Working Implementation Agreements for Open Systems Interconnection Protocols: Part 20 - Manufacturing Message Specification (MMS)

Output from the June 1994 Open Systems Environment Implementors' Workshop (OIW)

SIG Chair: **Rick Igou, Martin Marietta Energy Systems**
SIG Editor: **Rick Igou, Martin Marietta Energy Systems**

Foreword

This part of the Working Implementation Agreements was prepared by the Manufacturing Message Specification (MMS) Special Interest Group (MMSSIG) of the National Institute of Standards and Technology (NIST) Workshop for Implementors of Open Systems Interconnection (OSI). See Part 1 - Workshop Policies and Procedures in the "Draft Working Implementation Agreements Document" for the workshop charter.

Text in this part has been approved by the Plenary of the above-mentioned Workshop. ~~No significant technical change has occurred in this part since it was previously presented.~~ Annex D has been added to this part as new text. Some of annex d has been shaded; however, mostly, only the headings for each chart are shaded although each chart is new text.

Future changes and additions to this version of these Implementor Agreements will be published as a new part. Deleted and replaced text will be shown as strikeout. New and replacement text will be shown as shaded.

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(Refer to the Stable Agreements, Version 6.)

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(Refer to the Stable Agreements, Version 6.)

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Semaphore services are not considered in Phase 1.

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(Refer to the Stable Agreements, Version 6.)

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Event Management services are not considered in Phase 1.

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Journal Management services are not considered in Phase 1.

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(Refer to the Stable Agreements, Version 6.)

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(Refer to the Stable Agreements, Version 6.)

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(Refer to the Stable Agreements, Version 6.)

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ISP text and Explanatory Report for AMM11, MMS General Applications Profile

(Refer to the Stable Agreements, Version 6.)

TITLE: Explanatory Report for Parts 1-3 of pDISP 14226 - Manufacturing Messaging Specification

SOURCE: OIW

DATE: 1994-6-15

STATUS: Final version for submission to ISO/IEC TC 184/SC 5 together with pDISP

This explanatory report has been prepared in accordance with ISO/IEC procedures which specify the taxonomy update, ISP approval, and maintenance process.

A. General Profile Information

1. Profile identification

These parts of pDISP 14226 cover the profile with taxonomy identifier AMM11, as listed in ISO/IEC TR10000-2:1992.

2. Profile title

Industrial automation systems - International Standardized Profile AMM11: MMS General Application Base Profile.

3. Submitting organization and contact point

The submitting organization is

OIW
NIST
Gaithersburg, MD.
USA

The editor for all parts of this submission who will serve as contact point during the review and approval process is:

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4. Dates of original notification

Submission of harmonized taxonomy update 1992

5. Maintanence

OIW will maintain this document and the point of the contact is the identified in item 3 above.

6. Multi-TC ISP MOA

The MOA is contained in JTC1 SGFS N758

B. Base Standards Referenced

1. ISO IEC Standards

ISO/IEC 9506-1:1990, Industrial automation systems - Manufacturing Message Specification - Part 1: Service definition

ISO/IEC 9506-1:1990/TC1:1994, Industrial automation systems - Manufacturing Message Specification - Part 1: Service definition Technical Corrigenda 1

ISO/IEC 9506-2:1990, Industrial automation systems - Manufacturing Message Specification - Part 2: Protocol specification

ISO/IEC 9506-2:1990/TC1:1994, Industrial automation systems - Manufacturing Message Specification - Part 2: Protocol specification Technical Corrigenda 1

ISO/IEC ISP 11188-1:1993, Information Technology - International Standardized Profile - Common Upper Layer Requirements - Part 1: Basic connection oriented requirements

2. Compliance with documentation requirements on conformance

   The profile documented in the submitted pDISP parts are in the class of Application Profiles using Connection-mode Transport Service. The documentation requirements in ISO/IEC TR 10000-1 on conformance have been met.

3. Non-compliance with base standards.

   There are no aspects of actual or potential non-compliance with base standards.

4. Ammendments and technical corrigenda to base standards which may impact interworking.

   Technical Corrigenda 1 has been referenced by this pDISP. Ammendment 1 has not been referenced as it is out of scope and will not impact interworking.

C. Registration Requirements

None

D. Relationship To Other Publications

   No national or regional standards are referenced in the parts of the submitted pDISP.

E. Profile Purpose

1. Summary

   The AMM set of profiles is applicable to end systems operating in an Open Systems Interconnection (OSI) environment which utilize MMS (ISO/IEC 9506) for communication of real time data and control.

2. Relationship to other ISPs

Part one of this ISP is based on CULR-1.

F. pDISP Development Process

1. Origin and development history

   Reasonably mature regional MMS profiles had been developed by both the OIW and EWOS prior to the development of the MMS ISP. The differences between the two were minor in nature. The ISP has been developed at sessions of the MMS SIG at OIW and with members of OIW and AOW in attendence. Review comments from OIW and AOW have been continously resolved resulting in a harmonized document.

2. Degree of openness and harmonization
   The working drafts of pDISP 14226 have been regularly reviewed by the MMS groups of all three regional workshops, OIW, EWOS, and AOW.

The parts of pDISP 14226 as submitted are fully harmonized between the three regional workshops and have been endorsed by the plenary assemblies of the three workshops.

3. Joint Planning

The taxonomy for the MHS profiles was agreed between the three workshops and submitted to SGFS in 1992. It is included in the current published version of ISO/IEC TR 10000-2.

G. ISP Content & Format.

1. The requirements and format as described in TR 10000-1 have been met.

2. Section not applicable.

3. Multi-part Structure.

This ISP consists of three parts. Part one contains the requirements for upper layer protocols based on CULR-1, ISP 11188. Part two contains requirements for all ISPs based on MMS. Part three contains a base set of requirements for use in MMS communications.

4. Multi-TC requirements.

As part one requires ballot by JTC1 in addition to TC 184.

H. Any Other Information

None.

