

DICOM Correction Proposal

STATUS	Assigned
Date of Last Update	2015/11/05
Person Assigned	Kevin O'Donnell
Submitter Name	Kevin O'Donnell
Submission Date	2015/09/29

Correction Number	CP-1558
Log Summary: Add UPS Requesting Station Name Code Sequence	
Name of Standard 2015	
<p>Rationale for Correction:</p> <p>There is currently no way for performers of workitems to know the system that originally requested the workitem. This information can be useful, for example to set up a notification subscription about an addendum or other follow-on step for a task originally scheduled by the requesting station.</p> <p>There is a Requesting AE (0074,1236) in the Cancellation Requested Notification which is populated by the Manager to identify the source of the cancel request. Could re-use that attribute but then the symmetry of encoding between the Scheduled Station Name and the Requesting Station Name would be lost.</p> <p>A new Sequence is proposed.</p> <p>Or require Manager to keep a table of subscribers to old instances – N-ACTION to resubscribe for a past Instance that renews subscriptions</p>	
<p>Correction Wording:</p> <p><include proposed change below, following guidelines for formatting of changes in supplements></p>	

<i>Add a new N-ACTION to get past-subscribers subscribed to a new instance</i>
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CC.2.3 Request UPS Subscription Transfer (N-ACTION)

This operation allows an SCU to request to the SCP that subscribers to a UPS instance be subscribed to a new UPS instance. This operation shall be invoked by the SCU through the DIMSE N-ACTION Service.

CC.2.3.1 Action Information

DICOM AEs that claim conformance to the UPS Watch SOP Class as an SCU and/or an SCP shall support the Action Types and Action Information as specified in [Table CC.2.3-1](#).

Table CC.2.3-1. Subscribe/Unsubscribe to Receive UPS Event Reports - Action Information

Action Type Name	Action Type ID	Attribute Name	Tag	Requirement Type SCU/SCP
Subscribe to Receive UPS Event Reports	3	Receiving AE	(0074,1234)	1/1
		Deletion Lock	(0074,1230)	1/1
		Match Keys (see Section CC.2.3.1)		1/1
Unsubscribe from Receiving UPS Event Reports	4	Receiving AE	(0074,1234)	1/1
Suspend Global Subscription	5	Receiving AE	(0074,1234)	1/1
Transfer Subscription	6	UPS Instance	TODO	1/1

Each AE may be in one of three UPS Subscription States for each existing UPS Instance: Not Subscribed, Subscribed with Deletion Lock, or Subscribed w/o Deletion Lock. The UPS Subscription State determines whether N-EVENT-REPORTs relating to a UPS Instance will be sent to the AE.

Each AE may also be in one of three Global Subscription States for a given SCP: No Global Subscription, Globally Subscribed with Deletion Lock, Globally Subscribed w/o Deletion Lock. The Global Subscription State mainly determines the initial UPS Subscription State for an AE and new UPS Instances created by the SCP. Changes to the Global Subscription State can also change the UPS Subscription State for existing UPS Instances as described in [Table CC.2.3-2](#).

The three Subscription actions in [Table CC.2.3-1](#) are used to manage the UPS Subscription State and Global Subscription State of an AE.

[Table CC.2.3-2](#) describes the UPS Subscription State transitions of an AE for a given UPS Instance. Each row in the table defines what should happen in response to a Subscription Action, or a UPS creation event, given the initial state. The table also shows when an initial event message should be sent to the AE describing the "Current UPS State".

Note

In general, instance specific instructions take precedence over global instructions. The exception is the Unsubscribe Globally instruction, which removes all subscriptions, global and specific. To simply stop globally subscribing to new instances without removing specific subscriptions, use the Suspend Global Subscription message.

Most actions affect only the UPS Subscription State of a single UPS Instance. However, Global actions potentially affect all existing UPS Instances managed by the SCP and this is indicated in the following table by "All". For example, in the "AE Subscribes Globally with Lock" row, the content of the "Not Subscribed" cell means that in addition to setting the Global Subscription State for the AE to "Global Subscription with Lock", all existing UPS Instances whose UPS Subscription State for the Receiving AE is "Not Subscribed" will each have their UPS Subscription State changed to "Subscribed with Lock" and an event will be sent to the Receiving AE for each Instance.

