:

11.1.1 Resource Descriptions

There are three resources defined by this service:

worklist A collection of Workitems managed by the origin server.

workitem A dataset containing the Attributes specified in Section CC.2.5.1.3 “UPS Attribute Service Requirements” in PS3.4.

subscription A resource that specifies a Subscriber, to whom notifications about changes in the resource's state should be sent.

In the Worklist Service, the Workitem is identified by a Workitem UID, which corresponds to the Affected SOP Instance UID and Requested SOP Instance UID used in the PS3.4 UPS Service.

The following URI Template variables are used in the definitions of the resources throughout Chapter 11.

{workitem} the Workitem UID.

{aetitlesubscriber} The Application Entity Title of a Subscriber.

The Worklist Service manages a UPS Worklist and its Workitems. The URI Templates defined by this service are specified in Table 11.1.1-1.

Table 11.1.1-1. Resources, URI Templates and Descriptions

| Resource | URI Template | Description |
|--------------------------------|---|--|
| Worklist | / | The Base URI of the Worklist Service. A Worklist contains and manages a collection of Workitems. There is only one Worklist per service. |
| All Workitems | /workitems | The Workitems resource contains the entire collection of workitems in the Worklist. |
| Workitem | /workitems/{workitem} | The Workitem resource contains a single Workitem. |
| Workitem State | /workitems/{workitem}/state/ | The Workitem State resource is used to change the state of a Workitem. |
| Workitem Request Cancellation | /workitems/{workitem}/cancelrequest/ | The Workitem Cancel resource is used to request the cancellation of a Workitem. |
| Workitem Subscription | /workitems/{workitem}/subscribers/{aetitle}subscriber | The Subscription to a Workitem. |
| Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5/subscribers/{aetitle}subscriber | The Workitem Subscription resource contains a Subscription to the Worklist |
| Filtered Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5.1/subscribers/{aetitle}subscriber | The Workitem Subscribers resource contains a single Worklist Subscriber. |

...

Modify Section 11.7.1 Request, as follows (Section 11.7 Change Workitem State Transaction is included for context):

11.7 Change Workitem State Transaction

This transaction is used to change the state of a Workitem. It corresponds to the UPS DIMSE N-ACTION operation "Change UPS State". State changes are used to claim ownership, complete, or cancel a Workitem.

11.7.1 Request

The request shall have the following syntax:

```
PUT SP /workitems/{workitem}/state?requester={aetitle} SP version CRLF
```

```
Content-Type: dicom-media-type
```

```
(Content-Length: uint / Transfer-Encoding: encoding) CRLF
```

```
*(header-field CRLF)
```

```
CRLF
```

```
Payload
```

The user agent shall conform to the SCU behavior specified in Section CC.2.1.2 "Service Class User Behavior" in PS3.4.

11.7.1.1 Target Resources

The Target Resource for this transaction is a Workitem.

11.7.1.2 Query Parameters

The user agent shall supply, and the origin server shall support, the Common Query Parameters in Section 11.1.2.

The origin server shall support Query Parameters as required in Table 11.7.1-1.

The user agent shall supply in the request Query Parameters as required in Table 11.7.1-1.

Table 11.7.1-1. Query Parameters by Resource

| <u>Key</u> | <u>Value</u> | <u>Resource</u> | <u>Usage</u> | | <u>Description</u> |
|------------------|----------------|-----------------|-------------------|----------------------|--------------------|
| | | | <u>User Agent</u> | <u>Origin Server</u> | |
| <u>requester</u> | <u>aetitle</u> | <u>Workitem</u> | <u>O</u> | <u>O</u> | |

The Requester Parameter has the following syntax:

```
requester = "requester=" aetitle
```

If present, the value shall be the Application Entity Title of the requesting user agent. When the requester parameter is present, the origin server shall use the provided AE Title as the value for the Requesting AE (0074,1236) attribute in UPS Event Reports generated for the workitem operation, as specified in Section CC.2.4.1 "Event Report Information" in PS3.4.

When the requester parameter is not present, the origin server shall determine the requesting AE Title through implementation-specific means (e.g., HTTP authentication, client certificates, or other mechanisms).

Modify Section 11.8.1 Request, as follows (Section 11.8 Request Cancellation is included for context):

11.8 Request Cancellation

This transaction allows a user agent that does not own a Workitem to request that it be canceled. It corresponds to the UPS DIMSE N-ACTION operation "Request UPS Cancel". See Section CC.2.2 in PS3.4.