TITLE: Information technology – International Standardized Profiles AMM11: MMS General Applications Base Profile – Part 1: Specification of ACSE, Presentation and Session Protocols for the use by MMS

SOURCE: Editor

STATUS: Submittal copy, June 1994

This document has been prepared based on the comments from the OIW's MMS SIG, EWOS's EGMMS and the AOW's MMS SIG. The text has been revised to be as close to the final document as possible at this time. Additions to draft six text are denoted by highlighted text. Deletions are denoted by strikeout.

This document is based on ISO/IEC DISP 11188-1, Common Upper Layer Requirements (CULR). When additional requirements are needed, they are included in this part. The intention is to not duplicate text from DISP 11188-1 here. Since we are referencing DISP 11188-1, the definition of 'm', 'o', etc is determined by DISP 11188-1.

Contents

Foreword

The ISO/IEC ISP 14226 specifies the AMM11 MMS General Applications International Standardized Profile. This ISP has three parts:

Part 1 - Specification of ACSE, Presentation, and Session Protocols for the use by MMS

Part 2 - Common MMS Requirements

Part 3 - Specific MMS Requirements

This part of the ISO/IEC ISP 14226 is produced and approved by the Special Group on Functional Standardization of ISO/IEC JTC 1. This Group includes ISO/IEC Member Bodies and S-liaison organizations. The S-liaison organizations that have contributed to the production of this draft are

Asia-Oceania Workshop (AOW)

European Workshop for Open Systems (EWOS)

NIST OSE Implementors Workshop (OIW)

Introduction

This draft for an International Standardized Profile (ISP) is defined within the context of Functional Standardization, in accordance with the principles specified by ISO/IEC TR 10000, "Framework and Taxonomy of International Standardized Profiles". The context of Functional Standardization is one part of the overall field of Information Technology (IT) standardization activities, covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that collectively perform a specific well-defined IT function. Profiles standardize the use of options and other variations in the base standards, and provide a basis for the development of uniform, internationally recognized system tests.

Information technology – International Standardized Profiles AMM11: MMS General Applications Base Profile –

PART 1: Specification of ACSE, Presentation and Session Protocols for the use by MMS

1. Scope

1.1. General

This part of ISO/IEC ISP 14226 specifies how the Association Control Service Element, the Presentation layer and the Session layer standards shall be used to support the required MMS functions specified in Part 3. Other MMS ISPs may specify this part as part of their profiles.

1.2. Position within the Taxonomy

This part of ISO/IEC ISP 14226 is the first part, of a multi-part ISP identified in ISO/IEC TR 10000-2 as "AMM11, MMS General Applications Base Profile".
It may be combined with any T-Profile specifying the OSI connection-mode transport service.

1.3. Scenario

The model used is one of two end systems running an end-to-end association using the ACSE, Presentation and Session services and protocols (see figure 1).

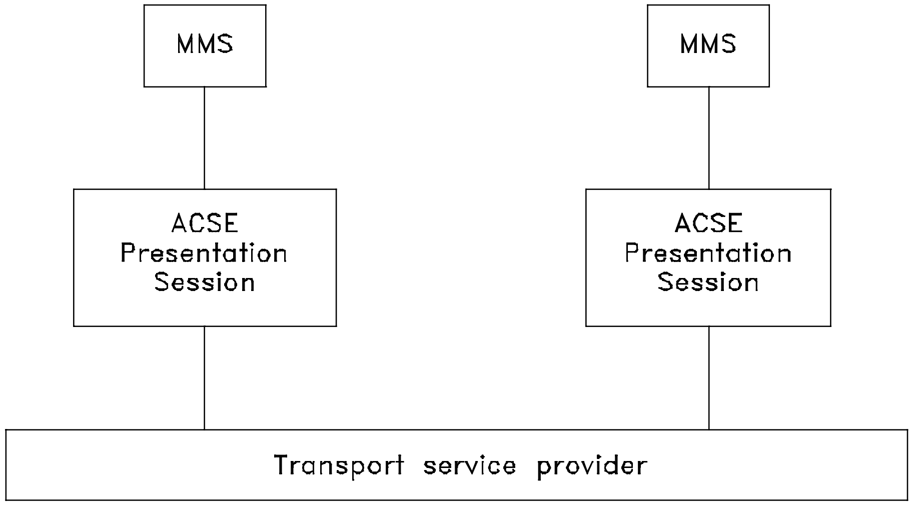

Figure 1 - Model of the supportive layers

2. Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this profile. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this profile are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and CCITT maintains published editions of its current Recommendations.

Amendments and corrigenda to the base standards referenced: See annex B for a complete list of these documents which are used in this ISP.

- ISO/IEC TR 10000-1:1992, Information Technology - Framework and taxonomy of International Standardized Profiles - Part 1 : Framework.

- ISO/IEC TR 10000-2:1992, Information Technology - Framework and taxonomy of International Standardized Profiles - Part 2 : Taxonomy of Profiles.

- ISO/IEC DISP 11188-1:1993, Information Technology - International Standardized Profile -Common Upper Layer Requirements - Part 1: Basic connection oriented requirements.

3. Definitions

Terms used in this part are defined in the referenced base standards.

4. Abbreviations

Abbreviations used in this part are defined in the referenced base standards.

PRL Profile Requirements List

5. Conformance

This part of ISO/IEC ISP 14226 states requirements upon implementations to achieve interworking. A claim of conformance to this part of ISO/IEC ISP 14226 is a claim that all requirements in the relevant base standards are satisfied, and that all requirements in the following Clauses and in annex A are satisfied. Annex A states the relationship between these requirements and those of base standards.

5.1. Conformance Statement

For each implementation claiming conformance to this part of ISO/IEC 14226 an appropriate set of PICSs shall be made available stating support or non-support of each option identified in this part.

5.2. Relationship with Base Standards

All requirements defined in ISO/IEC DISP 11188-1 concerning the relationship with base standards apply for an implementation to conform to this ISP.

Annex A makes mandatory support of some features that were optional in the above document.