Table CC.2.3-2. UPS Subscription State Transition Table

Events	States (for a specific UPS and AE)			
	<i>null</i>	Not Subscribed	Subscribed with Lock	Subscribed w/o Lock
A UPS is Created when the AE Global Subscription State is "No Global Subscription"	Go to Not Subscribed	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
A UPS is Created when the AE Global Subscription State is "Global Subscription with Lock"	Go to Subscribed with Lock; Send initial event	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
A UPS is Created when the AE Global Subscription State is "Global Subscription w/o Lock"	Go to Subscribed w/o Lock; Send initial event	<i>N/A</i>	<i>N/A</i>	<i>N/A</i>
AE Subscribes Globally with Lock	<i>N/A</i>	<i>AE Global State is now "Global"</i>	<i>AE Global State is now "Global"</i>	<i>AE Global State is now "Global"</i>

	States (for a specific UPS and AE)			
		<i>Sub. with Lock";</i> All Go to Subscribed with Lock; All Send initial event	<i>Sub. with Lock";</i> No UPS state change;	<i>Sub. with Lock";</i> No UPS state change;
AE Subscribes Globally w/o Lock	<i>N/A</i>	<i>AE Global State is now "Global Sub. w/o Lock";</i> All Go to Subscribed w/o Lock;	<i>AE Global State is now "Global Sub. w/o Lock";</i> No UPS state change;	<i>AE Global State is now "Global Sub. w/o Lock";</i> No UPS state change;
AE Subscribes to Specific UPS with Lock	<i>N/A</i>	Go to Subscribed with Lock; Send initial event	No UPS state change; Send initial event	Go to Subscribed with Lock; Send initial event
AE Subscribes to Specific UPS without Lock	<i>N/A</i>	Go to Subscribed w/o Lock; Send initial event	Go to Subscribed w/o Lock; Send initial event	No UPS state change; Send initial event
AE Unsubscribes from Specific UPS	<i>N/A</i>	No UPS state change	Go to Not Subscribed	Go to Not Subscribed
AE Unsubscribes Globally	<i>N/A</i>	<i>AE Global State is now "No Global Subscription";</i> No UPS state change;	<i>AE Global State is now "No Global Subscription";</i> All Go to Not Subscribed;	<i>AE Global State is now "No Global Subscription";</i> All Go to Not Subscribed;
AE Suspends Global Subscription	<i>N/A</i>	<i>AE Global State is now "No Global Subscription";</i> No UPS state change;	<i>AE Global State is now "No Global Subscription";</i> No UPS state change;	<i>AE Global State is now "No Global Subscription";</i> No UPS state change;

See [Section GGG.1 "Introduction" in PS3.17](#) Reliable Watchers and Deletion Locks for further discussion of deletion locks.

CC.2.3.2 Service Class User Behavior

The SCU subscribing to track the progress and results of the scheduled procedure step may be the system that created the UPS as an SCU of the UPS Push SOP Class, or it may be some other interested observer.

An SCU shall use the N-ACTION primitive to request the SCP to subscribe an AE (usually the requesting SCU) to receive event reports relating to UPS instances managed by the SCP. Since all UPSs are created as instances of the UPS Push SOP Class, the Requested SOP Class UID (0000,0003) in the N-ACTION request shall be the UID of the UPS Push SOP Class. See [Section CC.3.1](#) for further details.

An SCU shall also use the N-ACTION primitive to request the SCP to unsubscribe an AE to stop receiving event reports relating to UPS instances managed by the SCP. Action Information is specified in [Table CC.2.3-1](#). The SCU shall always provide the AE-TITLE that is to receive (or stop receiving) the N-EVENT-REPORTs.

To subscribe for events relating to a single specific UPS instance managed by the SCP, the SCU shall use Action Type ID 3 (Subscribe to Receive UPS Event Reports) and provide the SOP Instance UID of the specific UPS instance in the N-ACTION primitive request. The SCU shall indicate a need for the UPS instance to persist after its state has changed to COMPLETED or CANCELED by setting the value of the Deletion Lock to TRUE. Otherwise the SCU shall set the value of the Deletion Lock to FALSE.