To cancel a Workitem that the user agent owns, i.e., that is in the IN PROGRESS state, the user agent uses the Change Workitem State transaction as described in Section 11.7.

11.8.1 Request

The request shall have the following syntax:

```
POST SP /workitems/{workitem}/cancelrequest?requester={aetitle} SP version CRLF
Content-Type: dicom-media-type

(Content-Length: uint / Transfer-Encoding: encoding) CRLF

*(header-field CRLF)

CRLF

[Payload]
```

The user agent shall conform to the SCU behavior specified in Section CC.2.2.2 “Service Class User Behavior” in PS3.4.

11.8.1.1 Target Resources

The Target Resource for this transaction is a Workitem.

11.8.1.2 Query Parameters

The user agent shall supply, and the origin server shall support, the Common Query Parameters in Section 11.1.2.

The origin server shall support Query Parameters as required in Table 11.7.1-1.

The user agent shall supply in the request Query Parameters as required in Table 11.7.1-1.

11.8.1.3 Request Header Fields

The origin server shall support Header Fields as required in Table 11.8.1-1.

The user agent shall supply in the Request Header Fields as defined in Table 11.8.1-1.

Table 11.8.1-1. Request Header Fields

| Name | Values | Usage | | Description |
|-------------------|------------------|------------|---------------|--|
| | | User Agent | Origin Server | |
| Content-Type | dicom-media-type | M | M | The media-type of the payload. |
| Content-Length | uint | C | M | Shall be present if a transfer encoding has not been applied to the payload. |
| Transfer-Encoding | encoding | C | M | Shall be present if a transfer encoding has been applied to the payload. |

See also Section 8.4.

Modify Section 11.8.3.1 Status Codes, as follows:

11.8.3.1 Status Codes

Table 11.8.3-1 shows some common status codes corresponding to this transaction. See also Section 8.5 for additional status codes.

Table 11.8.3-1. Status Code Meaning

| Status | Code | Meaning |
|---------|-------------------|--|
| Success | 202 (Accepted) | <p>The request was accepted<u>acknowledged</u> by the origin server,but the Target Workitem state has not necessarily changed yet.</p> <p>Note</p> <p>The owner of the Workitem is not obliged to honor the request to cancel and, in some scenarios, may not even receive notification of the request.</p> |
| Failure | 400 (Bad Request) | There was a problem with the syntax of the request. |
| | 404 (Not Found) | The Target Workitem was not found. |
| | 409 (Conflict) | <p>The request is inconsistent with the current state of the Target Workitem. For example, the Target Workitem is in the SCHEDULED or COMPLETED state.</p> <p><u>The request cannot be performed for one of the following reasons:</u></p> <ul style="list-style-type: none"> <u>• The Target Workitem is in the COMPLETED state.</u> <u>• The origin server is the performer/owner of the Target Workitem and chooses not to cancel.</u> <u>• There is no possibility that the performer/owner of the Target Workitem will be informed of the cancel request.</u> |

11.8.3.2 Response Header Fields

The origin server shall support header fields as required in Table 11.8.3-2.

Table 11.8.3-2. Response Header Fields

| Name | Value | Origin Server Usage | Description |
|-------------------|------------|---------------------|---|
| Content-Type | media-type | C | The media type of the Status Report document. Shall be present if the response contains a payload. |
| Content-Length | uint | C | Shall be present if a transfer encoding has not been applied to the payload. |
| Transfer-Encoding | encoding | C | Shall be present if a transfer encoding has been applied to the payload. |

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

Warning: 299 <service>: The UPS is already in the requested state of CANCELED.

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

Warning: 299 <service>: The UPS is already COMPLETED.

Warning: 299 <service>: Performer chooses not to cancel.

Warning: 299 <service>: The performer cannot be contacted.

See also Section 8.4.

Modify Section 11.10.1 Resources, as:

11.10.1 Request

The request shall have the following syntax:

```
POST SP /workitems/{resource}/subscribers/{aetitle}{subscriber}{?deletionlock}{&filter} SP version
CRLF
```

```
*(header-field CRLF)
```

```
CRLF
```

The user agent shall conform to the SCU behavior specified in Section CC.2.3.2 “Service Class User Behavior” in PS3.4.

11.10.1.1 Target Resources

The origin server shall support the resources in Table 11.10.1-1.