5.2.1. ACSE Conformance

To conform to the Association Control Service Element (ACSE) protocol used in this profile, implementations shall implement the normal mode, AE-Title-form2 for sending, support operation of session version 2, and all the supported (m) features (identified in annex A). They shall state which optionally supported (o) features are implemented.

All rules defined in clause 6 of ISO/IEC DISP 11188-1 shall be applied.

5.2.2. Presentation Conformance

To conform to the Presentation protocol used in this profile, implementations shall implement the normal mode and all the supported (m) features (identified in annex A). They shall state which optionally supported (o) features are implemented. All rules defined in clause 7 of ISO/IEC DISP 11188-1 shall be applied.

Conformant implementations shall also support the following encoding rules:

> Constructed encodings shall not be used for bit strings (or types derived from bit strings by tagging) shorter than 256 bits, nor for octet strings (or types derived from octet strings by tagging) shorter than 1024 octets in the MMS PDUs. For such strings, only primitive encoding shall be used. Upon receipt of a constructed bit string or octet string that violates this restriction, the receiving implementation may reject the corresponding PDU or send a P-U-Abort, but shall not send a P-P-Abort.

5.2.3. Transfer Syntax Conformance

An implementation conforming to this part of profile shall support the "Basic Encoding rules of a single ASN.1 type" as defined in ISO 8825, together with the additional rules defined in clause 8 of ISO/IEC DISP 11188-1, for the generation of protocol encodings specified in ASN.1.

5.2.4. Session Conformance

To conform to the Session protocol used in this profile, implementations shall implement the supported (m) features (identified in annex A). They shall state which optionally supported (o) features are implemented. All rules defined in clause 9 of ISO/IEC DISP 11188-1 shall be applied.

Implementations conforming to this part shall implement session version 2.

The session duplex functional unit is required by the base standard for operation of MMS.

PART 1:

Annex A - Profile Requirements List for ACSE, Presentation and Session

A.1. General

NOTE - Upon CULR becoming ISP, the following text will be updated to reflect the CULR ISP.

This annex describes the ACSE, Presentation and Session requirements in terms of tables which reference the base standard PICS proforma. They are intended to give a precise specification of requirements. In case of arbitration or dispute, this annex takes precedence over clause 5 of this ISP.

A.2. References

In the PICS proforma reference column of A.4 to A.6, and in the lists of conditional expressions underneath the tables, tables within the base standard PICS proformas are referenced. The first letter identifies the specific PICS proforma:

A: ACSE – ISO/IEC 8650-2

P: Presentation – ISO/IEC 8823-2

S: Session – ISO/IEC 8327-2

The characters from the second character to the solidus (/) form a reference to the specific subclause in annex A of that PICS proforma which contains the table in question. The number after the solidus references the row number in the table.

A.3. Classification of Requirements

Throughout this annex, to specify the level of support for each feature, the following classification is used.

A.3.1. Status Column

The status column reflects the classification to be found in the base standard PICS proforma:

o: optional

c: conditional

o.n: optional with at least one of the marked items being selected

The definitions of conditional items may be found in the respective PICS proformas.
Where the status entry contains two classifications separated by a comma, these reference the sending and receiving capabilities respectively.

A.3.2. Profile Column

The profile column reflects the requirement of this part of ISO/IEC 14226. Each entry in this column is chosen from the following list (for definitions see ISO/IEC DISP 11188-1 clause 3.2):

m: mandatory support

C: conditional support

o.n: optional with at least one of the marked items being selected

i: outside the scope

-: not applicable

Where the status entry contains two classifications separated by a comma, these reference the sending and receiving capabilities respectively.

A.4. ACSE PRL

	PICS Proforma	Name of Item	Normative Reference	Status	Profile
1	A.A.6.1/1	Initator		o.2	C11
2	A.A.6.1/2	Responder		o.2	C12

C11: If an MMS implementation claims support for the MMS Initiate service in the requestor role then m, else o.

C12: If an MMS implementation claims support for the MMS Initiate service in the responder role then m, else o.

3	A.A.6.2/1	Initiator		o	C13
4	A.A.6.2/2	Requestor		o	C14

C13: If an MMS implementation claims support for the MMS Conclude service in the requestor role then m, else o.

C14: If an MMS implementation claims support for the MMS Conclude service in the responder role then m, else o.

5	A.A.7/1	Normal mode		o.4	m
6	A.A.7/2	X.410 (1984) mode		o.4	i
7	A.A.7/4	Support operation of Session v2		o	m

8	A.A.11.1/2	Form 2 (Object id. and integer)		o.5,m	C15,m

C15: If sending of any of the AP-title or AE-qualifier parameters is supported, them m, else o.

A.5. Presentation PRL

	PICS Proforma	Name of Item	Normative Reference	Status	Profile
1	P.A.5.1/1	X.410 (1984)	5.2.2	o.01	i
2	P.A.5.1/2	Normal	5.2.2	o.01	m

3	P.A.6.1.1.1		Initiator		o.03
4	P.A.6.1.1.1		Responder		o.03

C21: m if the implementation supports the MMS Initiate service in the requestor role. o otherwise.

C22: m if the implementation supports the MMS Initiate service in the responder role. o otherwise.

5	P.A.6.1.1.3		Requestor		o.05
6	P.A.6.1.1.3		Acceptor		o.05

C23: m if the implementation supports the MMS Conclude service in the requestor role. o otherwise.

C24: m if the implementation supports the MMS Conclude service in the responder role. o otherwise.