To unsubscribe for events relating to a single specific UPS instance managed by the SCP, the SCU shall use Action Type ID 4 (Unsubscribe from Receiving UPS Event Reports) and provide the SOP Instance UID of the specific UPS instance in the N-ACTION primitive request.

To subscribe for events relating to all current and subsequently created UPS instances managed by the SCP, the SCU shall use Action Type ID 3 (Subscribe to Receive UPS Event Reports) and provide the well-known UID 1.2.840.10008.5.1.4.34.5 in the N-ACTION primitive request. The SCU shall indicate a need for UPS instances to persist after their states have changed to COMPLETED or CANCELED by setting the value of the Deletion Lock to TRUE. Otherwise the SCU shall set the value of the Deletion Lock to FALSE.

Note

This "global subscription" is useful for SCUs that wish to monitor all activities without having to issue regular C-FINDs to identify new UPS instances.

To subscribe for events relating to a filtered subset of all current and subsequently created UPS instances (Filtered Global Subscription) managed by the SCP, the SCU shall use Action Type ID 3 (Subscribe to Receive UPS Event Reports) and provide both the well-known UID 1.2.840.10008.5.1.4.34.5.1 and a set of Matching Keys and values in the N-ACTION primitive request (see [Section CC.2.3.3.1](#)). The SCU shall indicate a need for UPS instances to persist after their states have changed to COMPLETED or CANCELED by setting the value of the Deletion Lock to TRUE. Otherwise the SCU shall set the value of the Deletion Lock to FALSE.

Note

The well-known UID for a Filtered Global Subscription is distinct from the Global Subscription well-known UID.

To unsubscribe for events relating to all current UPS instances managed by the SCP and also stop being subscribed to subsequently created UPS instances, the SCU shall use Action Type ID 4 (Unsubscribe from Receiving UPS Event Reports) and provide the well-known UID 1.2.840.10008.5.1.4.34.5 in the N-ACTION primitive request.

Note

This "global unsubscription" is useful for SCUs that wish to stop monitoring all activities and release all deletion locks (if any) placed for this subscriber.

To just stop being subscribed to subsequently created UPS instances, but still continue to receive events for currently subscribed instances managed by the SCP, the SCU shall use Action Type ID 5 (Suspend Global Subscription) and provide the well-known UID 1.2.840.10008.5.1.4.34.5 in the N-ACTION primitive request.

For each UPS instance on which the SCU has placed a deletion lock, either explicitly on the specific instance or implicitly via a global subscription with lock, the SCU shall remove the deletion lock once any needed final state information for the instance has been obtained. The deletion lock may be removed either by unsubscribing or by subscribing with the value of the Deletion Lock set to FALSE.

Note

The SCP will retain COMPLETED or CANCELED UPS Instances until all deletion locks have been released. Failure by SCUs to release the deletion lock may cause problems for the SCP. SCUs that do not have a significant

need for the final state information, or who cannot dependably remove deletion locks should not use deletion locks.

The successful N-ACTION Response Status Code indicates that the SCP has received the N-ACTION request and the Subscription State for the AE has been successfully modified.

Note

- 1. When subscribing to a specific instance, the SCU can also expect to receive an initial N-EVENT-REPORT containing the current state of the UPS instance. When subscribing globally with the Deletion Lock set to TRUE, the SCU can expect to receive initial N-EVENT-REPORTs for every instance currently managed by the SCP. Initial N-EVENT-REPORTs for newly created instances, received as a result of a global subscription, will appear as transitions to the SCHEDULED state.*
- 2. The UPS-RS User-Agent is responsible for opening the N-EVENT-REPORT communication channel (see [Section 6.9.10 "OpenEventChannel" in PS3.18](#)). The UPS-RS User-Agent is also responsible for re-establishing the N-EVENT-REPORT communication channel if it is disconnected. This differs from the DIMSE approach where the UPS SCP opens an Association for N-EVENT-REPORT messages as necessary.*

A warning N-ACTION Response Status Code of "Deletion Lock not granted", indicates that the AE subscription requested by the SCU was successful, but the deletion lock has not been set.