Table 11.10.1-1. Subscribe Transaction Resources

| Resource | URI Template |
|--------------------------------|---|
| Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5/subscribers/{aetitle}{subscriber} |
| Filtered Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5.1/subscribers/{aetitle}{subscriber} |
| Workitem Subscription | /workitems/{workitem}/subscribers/{aetitle}{subscriber} |

...

Modify the URI template path parameter in Section 11.11.1.1 Target Resources, as follows:

11.11.1.1 Target Resources

The origin server shall support the resources in Table 11.11.1-1.

Table 11.11.1-1. Unsubscribe Transaction Resources

| Resource | URI Template |
|--------------------------------|---|
| Workitem Subscription | /workitems/{workitem}/subscribers/{aetitle}{subscriber} |
| Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5/subscribers/{aetitle}{subscriber} |
| Filtered Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5.1/subscribers/{aetitle}{subscriber} |

Modify the Section 11.12 Suspend Global Subscription Transaction, as follows:

11.12 Suspend Global Subscription Transaction

This transaction is used to stop the origin server from automatically subscribing the user agent to new Workitems. This does not delete any existing subscriptions to specific Workitems.

11.12.1 Request

The request shall have the following syntax:

```
POST SP {/resource} SP version CRLF
```

*(header-field CRLF)

CRLF

11.12.1.1 Target Resources

The origin server shall support the resources in Table 11.12.1-1.

Table 11.12.1-1. ~~Unsubscribe~~Suspend Global Subscription Transaction Resources

| Resource | URI Template |
|--------------------------------|---|
| Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5/subscribers/{ aetitle }/{subscriber}/suspend |
| Filtered Worklist Subscription | /workitems/1.2.840.10008.5.1.4.34.5.1/subscribers/{ aetitle }/{subscriber}/suspend |

...

Modify the example in Section 11.13 Workitem Event Reports, as follows:

11.13 Workitem Event Reports

The origin server uses the Send Event Report Transaction (see Section 8.10.5) to send a Workitem Event Report, containing the details of any state change in the Workitem to the user agent.

The origin server shall send Workitem Event Reports as described in Section CC.2.4.3 in PS3.4.

The Event Report shall contain all mandatory Attributes described in Table CC.2.4-1 "Report a Change in UPS Status - Event Report Information" in PS3.4 and Table 10.3-2 "N-EVENT-REPORT-RSP Message Fields" in PS3.7 .

The following is an example application/dicom+json Workitem Event Report payload:

```
{
  "00000002": { "vr": "UI", "Value": ["1.2.840.10008.5.1.4.34.6.41"] },
  "00000110": { "vr": "US", "Value": [23] },
"00001000": { "vr": "UI", "Value": ["1.2.840.10008.5.1.4.34.6.4.2.3.44.22231"] },
  "00001000": { "vr": "UI", "Value": ["2.25.13834239247872462607454213026820645668"] },
  "00001002": { "vr": "US", "Value": [1] },
  "00404041": { "vr": "US", "Value": ["READY"] },
  "00741000": { "vr": "LT", "Value": ["SCHEDULED"] }
} CRLF
```

Modify Table H-1. Resources and Methods, as follows:

Table H-1. Resources and Methods

| Service | Resource | Transactions | Reference |
|-------------------------------|----------|--------------|-----------|
| ... | | | |
| Worklist (see Section 11.1.1) | | | |

| Service | Resource | Transactions | Reference |
|---------|--|--|--------------------------------|
| ... | workitems | Search for Workitem Create Workitem | Section 11.9 Section 11.4 |
| | {Workitem} | Retrieve Workitem Update Workitem | Section 11.4 Section 11.6 |
| | state | Change Workitem State | Section 11.7 |
| | cancelrequest | Request Workitem Cancellation | Section 11.8 |
| | subscribers | N/A | N/A |
| | {AETitle} <u>{subscriber}</u> | Subscribe Unsubscribe | Section 11.10 Section 11.11 |
| | 1.2.840.10008.5.1.4.34.5 | N/A | N/A |
| | subscribers | N/A | N/A |
| | {AETitle} <u>{subscriber}</u> | Subscribe Unsubscribe | Section 11.10 Section 11.11 |
| | suspend | Unsubscribe | Section 11.11 |
| | 1.2.840.10008.5.1.4.34.5.1 | N/A | N/A |
| | subscribers | N/A | N/A |
| | {AETitle} <u>{subscriber}</u> | Subscribe Unsubscribe | Section 11.10 Section 11.11 |
| | suspend | Suspend Worklist Subscription | Section 11.11 |
| ... | | | |