A.6. Session PRL

	PICS Proforma	Name of Item	Normative Reference	Status	Profile
1	S.A.3/2	Version 2		o.1	m
2	S.A.6.1/4	Duplex		o.2	m
3	S.A.6.2/2	Reuse of transport connection		o	i
4	S.A.6.2/4	Extended Concatenation (sending)		o	i
5	S.A.6.2/5	Extended Concatenation (receiving)		o	i
6	S.A.7.1.1.1		Initiator		o.3
7	S.A.7.1.1.1		Responder		o.3
8	S.A.7.1.1.2		Requestor		o.4
9	S.A.7.1.1.2		Acceptor		o.4
10	S.A.7.1.1.3		Requestor		o.5
11	S.A.7.1.1.3		Acceptor		o.5
12	S.A.7.1.2/2	Overflow Accept (OA)	9.2.2	c5, c6	i,i
13	S.A.7.1.2/3	Connect Data Overflow (CDO)	9.2.2	c6, c5	i,i
14	S.A.7.5.1/1	Requestor (expedited data)		o.6	-
15	S.A.7.5.2/2	Acceptor (expedited data)		o.6	-
16	S.A.7.6.1/1	Requestor (typed data)		o.7	-
17	S.A.7.6.1/2	Acceptor (typed data)		o.7	-
18	S.A.7.7.1/1	Requestor (capability data)		o.8	-
19	S.A.7.7.1/2	Acceptor (capability data)		o.8	-

20	S.A.7.8.1/1	Requestor (minor synchronize)		o.9	-
21	S.A.7.8.1/2	Acceptor (minor synchronize)		o.9	-

22	S.A.7.10.1/		Requestor		o.10
23	S.A.7.10.1/		Acceptor		o.10

24	S.A.7.13.1.		Requestor		o.12
25	S.A.7.13.1.		Acceptor		o.12

26	S.A.7.13.1.		Requestor		o.13
27	S.A.7.13.1.		Acceptor		o.13

28	S.A.7.13.1.		Requestor		o.14
29	S.A.7.13.1.		Acceptor		o.14

30	S.A.7.13.1.		Requestor		o.15
31	S.A.7.13.1.		Acceptor		o.15

32	S.A.7.13.1.		Requestor		o.16
33	S.A.7.13.1.		Acceptor		o.16
34	S.A.7.13.1.		Requestor		o
35	S.A.7.13.1.		Acceptor		o
36	S.A.8.1.3/4	Data Overflow Item (CN)	9.2.2	c6, c5	i,i
37	S.A.8.2/1	TSDU Maximum Size (OA)		c64, c65	i,i
38	S.A.8.2/2	Version Number (OA)		c66, c67	i,i
39	S.A.8.3/1	Enclosure Item (CDO)	9.2.2	c68, c69	i,i
40	S.A.8.3/1	User Data (CDO)	9.2.2	c68, c69	i,i

TITLE: Information technology – International Standardized Profile AMM11: MMS General Applications Base Profile – Part 2: Common MMS Requirements

SOURCE: Editor

STATUS: Submittal copy, June 1994

This document has been prepared based on the comments from the OIW's MMS SIG, EWOS's EG MMS and AOW's MMS SIG. The text has been revised to be as close to the final document as possible at this time. Additions to draft six text are denoted by highlighted text. Deletions are denoted by strikeout.

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OSE Implementors Workshop (OIW)

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Information Technology – International Standardized Profile AMM11 – MMS General Applications Base Profile –

PART 2: Common MMS Requirements

1. Scope

1.1. General

This part of ISO/IEC ISP 14226 specifies the common MMS requirements that form the basis for part 3 of this ISP and for other ISPs referencing this part. This part when used in conjunction with other ISPs specifies how the MMS standard shall be used to provide the MMS functions required by applications controlling a full range of devices in the scope of MMS.

1.2. Position within the Taxonomy

This part of ISO/IEC ISP 14226 is the second part of a multi-part ISP identified in ISO/IEC TR 10000-2 as "AMM11, MMS General Applications Base Profile".

It may be combined with any T-Profile specifying the OSI connection-mode transport service.

2. Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this profile. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this profile are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and CCITT maintains published editions of its current Recommendations.

- ISO/IEC 9506-1:1990, Industrial automation systems - Manufacturing Message Specification - Part 1 - Service definition

- ISO/IEC 9506-2:1990, Industrial automation systems - Manufacturing Message Specification - Part 2 - Protocol specification

- ISO/IEC TR 10000-1:1992, Information Technology - Framework and taxonomy of International Standardized Profiles - Part 1 : Framework.

- ISO/IEC TR 10000-2:1992, Information Technology - Framework and taxonomy of International Standardized Profiles - Part 2 : Taxonomy of Profiles.

- ISO/IEC ISP 10607-3:1991, Information Technology - International Standardized Profiles AFT nn-File Transfer, Access and Management - Part 3: AFT 11 - Simple File Transfer Service (unstructured)

- ISO/IEC 9506 – Technical Corrigenda 1:1993

- ISO/IEC 9506-1 - Ammendment 1:1993 Data Exchange

- ISO/IEC 9506-2 - Ammendment 1:1993 Data Exchange

- ISO/IEC DISP 14226-1, Information Technology - International Standardized Profile AMM11:MMS General Applications Base Profile - Part 1: Specification of ACSE, Presentation, and Session Protocols for use by MMS

3. Definitions

Unless specifically noted, terms used in this part shall be as defined in the referenced base standards.

An MMS implementation is a realization of an MMS user together with its underlying MMS provider.

A calling MMS implementation is the MMS implementation that issues the Initiate request primitive.

A called MMS implementation is the MMS implementation that issues the Initiate response primitive.

4. Abbreviations

Unless specifically noted, abbreviations used in this part shall be as defined in the referenced base standards.

Client-CR	Client Conformance Requirements
Server-CR	Server Conformance Requirements

5. Conformance Requirements

This part of ISO/IEC ISP 14226 states requirements upon implementations to achieve interworking. A claim of conformance to this part of ISO/IEC ISP 14226 is a claim that all requirements in the relevant base standards are satisfied, and that all requirements in the following Clauses and in annex A are satisfied. Annex A states the relationship between these requirements and those of base standards.

The conformance requirements of this ISP are described in terms of "Client Conformance Requirements (Client-CR)" and "Server Conformance Requirements (Server-CR)" for each service.

An MMS implementation compliant with the Client-CR for all services in this ISP is called a "Client Implementation".

An MMS implementation compliant with the Server-CR for all services in this ISP is called a "Server Implementation".

