DICOM Correction Proposal Form

Tracking Information - Administration Use Only	
Correction Proposal Number	CP-992
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Correction Number	CP-992
Log Summary: Clarify allowable length values for certain PDUs	
Type of Modification Correction	Name of Standard PS 3.7, P.S. 3.8-2008

Rationale for Correction

The wording in the description of Item-Length and PDU-length in some PDU and Sub-Item definitions does not prohibit a value of 0, which can lead to confusion.

<Confirm that the requirement it encode the length and the requirement on the content of the referenced item make 0 impossible anyway. If so, cancel.>

Is there any reason to interpret the following fields as allowing NULL?

- Implementation-class-uid (clear)
- Implementation-version-name (not clear. optional, up to 16 char, structure and policies not specified)
- SCP/SCU Role Selection – pretty clear. Mandatory fields, SCU role shall contain a byte, so UID-length is a positive integer, and Item-length is a larger positive integer.
- SOP Class Extended Negotiation – pretty clear. Mandatory fields, one Sub-Item per SOP Class UID. Does any Service Class make this Sub-Item mandatory but not make it mandatory to propose at least one extended item?
- Some ambiguity from the text "The Association-acceptor, for each SOP Class Extended Negotiation Sub-Item offered, either accepts the Association-requester proposal by returning the same value (1) or turns down the proposal by returning the value (0)." Might imply that you can populate the Extended Negotiation Sub-Item with a single 0 byte.
- SOP Class Common Extended Negotiation – clear. Mandatory fields. Explicit statement that the last two may be zero-length, implying the rest can't be. Additionally the SOP-class-uid-length byte means Item-Length can't be zero.
- User Identity – mostly clear. Mandatory fields make Item-length non-zero. In the response, zero length server response is explicitly permitted, making the Server-response-length byte "0" which in turn makes the Item-length non-zero.
  Slight ambiguity in the text "This Sub-Item is optional and if supported, only one User Identity Negotiation Sub-Item shall be present in the User Data Item". If I have chosen to support User-Identity Sub-Item, is it required that there shall always be one (i.e. even if the user has not identified themself)?
- A-ASSOCIATE-RQ PDU – clear. Mandatory fields make PDU-length non-zero.
- Application context item – mostly clear. Annex F disallows Null components for Application-context-names.
  Some ambiguity since the text "An Application Context Item shall be made of a sequence of mandatory fields followed by a variable length field." implies the variable length field is not mandatory allowing a zero Item Length. Suggest changing "mandatory" to "fixed length" and let the sentence after bring in Mandatory.
- Presentation Context Item - clear. Mandatory fields make Item-Length non-zero. Variable field explicitly required to have contents.
- Abstract Syntax item – mostly clear. Annex F disallows Null components for Abstract-syntax-names.
  Some ambiguity since the text "The Abstract Syntax Sub Item shall be made of a sequence of mandatory fixed length fields followed by a variable field." implies the variable length field is not mandatory allowing a zero Item Length. Suggest deleting the word mandatory since it is in the next sentence.
- Transfer Syntax Item – same
- User Information Item – mostly-clear. Explicitly requires one or more User-Data sub-items, and all subitems start with an Item-type making them non-zero.
  Same ambiguity as most (will not note for remaining items. Find/fix everywhere if fixing.)

Sections of documents affected
PS 3.7 Annex D, PS 3.8 Section 9
Correction Wording:

In PS 3.7, Annex D (DICOM upper layer protocol for TCP/IP), insert text as follows:

…

Table D.3-1
IMPLEMENTATION CLASS UID SUB-ITEM FIELDS (A-ASSOCIATE-RQ)

Item Bytes	Field Name	Description of Field
1	Item-type	52H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Implementation-class-uid field. It shall be encoded as an unsigned **non-zero** binary number.
5 - xxx	Implementation-class-uid	This variable field shall contain the Implementation-class-uid of the Association-requester as defined in Section D.3.3.2 of this part. The Implementation-class-uid field is structured as a UID as defined in PS 3.5.