A failure N-ACTION Response Status Code indicates that the subscription state change requested will not be processed and no subscription states have been changed. The action taken by the SCU upon receiving this status is beyond the scope of this Standard.

At any time after receipt of the N-ACTION-Response, the SCU may release the association on which it sent the N-ACTION-Request.

CC.2.3.3 Service Class Provider Behavior

Upon receipt of the N-ACTION request, the SCP shall attempt to update the Global Subscription State and/or UPS Subscription State of the specified AE with respect to the specified SOP Instance UID as described in [Table CC.2.3-2](#) and then return, via the N-ACTION response primitive, the appropriate N-ACTION Response Status Code.

The SCP may optionally allow an Application Entity to subscribe globally to a filtered set of UPS Instances. In this case, the Application Entity will only be subscribed to existing and future UPS Instances that match the search criteria specified by the Matching Keys of the N-ACTION request (see [Section CC.2.3.3.1](#)). If the SCP does not support Filtered Global Subscription it will return a Failure response with a Code of C307 (see [Table CC.2.3-3](#)).

A success status conveys that the Global Subscription State and/or UPS Subscription State for the AE specified in Receiving AE (0074,1234) was successfully modified by the SCP. The AE-TITLE in Receiving AE (0074,1234) may be different than the AE-TITLE used by the SCU for the association negotiation. The SCP shall use the AE-TITLE specified in Receiving AE (0074,1234). This allows systems to subscribe other systems they know would be interested in events for a certain UPS.

For all UPS instances managed by the SCP, the SCP shall send N-EVENT-REPORTS (as described in [Section CC.2.4.3](#)) to AEs that have a UPS Subscription State of "Subscribed with Lock" or "Subscribed w/o Lock". If the SCP also supports the HTTP CreateSubscription service as an Origin-Server, the SCP shall also send HTTP SendEventReport messages (see [Section 6.9.11 "SendEventReport" in PS3.18](#)).

Upon successfully processing a subscription action, the SCP shall send initial UPS State Report N-EVENT-REPORTs, as indicated in [Table CC.2.3-2](#), providing the current status of the UPS Instance to the Receiving AE.

The SCP may also refuse both specific and global Subscription requests by returning a failure N-ACTION Response Status Code for "Refused: Not Authorized" if the refusal depends on permissions related to the tasks or the requestor, or "Refused: SCP does not support Event Reports" if the SCP does not support sending the events. The SCP must document in its conformance statement if it might refuse Subscription requests.

The SCP may remove existing Deletion Locks by changing the UPS Subscription State for the AE from "Subscribed with Lock" to "Subscribed w/o Lock" and/or by changing the Global Subscription State for an AE from "Global Subscription with Lock" to "Global Subscription w/o Lock". This is intended to allow the SCP to deal with SCU malfunctions. The SCP must document in its conformance statement if it might remove a Deletion Lock.

The SCP may also refuse the Deletion Lock portion of a specific or global Subscription request. For example, a request to modify the UPS Subscription

State for the AE to "Subscribed with Lock" would instead result in a UPS Subscription State of "Subscribed w/o Lock" and a Warning status (see [Table CC.2.3-3](#)) returned to the requesting SCU. This is intended to deal with Security and related policy restrictions. The SCP must document in its conformance statement if it might refuse a Deletion Lock.

Bi-directional Authentication of machines/users/applications is possible at association time (see [PS3.7](#) and [PS3.15](#)). [PS3.7](#) provides a "Refused: Not Authorized" error code. Further requiring or documenting authentication and/or authorization features from the SCU or SCP is beyond the scope of this SOP Class.

CC.2.3.3.1 Filtered Global Subscription

An SCP that supports Filtered Global Subscription shall create an instance subscription for each UPS Instance that would match a C-FIND request with the Matching Keys provided in the subscription request.

The SCP shall support the same matching logic used for C-FIND (see [Section CC.2.8.3](#)).

CC.2.3.4 Status Codes

The status values that are specific for this DIMSE operation are defined in [Table CC.2.3-3](#).