5.1. General Requirements for use of all parts of MMS

To achieve interworking, each server implementation shall be able to accept an association with a client implementation.

5.1.1. Max supported PDU size

The max_mms_pdu_size is defined as the maximum number of octets in an MMSpdu encoded using the negotiated transfer syntax. The size shall apply to all MMSpdu's with the exception of the Initiate-request PDU, Initiate-response PDU and Initiate-error PDU. The max_mms_pdu_size shall be negotiated during connection initiation using the LocalDetailCalling and LocalDetailCalled parameters of the MMS Initiate service.

The negotiated max_mms_pdu_size shall be applied as follows:

- Any received MMSpdu whose length is less than or equal to the negotiated max_mms_pdu_size shall be properly parsed and processed.

- An MMS implementation should not send an MMSpdu whose size exceeds the negotiated max_mms_pdu_size. If an MMS implementation sends an MMSpdu that exceeds the negotiated max_mms_pdu_size, then it shall be prepared to receive a Reject PDU. Should an MMS implementation receive an MMSpdu that exceeds the negotiated max_mms_pdu_size, it shall either reject the MMSpdu or accept the MMSpdu as if no size violation had occurred and performed the expected processing.

- If an MMS implementation is unable to send a service response because the response would exceed the max_mms_pdu_size, then it shall return a Service response (-) with an error class of SERVICE and an error code of OTHER.

- When rejecting an MMSpdu because it exceeds the negotiated max_mms_pdu_size, an MMS implementation shall use a Reject PDU Type of PDU-ERROR and a Reject Code of INVALID-PDU in the resulting Reject PDU.

5.1.2. FileName

Restrictions for the use of the type FileName in the MMS Abstract Syntax are specified in section 9.1 of ISO/IEC ISP 10607-3.

5.2. Service-specific Requirements

5.2.1. Environment and General Management

5.2.1.1. Initiate Service

5.2.1.1.1. Negotiation of MMS Abstract Syntaxes

On the A-Associate response the MMS responder shall not accept more than one presentation context derived from an MMS abstract syntax. For this agreement, the term 'MMS abstract syntax' shall represent an abstract syntax from the set containing the abstract syntax defined in clause 19 of ISO/IEC 9506-2 and abstract syntaxes defined by MMS companion standards.

5.2.1.1.2. Max Serv Outstanding

An MMS implementation which intends to conform only with the Client Conformance Requirements for Requester CBB's shall:

a) propose one or greater for the value of the Proposed Max Serv Outstanding Called parameter in the Initiate service when initiating the application association (calling);

b) offer one or greater for the value of the Negotiated Max Serv Outstanding Calling parameter in the Initiate service when receiving the application association initiation (called);

An MMS implementation which intends to conform to one or more Server Conformance Requirements for Responder CBB's shall:

a) propose one or greater for the value of the Proposed Max Serv Outstanding Calling parameter in the Initiate service when initiating the application association (calling);

b) offer one or greater for the value of the Negotiated Max Serv Outstanding Called parameter in the Initiate service when receiving the application association initiation (called);

5.2.1.1.3. Local Detail Calling

The Local Detail Calling parameter in the Initiate request primitive shall specify the max_mms_pdu_size guaranteed to be supported by the calling MMS implementation. If the Local Detail Calling parameter is absent from the request primitive, then the calling MMS implementation shall guarantee support for an unlimited max_mms_pdu_size.

If present in the request or indication primitives, the Local Detail Calling parameter shall not be less than 64; however, it is recommended that at least 512 octets be supported.

5.2.1.1.4. Local Detail Called

The Local Detail Called parameter in the Initiate response primitive shall specify the negotiated max_mms_pdu_size for the application association.

If the Local Detail Calling parameter is omitted in the indication primitive, then the Local Detail Called parameter:

a) may be omitted from the response, indicating that the calling MMS implementation and the called MMS implementation are prepared to support an unbounded max_mms_pdu_size;

b) may be specified in the response, indicating a requirement to support the specified value for max_mms_pdu_size.

If the Local Detail Calling is included in the request, then this parameter shall be present in the response and its value shall be less than or equal to the value of the Local Detail Calling parameter of the request.

If present in the response, the Local Detail Called shall not be less than 64; however, it is recommended that at least 512 octets be supported.

5.2.1.1.5. Rules of Extensibility

Any additional valid tagged ASN.1 values received as sequence elements in the parameters of the Initiate-RequestPDU, the Initiate-ResponsePDU, or the Initiate-ErrorPDU shall be ignored for upward compatibility purposes.

Implementations shall be capable of parsing up to 128 bits in the services supported field of either the Initiate-RequestPDU or Initiate-ResponsePDU. Implementations shall be capable of parsing up to 32 bits in the parameter CBB field of either the Initiate-RequestPDU or the Initiate-ResponsePDU. In both cases, the behaviour of the implementation shall be no different than if the PDU received had not contained additional bits.

5.2.2. VMD Support

5.2.2.1. Get Capability List Service

Only one capability shall be described in each Visible String of the SEQUENCE OF.

5.2.3. Domain Management

5.2.3.1. List Of Capabilities

Only one capability shall be described in each Visible String of the SEQUENCE OF.

The order of the strings within the List Of Capabilities parameter may have significance to the server implementation and shall be preserved.

5.2.3.2. Initiate Download Sequence Service

The List Of Capabilities parameter shall follow the limitations of 5.2.3.1.

The syntax and semantics of the capabilities shall be defined by the Server implementation in the PICS. Any deviation from the defined syntax and semantics shall be reasons for the Server implementation to return a service error with Error Class equal to RESOURCE and Error Code equal to CAPABILITY-UNKNOWN.

5.2.3.3. Download Segment Service

A client implementation that receives a Download Segment indication after issuing a Download Segment Result (+) with the More Follows parameter equal to FALSE or after issuing a Download Segment Result (-) shall issue either a service error, specifying an Error Class equal to SERVICE and an Error Code equal to PRIMITIVES-OUT-OF-SEQUENCE, or an Abort Request.