D.3.3.2.2 Implementation class UID sub-item structure (A-ASSOCIATE-AC)

The Implementation Class UID Sub-Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Only one Implementation Class UID Sub-Item shall be present in the User Data Item of the A-ASSOCIATE-AC. Table D.3-2 shows the sequence of the mandatory fields.

Table D.3-2
IMPLEMENTATION UID SUB-ITEM FIELDS (A-ASSOCIATE-AC)

Item Bytes	Field Name	Description of Field
1	Item-type	52H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Implementation-class-uid field. It shall be encoded as an unsigned **non-zero** binary number.
5 - xxx	Implementation-class-uid	This variable field shall contain the Implementation-class-uid of the Association-acceptor as defined in Section D.3.3.2. The Implementation-class-uid field is structured as a UID as defined in PS 3.5.

D.3.3.2.3 Implementation version name structure (A-ASSOCIATE-RQ)

The Implementation Version Name Sub-Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Only one Implementation Version Name Sub-Item shall be present in the User Data Item of the A-ASSOCIATE-RQ. Table D.3-3 shows the sequence of the mandatory fields.

Table D.3-3
IMPLEMENTATION VERSION NAME SUB-ITEM FIELDS (A-ASSOCIATE-RQ)

Item Bytes	Field Name	Description of Field
1	Item-type	55H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Implementation-version-name field. It shall be encoded as an unsigned **non-zero** binary number.
5 - xxx	Implementation-version-name	This variable field shall contain the Implementation-version-name of the Association-requester as defined in Section D.3.3.2. It shall be encoded as a string of 1 to 16 ISO 646:1990 (basic G0 set) characters.

D.3.3.2.4 Implementation version name structure (A-ASSOCIATE-AC)

The Implementation Version Name Sub-Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Only one Implementation Version Name Sub-Item shall be present in the User Data Item of the A-ASSOCIATE-AC. Table D.3-4 shows the sequence of the mandatory fields.

Table D.3-4
IMPLEMENTATION VERSION NAME SUB-ITEM FIELDS (A-ASSOCIATE-AC)

Item Bytes	Field Name	Description of Field
1	Item-type	55H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Implementation-version-name field. It shall be encoded as an unsigned **non-zero** binary number.
5 - xxx	Implementation-version-name	This variable field shall contain the Implementation-version-name of the Association-acceptor as defined in Section D.3.3.2. It shall be encoded as a string of 1 to 16 ISO 646:1990 (basic G0 set) characters.

…

D.3.3.4.1 SCP/SCU role selection sub-item structure (A-ASSOCIATE-RQ)

The SCP/SCU Role Selection Sub-Item shall be made of a sequence of mandatory fields. This Sub-Item is optional and if supported, one or more SCP/SCU Role Selection Sub-Items may be present in the User Data Item of the A-ASSOCIATE-RQ. Table D.3-9 shows the sequence of the mandatory fields.

Table D.3-9
SCP/SCU ROLE SELECTION SUB-ITEM FIELDS (A-ASSOCIATE-RQ)

Item Bytes	Field Name	Description of Field
1	Item-type	54H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the SCP Role field. It shall be encoded as an unsigned **non-zero** binary number.
5-6	UID-length	This UID-length shall be the number of bytes from the first byte of the following field to the last byte of the SOP-class-uid field. It shall be encoded as an unsigned binary number.
7 -xxx	SOP-class-uid	This variable field shall contain the SOP Class UID or Meta SOP Class UID which may be used to identify the corresponding Abstract Syntax for which this Sub-Item pertains. It shall encoded as an UID as defined in PS 3.5.
xxx	SCU-role	This byte field shall contain the SCU-role as defined for the Association-requester in Section D.3.3.4. It shall be encoded as an unsigned binary and shall use one of the following values: 0 - non support of the SCU role 1 - support of the SCU role
xxx	SCP-role	This byte field shall contain the SCP-role as defined for the Association-requester in Section D.3.3.4. It shall be encoded as an unsigned binary and shall use one of the following values: 0 - non support of the SCP role 1 - support of the SCP role.