Table CC.2.3-3. Status Values

Status	Meaning	Code
Success	The requested change of subscription state was performed	0000
Warning	Deletion Lock not granted.	B301
Failure	Specified SOP Instance UID does not exist or is not a UPS Instance managed by this SCP	C307
	Receiving AE-TITLE is Unknown to this SCP	C308
	Refused: Specified action not appropriate for specified instance	C314
	Refused: SCP does not support Event Reports	C315

Or Add a new Requesting Station Name to Table C.30.2-1 in PS3.3 as shown:

Table C.30.2-1. Unified Procedure Step Scheduled Procedure Information Module Attributes

Attribute Name	Tag	Attribute Description
Scheduled Procedure Step Priority	(0074,1200)	Priority of the scheduled Procedure Step Enumerated Values: HIGH used to indicate an urgent or emergent work item, equivalent to a STAT request. MEDIUM used to indicate a work item that has a priority less than HIGH and higher than LOW. It can be used to further stratify work items. LOW used to indicate a routine or non-urgent work item.
Scheduled Procedure Step Modification Date and Time	(0040,4010)	Date and time when the Scheduled Procedure Information was last modified or first created (whichever is most recent). Note This attribute should be automatically updated by the worklist management system whenever any modification is made to Scheduled Procedure Information Module attributes of a Unified Procedure Step.
Worklist Label	(0074,1202)	A label identifying the worklist to which the Procedure Step instance belongs.
Procedure Step Label	(0074,1204)	A label describing the task of the Procedure Step in text appropriate for displaying in the user selection interface.
Comments on the Scheduled Procedure Step	(0040,0400)	User-defined comments on the scheduled Procedure Step.
<u>Requesting Station Name Code Sequence</u>	<u>(0040,40XX)</u>	<u>Identifying names within the enterprise of the equipment that requested the Procedure Step. The names conveyed in Code Value (0008,0100) may be the same as the AE Titles, but do not have to be.</u> <u>This may be used by other systems to set up relevant notifications such as the creation of an addendum or other follow-on to this scheduled Procedure Step.</u> <u>Zero or more Items shall be included in this Sequence.</u>
<u>>Include Table 8.8-1 "Code Sequence Macro Attributes"</u>		<u>No Baseline CID is defined.</u>
Scheduled Station Name Code Sequence	(0040,4025)	Identifying names within the enterprise of the equipment for which the Procedure Step is scheduled. The names conveyed in Code Value (0008,0100) may be the same as the AE Titles, but do not have to be. Zero or more Items shall be included in this Sequence.
<u>>Include Table 8.8-1 "Code Sequence Macro Attributes"</u>		<u>No Baseline CID is defined.</u>
Scheduled Station Class Code Sequence	(0040,4026)	Classes of the equipment for which the Procedure Step is

Attribute Name	Tag	Attribute Description
		scheduled. Zero or more Items shall be included in this Sequence.
<i>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>		<i>No Baseline CID is defined.</i>
Scheduled Station Geographic Location Code Sequence	(0040,4027)	Geographic locations of the equipment for which the Procedure Step is scheduled. Zero or more Items shall be included in this Sequence.
<i>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>		<i>No Baseline CID is defined.</i>
Scheduled Human Performers Sequence	(0040,4034)	Human performers that are scheduled to be involved or responsible for performing the Procedure Step. Zero or more Items shall be included in this Sequence.
<i>>Human Performer Code Sequence</i>	(0040,4009)	Human performer that is involved or responsible for performing the Procedure Step. Only a single Item shall be included in this Sequence.
<i>>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>		<i>No Baseline CID is defined.</i>
<i>>Human Performer's Name</i>	(0040,4037)	Name of the human performer.
<i>>Human Performer's Organization</i>	(0040,4036)	Organization to which the human performer is accountable for the activities in the Procedure Step.
Scheduled Procedure Step Start DateTime	(0040,4005)	Date and time at which the Procedure Step is scheduled to start.
Expected Completion DateTime	(0040,4011)	Date and time at which the Procedure Step is expected to be completed.
Scheduled Workitem Code Sequence	(0040,4018)	Coded description of the Procedure Step. Only a single Item shall be included in this Sequence.
<i>>Include Table 8.8-1 "Code Sequence Macro Attributes"</i>		<i>Baseline CID is CID 9231 "Workitem Definition".</i> Note This CID has generic workitems. An implementation may choose to define more specific, detailed workitems.
Scheduled Processing Parameters Sequence	(0074,1210)	Processing parameters to be used by the performing system when carrying out the Procedure Step. Zero or more Items shall be included in this Sequence.
<i>>Include Table 10-2 "Content Item Macro Attributes Description"</i>		<i>No Baseline CIDs are defined for Concept Name Code Sequence or Concept Code Sequence.</i>
<i>>Content Item Modifier Sequence</i>	(0040,0441)	Sequence that specifies modifiers for a Protocol Context Content Item. One or more Items are permitted in this Sequence.
<i>>>Include Table 10-2 "Content Item Macro Attributes"</i>		<i>No Baseline CIDs are defined for Concept Name Code</i>