5.2.3.4. Terminate Download Sequence Service

If a client implementation receives a Terminate Download Sequence indication in which the Discard parameter is absent and the client implementation has not issued a Download Segment response with the More Follows parameter equal to FALSE for that Domain, it shall behave as if it had received a Terminate Download Sequence indication with the Discard parameter present with the Error Class equal to VMD-STATE and Error Code equal to DOMAIN-TRANSFER-PROBLEM. It is then up to the client implementation to determine the true state of the Domain and take any recovery action.

5.2.3.5. Initiate Upload Sequence Service

The List Of Capabilities parameter shall follow the limitations of 5.2.3.1.

5.2.3.6. Upload Segment Service

A server implementation that receives a Upload Segment indication for an Upload State Machine for which it has issued an Upload Segment Result (-) or an Upload Segment Result (+) with the More Follows parameter equal to FALSE, shall issue either a service error, specifying an Error Class equal to SERVICE and an Error Code equal to PRIMITIVES-OUT-OF-SEQUENCE, or an Abort Request.

5.2.3.7. Get Domain Attributes Service

The List Of Capabilities parameter shall follow the limitations of 5.2.3.1.

5.2.4. Program Invocation Management

5.2.4.1. Start

A Program Invocation State of NON-EXISTENT shall be returned in a Result (-) when a request to start a non-existent Program Invocation is received.

5.2.4.2. Stop

A Program Invocation State of NON-EXISTENT shall be returned in a Result (-) when a request to stop a non-existent Program Invocation is received.

5.2.4.3. Resume

A Program Invocation State of NON-EXISTENT shall be returned in a Result (-) when a request to resume a non-existent Program Invocation is received.

5.2.4.4. Reset

A Program Invocation State of NON-EXISTENT shall be returned in a Result (-) when a request to reset a non-existent Program Invocation is received.

5.2.4.5. Kill

A Program Invocation State of NON-EXISTENT shall be returned in a Result (-) when a request to kill a non-existent Program Invocation is received.

5.2.5. Variable Access

5.2.5.1. Scattered Access

It is strongly recommended that for services which use variable access, a Variable List Name or a List Of Variable be used instead of Scattered Access.

No implementations shall be required to propose or accept the VSCA Parameter CBB.

5.2.5.2. Floating Point

It is strongly recommended that for services which use floating point types or values, that the choice of floating-point in the Data and TypeSpecification productions be used instead of the choice of real.

No implementations shall be required to propose or accept the REAL Parameter CBB.

Any implementation which supports data of the MMS floating-point type, shall be capable of supporting a size parameter of format width 32 and exponent width 8.

Implementations that provide support for floating point data and types shall support the choice of "floating point" in the Data and TypeSpecification productions.

5.2.5.3. List Of Variables

The order of Variable Specification that appears in the List Of Variable shall not constrain the temporal order of the access to individual variables by the V-Put and V-Get functions in the Server implementation.

5.2.5.4. Parameter CBBs

Each server implementation that claims support for the Read, Write, or InformationReport service shall be capable of supporting either the VNAM or VADR parameter CBB.

Each client implementation that claims support for the Read, Write or InformationReport service shall be capable of supporting the VNAM and VADR parameter CBBs.

5.2.5.5. Named Variable Scope

Each server implementation that claims support for the VNAM parameter CBB shall be capable of supporting either VMD-Specific or Domain-Specific named variables.

Each client implementation that claims support for the VNAM parameter CBB shall be capable of supporting both VMD-Specific and Domain-Specific named variables.

5.2.5.6. Address Types

Each server implementation that claims support for the VADR parameter CBB shall be capable of supporting either the Symbolic-Address or Numeric-Address choice.

Each client implementation that claims support for the VADR parameter CBB shall be capable of supporting both the Symbolic-Address and Numeric-Address choices.

5.2.6. Semaphore Management

Out of scope.

5.2.7. Operator Communication

No additional requirements have been identified.

5.2.8. Event Management

Out of scope.

5.2.9. Journal Management

Out of scope.

5.2.10. File Access

Out of scope.

5.2.11. File Management

Out of scope.

5.2.12. Data Exchange Management

Out of scope.

PART 2:

Annex A - ISPICS Requirements List

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Annex A - ISPICS Requirements List

A.1. General

This annex describes the common MMS requirements in terms of tables which were derived from the base standard. They are intended to give a precise specification of requirements.

A.2. Classification of Requirements

Throughout this annex, to specify the level of support for each feature, the following classification is used.

Client-CR : Client Conformance Requirement.

Server-CR : Server Conformance Requirement

A.2.1. Base Column

The "Base" column reflects the definitions and specifications in ISO/IEC 9506-1:1990 and ISO/IEC 9506-2:1990. Each entry in this column is chosen from the following list:

mandatory; m : That feature shall be supported, i.e. its syntax and procedures shall be implemented as specified in the base standard.

However, it is not a requirement that the feature shall be used in all instances of communication, unless mandated by the base standard .

optional; o : Any feature denoted by "o" is left to the implementation as to whether that feature is implemented or not.

If a parameter is optionally supported, then the syntax shall be implemented, but it is left to each implementation whether the procedures are implemented or not.

A.2.2. F/S Column

The "F/S" column reflects the requirements of this Functional Standard. Each entry in this column is chosen from the following terminology:

supported; m : Any feature denoted by "m" is mandatory or optional in the base standard. That feature shall be supported, i.e. its syntax and procedures shall be implemented as specified in the base standard or in this ISP by all implementations claiming conformance to this ISP.

However, it is not a requirement that the feature shall be used in all instances of communication, unless mandated by the base standard or stated otherwise in this part of this A-Profile.

optionally supported; o : Any feature denoted by "o" is left to the implementation as to whether that feature is implemented or not.