D.3.3.4.2 SCP/SCU role selection sub-item structure (A-ASSOCIATE-AC)

The SCP/SCU Role Selection Sub-Item shall be made of a sequence of mandatory fields. This Sub-Item is optional and if supported, one or more SCP/SCU Role Selection Sub-Items may be present in the User Data Item of the A-ASSOCIATE-AC. Table D.3-10 shows the sequence of the mandatory fields.

Table D.3-10
SCP/SCU ROLE SELECTION SUB-ITEM FIELDS (A-ASSOCIATE-AC)

Item Bytes	Field Name	Description of Field
1	Item-type	54H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the SCP Role field. It shall be encoded as an unsigned **non-zero** binary number.
5-6	UID-length	This UID-length shall be the number of bytes from the first byte of the following field to the last byte of the SOP-class-uid field. It shall be encoded as an unsigned binary number.
7-xxx	SOP-class-uid	This variable field shall contain the SOP Class UID or Meta SOP Class UID which may be used to identify the corresponding Abstract Syntax for which this Sub-Item pertains. It shall encoded as an UID as defined in PS 3.5.
xxx	SCU-role	This byte field shall contain the SCU-role as defined in Section D.3.3.4. It shall be encoded as an unsigned binary and shall use one of the following values: 0 - The Association-acceptor rejects the Association-requester's proposal of the SCU role selection 1 - The Association-acceptor accepts the Association-requester's proposal of the SCU role selection
xxx	SCP-role	This byte field shall contain the SCP-role as defined for the Association-acceptor in Section D.3.3.4. It shall be encoded as an unsigned binary and shall use one of the following values: 0 - The Association-acceptor rejects the Association-requester's proposal of the SCP role selection 1 - The Association-acceptor accepts the Association-requester's proposal of the SCP role selection

D.3.3.5 SERVICE-OBJECT PAIR (SOP) CLASS EXTENDED NEGOTIATION

The SOP Class Extended Negotiation allows, at Association establishment, peer DICOM AEs to exchange application information defined by specific Service Class specifications. This is an optional feature that various Service Classes may or may not choose to support.

Each Service Class specification is required to document, as part of its SOP Class or Meta SOP Class, the application information it supports and how this information is negotiated between SCUs and SCPs. Service Class specifications shall specify, for both the SCU and SCP roles, the following:

- semantics of the application information (including the negotiation rules)
- encoding of the application information
- conditions for which the application information is mandatory and/or optional
- default conditions of the application information

Note: The use of the SOP Class Extended Negotiation is not limited to Service Classes defined by this Standard. It may also be used for privately defined Service Classes.

The Association-requester may only offer one SOP Class Extended Negotiation item for each SOP Class UID or Meta SOP Class.

If the SOP Class Extended Negotiation items do not exist in the A-ASSOCIATE indication they shall be omitted in the A-ASSOCIATE response.

D.3.3.5.1 SOP class extended negotiation sub-item structure(A-ASSOCIATE-RQ)

The SOP Class Extended Negotiation Sub-item shall be made of a sequence of mandatory fields followed by the Service-class-application-information field (specific for each Service Class specification). This Sub-Item is required per the specific Service Class specifications. Multiple SOP Class Extended Negotiation Sub-Items may be present in the User Data Item of the A-ASSOCIATE-RQ, however, only one Sub-Item per SOP Class UID shall be present. Table D.3-11 shows the sequence of mandatory fields.

Table D.3-11
SOP CLASS EXTENDED NEGOTIATION SUB-ITEM FIELDS
(A-ASSOCIATE-RQ and A-ASSOCIATE-AC)

Item Bytes	Field Name	Description of Field
1	Item-type	56H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-Length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Service-class-application-information field. It shall be encoded as an unsigned **non-zero** binary number.
5-6	SOP-class-uid-length	The SOP-class-uid-length shall be the number of bytes from the first byte of the following field to the last byte of the SOP-class-uid field. It shall be encoded as an unsigned binary number.
7-xxx	SOP-class-uid	The SOP Class or Meta SOP Class identifier encoded as a UID as defined in PS 3.5.
xxx-xxx	Service-class-application-information	This field shall contain the application information specific to the Service Class specification identified by the SOP-class-uid. The semantics and value of this field is defined in the identified Service Class specification.