Attribute Name	Tag	Attribute Description
<i>Description</i>		<i>Sequence or Concept Code Sequence.</i>
Input Readiness State	(0040,4041)	<p>Readiness state of the Input Information Sequence (0040,4021) and the referenced instances.</p> <p>Enumerated Values:</p> <p>INCOMPLETE The Input Information Sequence is not yet complete and additional instance references might be added.</p> <p>UNAVAILABLE The Input Information Sequence is complete but one or more of the referenced instances might not yet be available from the referenced source(s).</p> <p>READY The Input Information Sequence is complete and the referenced instances are available from the referenced sources.</p> <p>Note</p> <ol style="list-style-type: none"> 1. If the Procedure Step does not require input information, the Input Readiness State may be READY when the Input Information Sequence is empty. 2. There is no guarantee that the referenced instances will still be available at the referenced location when retrieval is attempted. 3. There is no requirement to confirm the presence of referenced media prior to setting the Input Readiness State to READY.
Input Information Sequence	(0040,4021)	<p>References to information objects needed to perform the scheduled Procedure Step.</p> <p>Referencing unencapsulated HL7 documents is described further in Section C.12.1.1.6. See also Input Readiness State (0040,4041).</p> <p>Zero or more Items shall be included in this Sequence.</p>
<i>>Include Table 10-3b "Referenced Instances and Access Macro Attributes"</i>		
Study Instance UID	(0020,000D)	Unique Study identification that shall be used for the created Composite SOP Instances resulting from this Unified Procedure Step.

Add a new Requesting Station Name to Table CC.2.5-3 in PS3.4 as shown:

Table CC.2.5-3. UPS SOP Class N-CREATE/N-SET/N-GET/C-FIND Attributes

Attribute Name	Tag	Req. Type N-CREATE (SCU/SCP)	Req. Type N-SET (SCU/SCP)	Final State	Req. Type N-GET (SCU/SCP)	Match Key Type	Return Key Type	Remark/Matching Type
...								

Attribute Name	Tag	Req. Type N-CREATE (SCU/SCP)	Req. Type N-SET (SCU/SCP)	Final State	Req. Type N-GET (SCU/SCP)	Match Key Type	Return Key Type	Remark/Matching Type
Unified Procedure Step Scheduled Procedure Information Module								
...								
Requesting Station Name Code Sequence	(0040,40XX)	2/2	3/2	O	3/2	O	2	The Attributes of the Scheduled Station Name Code Sequence shall only be retrieved with Sequence Matching.
>Include Table CC.2.5-2a "UPS Code Sequence Macro"								
Scheduled Station Name Code Sequence	(0040,4025)	2/2	3/2	O	3/2	R	2	The Attributes of the Scheduled Station Name Code Sequence shall only be retrieved with Sequence Matching. Note In Push Scenario, the SCP-Performer has to create empty but could self fill later
>Include Table CC.2.5-2a "UPS Code Sequence Macro"								
...								
All other Attributes from the Unified Procedure Step Scheduled Procedure Information Module		3/3	3/3	O	3/3	-	-	

Add a new Requesting Station Name to PS3.6 as shown:

Table 6-1. Registry of DICOM Data Elements

Tag	Name	Keyword	VR	VM
(0040,40XX)	Requesting Station Name Code Sequence	RequestingStationNameCodeSequence	SQ	1