If a parameter is optionally supported, then the syntax shall be implemented, but it is left to each implementation whether the procedures are implemented or not.

conditionally supported; c : Any feature denoted by "c<n>" shall be supported under the condition referenced c<n> specified in this ISP, where <n> stands for a number. If these conditions are not met, the feature is outside the scope of this ISP.

excluded; x : Any feature denoted by "x" is excluded in this ISP, i.e. an implementation shall behave as if the feature is not implemented.

companion standard specific; cs : Any feature denoted by "cs" is left to be defined by an ISP or a part of an ISP referencing this part, and based on a companion standard abstract syntax. For ISPs that are based on the abstract syntax defined by ISO/IEC 9506-2, “cs” is equivalent to “excluded; x”.

outside of scope; i : Any feature denoted by "i" is outside the scope of this ISP, i.e. it may be ignored, and will therefore not be subject of an ISP conformance test. However the syntax of all parameters of supported PDUs shall be implemented, even if the procedures are not (i.e. the Receiver shall be able to decode the PDU).

not applicable; - : Any feature denoted by "-" is not defined in the context where it is mentioned, e.g. a parameter which is not part of the respective PDU. The occurrence of "not applicable" features is mainly due to the format of the tables in ISPICS Requirements List.

functional standard choice; * :Any feature denoted by "*" is left to be defined by an ISP or a part of an ISP referencing this part. The referencing profile shall replace the "*" by any of the alternatives given in the list above.

A.2.3. Value/Reference

The "Value/Ref." column specifies constraints on values for the parameter and/or contains references to text in this or other documents.

A.2.4. Conditional MACROs

The following MACROs are used in the F/S Column:

STR1 : Any feature denoted by “STR1” is conditioned on the support of STR1 Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the STR1 Parameter CBB.

STR2 : Any feature denoted by “STR2” is conditioned on the support of STR2 Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the STR2 Parameter CBB.

VADR : Any feature denoted by “VADR” is conditioned on the support of VADR Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the VADR Parameter CBB.

VNAM : Any feature denoted by “VNAM” is conditioned on the support of VNAM Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the VNAM Parameter CBB.

VLIS : Any feature denoted by “VLIS” is conditioned on the support of VLIS Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the VLIS Parameter CBB.

VSCA : Any feature denoted by "VSCA" is conditioned on the support of VSCA Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the VSCA Parameter CBB.

VALT : Any feature denoted by "VALT" is conditioned on the support of VALT Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the VALT Parameter CBB.

REAL : Any feature denoted by "REAL" is conditioned on the support of REAL Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the REAL Parameter CBB.

TPY : Any feature denoted by "TPY" is conditioned on the support of TPY Parameter CBB. Its requirement is left to be defined by an ISP that references this ISP and specifies the nature of its support for the TPY Parameter CBB.

MOD : Any feature denoted by "MOD" is left to be defined by an ISP that references this ISP and specifies the nature of its support for the MMS Modifiers.

A.3. Supported MMS PDU's

A.3.1. Environment and General Management

Ref	MMS PDU	Client-CR				Server-CR			
		Sending		Receiving		Sending		Receiving	
		Base	F/S	Base	F/S	Base	F/S	Base	F/S
1	InitiateRequest		*	o	*	o	*	m	m
2	InitiateResponse	o	*	o	*	m	m	o	*
3	InitiateError	o	*	o	*	m	m	o	*
4	ConcludeRequest	o	*	o	*	o	*	m	m
5	ConcludeResponse	o	*	o	*	m	m	o	*
6	ConcludeError	o	*	o	*	m	m	o	*
7	CancelRequest	o	*	o	*	o	*	o	*
8	CancelResponse	o	*	o	*	o	*	o	*
9	CancelError	o	*	o	*	o	*	o	*
10	Reject	m	m	m	m	m	m	m	m

Note: Abort service is provided by ACSE.

A.3.2. MMS Modifiers

Ref	Modifier	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	attachToEventCondition	o	i	o	i
2	attachToSemaphore	o	i	o	i

A.3.3. Parameter CBBs

Ref	Parameter	Base	Client-CR		Server-CR	
			F/S	Value/Ref.	F/S	Value/Ref.
1	str1	o	*		*	
2	str2	o	*		*	
3	vnam	o	c1		c1	

4	valt	o	*		*	
5	vadr	o	c1		c1	
6	vsca	o	x		x	
7	tpy	o	*		*	
8	vlis	o	*		*	
9	real	o	i		i	
10	cei	o	i		i	

c1: see section 5.2.5.4 to determine the requirements for these CBBs.

A.3.4. VMD Support

In this subclause and the following subclauses of A.3 the column "MMS PDU’s" contains one single entry for each MMS service. In case of a confirmed service this single entry shall represent the corresponding Request-, Response- and Error-PDU’S. In case of an unconfirmed service it shall represent the corresponding Request-PDU.

For responder role service CBBs, the Client-CR column shall indicate the support of sending the Request-PDU and receiving the Response-PDU and Error-PDU, whereas, the Server-CR column shall indicate the support of receiving the Request-PDU and sending the Response-PDU and Error-PDU.

For requester role service CBBs, the Client-CR column shall indicate the support of receiving the Request-PDU and (in case of a confirmed service) sending the Response-PDU and Error-PDU, whereas, the Server-CR column shall indicate the support of sending the Request-PDU and (in case of a confirmed service) receiving the Response-PDU and Error-PDU.

NOTE - As an example, the ’m’ in the Server-CR column for the Identify service means that the Server implementation has to support the receiving of the Identify-Request PDU and the sending of the Identify-Response PDU and the Identify-Error PDU, whereas the ’o’ in the Client-CR column means that the Client implementation may or may not support the sending of the Identify-Request PDU, and the receiving of the Identify-Response PDU and the Identify-Error PDU.