D.3.3.5.2 SOP class extended negotiation sub-item structure (A-ASSOCIATE-AC)

The SOP Class Extended Negotiation Sub-item shall be made of a sequence of mandatory fields followed by the Service-class-application-information field (specific for each Service Class specification). This Sub-Item is required per the specific Service Class specifications. Multiple SOP Class Extended Negotiation Sub-Items may be present in the User Data Item of the A-ASSOCIATE-AC, however, only one Sub-Item per SOP Class UID shall be present. Table D.3-11 shows the sequence of mandatory fields.

D.3.3.6 SERVICE-OBJECT PAIR (SOP) CLASS COMMON EXTENDED NEGOTIATION

The SOP Class Common Extended Negotiation allows, at Association establishment, peer DICOM AEs to exchange application information, the form of which is generic, and not specific to individual Service Classes, as compared to the information defined in D.3.3.5. This is an optional feature that Association-

requesters and Association-acceptors may or may not choose to support.

The information included for each SOP Class for which a sub-item is present consists of a Service Class UID and (optionally) a Related General SOP Class UID.

The Service Class UID conveys the Service Class of the SOP Class.

Note: Explicit conveyance of the Service Class may allow the selection of the proper format for the Service-class-application-information of the SOP Class Extended Negotiation Sub-item.

The Related General SOP Class UID conveys zero or more Related General SOP Class for the SOP Class.

Notes: 1. Consider the example of negotiation of support for a Procedure Log Storage SOP Class. That SOP Class is of the Storage Service Class. The encoding of the IOD would be compatible with the more general Enhanced SR Storage SOP Class. Therefore, the following common extended negotiation sub-item could optionally be included:

SOP Class UID:	1.2.840.10008.5.1.4.1.1.88.40	Procedure Log
Service Class UID:	1.2.840.10008.4.2	Storage Service Class
Related General SOP Class UID:	1.2.840.10008.5.1.4.1.1.88.22	Enhanced SR

2. The Related SOP Class may be absent, though the Service Class may still be included. For example, there may be a new image storage SOP Class without a Related SOP Class defined in PS 3.4, yet it is still useful to an Association-acceptor to be informed that the new SOP Class is of the Storage Service Class:

SOP Class UID:	1.2.840.10008.5.1.4.1.1.7.1	MF Single Bit SC Image Storage
Service Class UID:	1.2.840.10008.4.2	Storage Service Class
Related General SOP Class UID:	(none)	

The Association-requester may only offer one SOP Class Common Extended Negotiation item for each SOP Class UID.

No response is necessary, hence the SOP Class Common Extended Negotiation items shall be omitted in the A-ASSOCIATE response.

D.3.3.6.1 SOP class common extended negotiation sub-item structure (A-ASSOCIATE-RQ)

The SOP Class Common Extended Negotiation Sub-item shall be made of a sequence of mandatory fields, the last two of which may be zero-length. Multiple SOP Class Common Extended Negotiation Sub-Items may be present in the User Data Item of the A-ASSOCIATE-RQ, however, only one Sub-Item per SOP Class UID shall be present. Table D.3-12 shows the sequence of mandatory fields.

Table D.3-12
SOP CLASS COMMON EXTENDED NEGOTIATION SUB-ITEM FIELDS
(A-ASSOCIATE-RQ)

Item Bytes	Field Name	Description of Field
1	Item-type	57H
2	Sub-item-version	This field indicates the version of the Sub-item. Fields added to the Sub-item definition in succeeding editions of the Standard will not affect the semantics of previously defined fields. The version of the Sub-item defined in this edition of

		the Standard is 0.
3-4	Item-Length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Reserved field. It shall be encoded as an unsigned **non-zero** binary number.
5-6	SOP-class-uid-length	The SOP-class-uid-length shall be the number of bytes in the SOP-class-uid field. It shall be encoded as an unsigned binary number.
7-x	SOP-class-uid	The SOP Class identifier encoded as a UID as defined in PS 3.5.
(x+1)-(x+2)	Service-class-uid-length	The Service-class-uid-length shall be the number of bytes in the Service-class-uid field. It shall be encoded as an unsigned binary number.
(x+3)-y	Service-class-uid	The Service Class identifier encoded as a UID as defined in PS 3.5.
(y+1)-(y+2)	Related-general-sop-class-identification-length	The Related-general-sop-class-identification-length shall be the number of bytes in the Related-general-sop-class-identification field. Shall be zero if no Related General SOP Classes are identified.
(y+3)-z	Related-general-sop-class-identification	The Related-general-sop-class-identification is a sequence of pairs of length and UID sub-fields. Each pair of sub-fields shall be formatted in accordance with Table D.3-13.
(z+1)-k	Reserved	Reserved for additional fields of the sub-item. Shall be zero-length for Version 0 of Sub-item definition.

…

D.3.3.7.1 User Identity sub-item structure(A-ASSOCIATE-RQ)

The User Identity Negotiation Sub-Item shall be made of a sequence of mandatory fixed and variable length fields. This Sub-Item is optional and if supported, only one User Identity Negotiation Sub-Item shall be present in the User Data Item of the A-ASSOCIATE-RQ. Table D.3-14 shows the sequence of the mandatory fields.

Table D.3-14
User Identity Negotiation SUB-ITEM FIELDS
(A-ASSOCIATE-RQ)

Item Bytes	Field Name	Description of Field
1	Item-type	58H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the last field sent. It shall be encoded as an unsigned **non-zero** binary number.
5	User-Identity-Type	Field value shall be in the range 1 to 4 with the following meanings: 1 – Username as a string in UTF-8

		2 – Username as a string in UTF-8 and passcode 3 – Kerberos Service ticket 4 – SAML Assertion Other values are reserved for future standardization.
6	Positive-response-requested	Field value: 0 - no response requested 1 - positive response requested
7-8	Primary-field-length	The User-Identity-Length shall contain the length of the User-Identity value.
9-n	Primary-field	This field shall convey the user identity, either the username as a series of characters, or the Kerberos Service ticket encoded in accordance with RFC-1510.
n+1-n+2	Secondary-field-length	This field shall be non-zero only if User-Identity-Type has the value 2. It shall contain the length of the secondary-field.
n+3-m	Secondary-field	This field shall be present only if User-Identity-Type has the value 2. It shall contain the Passcode value.

D.3.3.7.2 User Identity sub-item structure(A-ASSOCIATE-AC)

The User Identity Sub-Item shall be made of a sequence of mandatory fixed and variable length fields. This Sub-Item is optional and if supported, only one User Identity Sub-Item shall be present in the User Data Item of the A-ASSOCIATE-AC. Table D.3-15 shows the sequence of the mandatory fields.

Table D.3-15
User Identity Negotiation SUB-ITEM FIELDS
(A-ASSOCIATE-AC)

Item Bytes	Field Name	Description of Field
1	Item-type	59H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3 - 4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the final field. It shall be encoded as an unsigned **non-zero** binary number.
5-6	Server-response-length	This field shall contain the number of bytes in the Server-response. May be zero.
7-n	Server-response	This field shall contain the Kerberos Server ticket, encoded in accordance with RFC-1510, if the User-Identity-Type value in the A-ASSOCIATE-RQ was 3. This field shall contain the SAML response if the User-Identity-Type value in the A-ASSOCIATE-RQ was 4. This field shall be zero length if the value of the User-Identity-Type in the A-ASSOCIATE-RQ was 1 or 2.

In PS 3.8, Section 9 (DICOM upper layer protocol for TCP/IP), insert text as follows:

…

9.3.2 A-ASSOCIATE-RQ PDU STRUCTURE

An A-ASSOCIATE-RQ PDU shall be made of a sequence of mandatory fields followed by a variable length field. Table 9-11 shows the sequence of the mandatory fields.

The variable field shall consist of one Application Context Item, one or more Presentation Context Items, and one User Information Item. Sub-Items shall exist for the Presentation Context and User Information Items.

Table 9-11
ASSOCIATE-RQ PDU fields

PDU bytes	Field name	Description of field
1	PDU-type	01H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-6	PDU-length	This PDU-length shall be the number of bytes from the first byte of the following field to the last byte of the variable field. It shall be encoded as an unsigned **non-zero** binary number
7-8	Protocol-version	This two byte field shall use one bit to identify each version of the DICOM UL protocol supported by the calling end-system. This is Version 1 and shall be identified with bit 0 set. A receiver of this PDU implementing only this version of the DICOM UL protocol shall only test that bit 0 is set.
9-10	Reserved	This reserved field shall be sent with a value 0000H but not tested to this value when received.
11-26	Called-AE-title	Destination DICOM Application Name. It shall be encoded as 16 characters as defined by the ISO 646:1990-Basic G0 Set with leading and trailing spaces (20H) being non-significant. The value made of 16 spaces (20H) meaning “no Application Name specified” shall not be used. For a complete description of the use of this field, see Section 7.1.1.4.
27-42	Calling-AE-title	Source DICOM Application Name. It shall be encoded as 16 characters as defined by the ISO 646:1990-Basic G0 Set with leading and trailing spaces (20H) being non-significant. The value made of 16 spaces (20H) meaning “no Application Name specified” shall not be used. For a complete description of the use of this field, see Section 7.1.1.3.
43-74	Reserved	This reserved field shall be sent with a value 00H for all bytes but not tested to this value when received
75-xxx	Variable items	This variable field shall contain the following items: one Application Context Item, one or more Presentation Context Items and one User Information Item. For a complete description of the use of these items see Sections 7.1.1.2, 7.1.1.13, and 7.1.1.6.

9.3.2.1 Application context item structure

An Application Context Item shall be made of a sequence of mandatory fields followed by a variable length field. Table 9-12 shows the sequence of the mandatory fields.

Table 9-12
APPLICATION CONTEXT ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	10H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Application-context-name field. It shall be encoded as an unsigned **non-zero** binary number.
5-xxx	Application-context-name	A valid Application-context-name shall be encoded as defined in Annex F. For a description of the use of this field see Section 7.1.1.2. Application-context-names are structured as UIDs as defined in PS 3.5 (see Annex A for an overview of this concept). DICOM Application-context-names are registered in PS 3.7.

9.3.2.2 Presentation context item structure

The Presentation Context Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Table 9-13 shows the sequence of the mandatory fields.

The variable field shall consist of one Abstract Syntax Sub-Item followed by one or more Transfer Syntax Sub-Items.

Table 9-13
PRESENTATION CONTEXT ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	20H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the last Transfer Syntax Item. It shall be encoded as an unsigned **non-zero** binary number.
5	Presentation-context-ID	Presentation-context-ID values shall be odd integers between 1 and 255, encoded as an unsigned binary number. For a complete description of the use of this field see Section 7.1.1.13.
6	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
7	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
8	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
9-xxx	Abstract/Transfer	This variable field shall contain the following sub-items: one Abstract

	Syntax Sub-Items	Syntax and one or more Transfer Syntax(es). For a complete description of the use and encoding of these sub-items see Sections 9.3.2.2.1 and 9.3.2.2.2.

9.3.2.2.1 Abstract syntax sub-item structure

The Abstract Syntax Sub-Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Table 9-14 shows the sequence of the mandatory fields.

Table 9-14
ABSTRACT SYNTAX SUB-ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	30H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Abstract-syntax-name field. It shall be encoded as an unsigned **non-zero** binary number.
5-xxx	Abstract-syntax-name	This variable field shall contain the Abstract-syntax-name related to the proposed presentation context. A valid Abstract-syntax-name shall be encoded as defined in Annex F. For a description of the use of this field see Section 7.1.1.13. Abstract-syntax-names are structured as UIDs as defined in PS 3.5 (see Annex B for an overview of this concept). DICOM Abstract-syntax-names are registered in PS 3.4.

9.3.2.2.2 Transfer syntax sub-item structure

The Transfer Syntax Sub-Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Table 9-15 shows the sequence of the mandatory fields.

Table 9-15
TRANSFER SYNTAX SUB-ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	40H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Transfer-syntax-name field(s). It shall be encoded as an unsigned **non-zero** binary number~~s~~
5-xxx	Transfer-syntax-name(s)	This variable field shall contain the Transfer-syntax-name proposed for this presentation context. A valid Transfer-syntax-name shall be encoded as defined in Annex F. For a description of the use of this field see Section 7.1.1.13. Transfer-syntax-names are structured as UIDs as defined in PS 3.5 (see Annex B for an overview of this concept). DICOM Transfer-syntax-names are registered in PS 3.5.

9.3.2.3 User information item structure

The User Information Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Table 9-16 shows the sequence of the mandatory fields.

The variable field shall consist of one or more User-Data Sub-Items.

Note: The User-Data Sub-Items may be present in any order within the User-Information Item. No significance should be placed on the order of User-Data Sub-Items within the User Information Item. Sending applications should be aware that some older applications might expect Sub-Items to be encoded in ascending order of Item-type within the enclosing Item.

Table 9-16
USER INFORMATION ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	50H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the User-data field(s). It shall be encoded as an unsigned **non-zero** binary number.
5-xxx	User-data	This variable field shall contain User-data sub-items as defined by the DICOM Application Entity. The structure and content of these sub-items is defined in Annex D.

9.3.3 A-ASSOCIATE-AC PDU STRUCTURE

An A-ASSOCIATE-AC PDU shall be made of a sequence of mandatory fields followed by a variable length field. Table 9-17 shows the sequence of the mandatory fields.

The variable field consist of one Application Context Item, one or more Presentation Context Items, and one User Information Item. Sub-Items shall exist for the Presentation Context and User Information Items.

Table 9-17
ASSOCIATE-AC PDU fields

PDU bytes	Field name	Description of field
1	PDU-type	02H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-6	PDU-length	This PDU-length shall be the number of bytes from the first byte of the following field to the last byte of the variable field. It shall be encoded as an unsigned **non-zero** binary number.
7-8	Protocol-version	This two byte field shall use one bit to identify each version of the DICOM UL protocol supported by the calling end-system. This is Version 1 and shall be identified with bit 0 set. A receiver of this PDU implementing only this version of the DICOM UL protocol shall only test that bit 0 is set.
9-10	Reserved	This reserved field shall be sent with a value 0000H but not tested to this value when received.

11-26	Reserved	This reserved field shall be sent with a value identical to the value received in the same field of the A-ASSOCIATE-RQ PDU, but its value shall not be tested when received.
27-42	Reserved	This reserved field shall be sent with a value identical to the value received in the same field of the A-ASSOCIATE-RQ PDU, but its value shall not be tested when received.
43-74	Reserved	This reserved field shall be sent with a value identical to the value received in the same field of the A-ASSOCIATE-RQ PDU, but its value shall not be tested when received.
75-xxx	Variable items	This variable field shall contain the following items: one Application Context Item, one or more Presentation Context Item(s) and one User Information Item. For a complete description of these items see Sections 7.1.1.2, 7.1.1.14, and 7.1.1.6.

9.3.3.1 Application context item structure

An Application Context Item shall be made of a sequence of mandatory fields followed by a variable length field. Table 9-12 shows the sequence of mandatory fields.

9.3.3.2 Presentation context item structure

The Presentation Context Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Table 9-18 shows the sequence of the mandatory fields.

The variable field shall consist of one Transfer Syntax Sub-Item.

Table 9-18
PRESENTATION CONTEXT ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	21H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Transfer Syntax Sub-Item. It shall be encoded as an unsigned **non-zero** binary number.
5	Presentation-context-ID	Presentation-context-ID values shall be odd integers between 1 and 255, encoded as an unsigned binary number. For a complete description of the use of this field see Section 7.1.1.13.
6	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
7	Result/Reason	This Result/Reason field shall contain an integer value encoded as an unsigned binary number. One of the following values shall be used: 0 - acceptance 1 - user-rejection 2 - no-reason (provider rejection) 3 - abstract-syntax-not-supported (provider rejection) 4 - transfer-syntaxes-not-supported (provider rejection)
8	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
9-xxx	Transfer syntax sub-item	This variable field shall contain one Transfer Syntax Sub-Item. When the Result/Reason field has a value other than acceptance(0), this field shall not be significant and its value shall not be tested when received. For a complete description of the use and encoding of this item see Section 9.3.3.2.1.

9.3.3.2.1 Transfer syntax sub-item structure

The Transfer Syntax Sub-Item shall be made of a sequence of mandatory fixed length fields followed by a variable field. Table 9-19 shows the sequence of the mandatory fields.

Table 9-19
TRANSFER SYNTAX SUB-ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	40H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Transfer-syntax-name field. It shall be encoded as an unsigned **non-zero** binary number.
5-xxx	Transfer-syntax-name	This variable field shall contain the Transfer-syntax-name proposed for this presentation context. A valid Transfer-syntax-name shall be encoded as defined in Annex F. For a description of the use of this field

		see Section 7.1.1.14. Transfer-syntax-names are structured as UIDs as defined in PS 3.5 (see Annex B for an overview of this concept). DICOM Transfer-syntax-names are registered in PS 3.5.

9.3.3.3 User information item structure

The User Information Item shall be made of a sequence of mandatory length fields followed by a variable field. Table 9-20 shows the sequence of the mandatory fields.

The variable field shall consist of one or more User-Data Sub-Items.

Note: The User-Data Sub-Items may be present in any order within the User-Information Item. No significance should be placed on the order of User-Data Sub-Items within the User Information Item. Sending applications should be aware that some older applications might expect Sub-Items to be encoded in ascending order of Item-type within the enclosing Item.

Table 9-20
USER INFORMATION ITEM FIELDS

Item bytes	Field name	Description of field
1	Item-type	50H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the User-data-information field(s). It shall be encoded as an unsigned **non-zero** binary number.
5-xxx	User-data	This variable field shall contain User-data sub-items as defined by the DICOM Application Entity. The structure and content of these sub-items is defined in Annex D.

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9.3.5 P-DATA-TF PDU STRUCTURE

A P-DATA-TF PDU shall be made of a sequence of mandatory fixed length fields followed by a variable length field. Table 9-22 shows the sequence of the mandatory fields.

The variable data field shall contain one or more Presentation-Data-Value Items.

Table 9-22
P-DATA-TF PDU FIELDS

PDU bytes	Field name	Description of field
1	PDU-type	04H
2	Reserved	This reserved field shall be sent with a value 00H but not tested to this value when received.
3-6	PDU-length	This PDU-length shall be the number of bytes from the first byte of the following field to the last byte of the variable field. It shall be encoded as an unsigned **non-zero** binary number.
7-xxx	Presentation-	This variable data field shall contain one or more

	data-value Item(s),	Presentation-data-value Items(s). For a complete description of the use of this field see Section 9.3.5.1

9.3.5.1 Presentation data value item structure

The Presentation Data Value Item shall be made of a sequence of mandatory fixed length fields followed by one variable length field. Table 9-23 shows the sequence of the fields.

The variable field shall consist of one Presentation-Data-Value.

Table 9-23
PRESENTATION-DATA-VALUE ITEM FIELDS

Item bytes	Field name	Description of field
1-4	Item-length	This Item-length shall be the number of bytes from the first byte of the following field to the last byte of the Presentation-data-value field. It shall be encoded as an unsigned **non-zero** binary number.
5	Presentation-context-ID	Presentation-context-ID values shall be odd integers between 1 and 255, encoded as an unsigned binary number. For a complete description of the use of this field see Section 7.1.1.13.
6-xxx	Presentation-data-value	This Presentation-data-value field shall contain DICOM message information (command and/or data set) with a message control header. For a complete description of the use of this field see Annex E.