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Status	o	*	o	*
2	UnsolicitedStatus	o	*	o	*
3	GetNameList	o	*	o	*
4	Identify	o	*	m	m
5	Rename	o	i	o	i

6	GetCapabilityList	o	*	o	*

A.3.5. Domain Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	InitiateDownloadSequence	o	*	o	*
2	DownloadSegment	o	*	o	*
3	TerminateDownloadSequence	o	*	o	*
4	InitiateUploadSequence	o	*	o	*
5	UploadSegment	o	*	o	*
6	TerminateUploadSequence	o	*	o	*
7	RequestDomainDownload	o	*	o	*
8	RequestDomainUpload	o	*	o	*
9	LoadDomainContent	o	*	o	*
10	StoreDomainContent	o	*	o	*
11	DeleteDomain	o	*	o	*
12	GetDomainAttributes	o	*	o	*

A.3.6. Program Invocation Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	CreateProgramInvocation	o	*	o	*
2	DeleteProgramInvocation	o	*	o	*
3	Start	o	*	o	*
4	Stop	o	*	o	*
5	Resume	o	*	o	*
6	Reset	o	*	o	*
7	Kill	o	*	o	*

8	GetProgramInvocationAttributes	o	*	o	*

A.3.7. Variable Access

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Read	o	*	o	*
2	Write	o	*	o	*
3	InformationReport	o	*	o	*
4	GetVariableAccessAttributes	o	*	o	*
5	DefineNamedVariable	o	c1	o	c1
6	DefineScatteredAccess	o	x	o	x
7	GetScatteredAccessAttributes	o	x	o	x
8	DeleteVariableAccess	o	c2	o	c2
9	DefineNamedVariableList	o	c3	o	c3
10	GetNamedVariableListAttributes	o	c3	o	c3
11	DeleteNamedVariableList	o	c3	o	c3
12	DefineNamedType	o	*	o	*
13	GetNamedTypeAttributes	o	*	o	*
14	DeleteNamedType	o	*	o	*

c1: to be defined by an ISP referencing this part. If this service is supported, then VNAM and VADR shall also be supported.

c2: to be defined by an ISP referencing this part. If this service is supported, then VNAM shall also be supported.

c3: to be defined by an ISP referencing this part. If this service is supported, then VLIS shall also be supported.

A.3.8. Semaphore Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	TakeControl	o	i	o	i
2	RelinquishControl	o	i	o	i
3	DefineSemaphore	o	i	o	i
4	DeleteSemaphore	o	i	o	i
5	ReportSemaphoreStatus	o	i	o	i
6	ReportPoolSemaphoreStatus	o	i	o	i
7	ReportSemaphoreEntryStatus	o	i	o	i

A.3.9. Operator Communication

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Input	o	*	o	*
2	Output	o	*	o	*

A.3.10. Event Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	DefineEventCondition	o	i	o	i
2	DeleteEventCondition	o	i	o	i
3	GetEventConditionAttributes	o	i	o	i
4	ReportEventConditionStatus	o	i	o	i
5	AlterEventConditionMonitoring	o	i	o	i
6	TriggerEvent	o	i	o	i
7	DefineEventAction	o	i	o	i
8	DeleteEventAction	o	i	o	i

9	GetEventActionAttributes	o	i	o	i
10	ReportEventActionStatus	o	i	o	i
11	DefineEventEnrollment	o	i	o	i
12	DeleteEventEnrollment	o	i	o	i
13	GetEventEnrollmentAttributes	o	i	o	i
14	ReportEventEnrollmentStatus	o	i	o	i
15	AlterEventEnrollment	o	i	o	i
16	EventNotification	o	i	o	i
17	AcknowledgeEventNotification	o	i	o	i
18	GetAlarmSummary	o	i	o	i
19	GetAlarmEnrollmentSummary	o	i	o	i

A.3.11. Journal Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	ReadJournal	o	i	o	i
2	WriteJournal	o	i	o	i
3	InitializeJournal	o	i	o	i
4	ReportJournalStatus	o	i	o	i
5	CreateJournal	o	i	o	i
6	DeleteJournal	o	i	o	i

A.3.12. File Access

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	ObtainFile	o	i	o	i

A.3.13. File Management

This subclause is informative only.

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	FileOpen	o	i	o	i
2	FileRead	o	i	o	i
3	FileClose	o	i	o	i

A.3.14. Data Exchange Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	GetDataExchangeAttributes	o	i	o	i
2	ExchangeData	o	i	o	i

A.3.15 Additional PDUs

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Additional PDU	o	cs	o	cs

A.4. PDU-Specific Requirements

This clause contains tables for all PDUs which have been marked as 'm', '*', or 'c<n>' in F/S column of clause A.3. Some of the PDU parameters represent complex structures which are described using the following conventions:

a) If a parameter with label <x> is a CHOICE type, the corresponding alternatives are listed below this parameter, using the sub-labels <x>.a, <x>.b, <x>.c, etc.

b) If a parameter with label <x> is a SEQUENCE or SEQUENCE OF SEQUENCE type, the sequence members are listed below that parameter using the sub-labels <x>.1, <x>.2, <x>.3, etc.

c) Some of the complex parameters are described in separate tables. In these cases, parameter names start with an upper case letter, otherwise parameters start with a lower case letter.

A.4.1. Environment and General Management

A.4.1.1. Initiate Request PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	localDetailCalling	o	m	5.2.1.1.3	m	m	
2	proposedMaxServOutstandingCallingg		m	m	5.2.1.	m	m
3	proposedMaxServOutstandingCalled	m	m	5.2.1.1.2	m	m	
4	proposedDataStructureNestingLevel	m	m		m	m	
5	initiateRequestDetail	m	m	Note 1	m	m	

Note 1: initiateRequestDetail is specified in ISO/IEC ISP 14226-3 or in another ISP referencing this part.

A.4.1.2. Initiate Response PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	localDetailCalled	o	m	5.2.1.1.4	m	m	
2	negotiatedMaxServOutstandingCalling		m	m	5.2.1.	m	m
3	negotiatedMaxServOutstandingCalledd		m	m	5.2.1.	m	m
4	negotiatedDataStructureNestingLevelel		m	m		m	m
5	initiateResponseDetail	m	m	Note 1	m	m	

Note 1: initiateResponseDetail is specified in ISO/IEC ISP 14226-3 or in another ISP referencing this part.

A.4.1.3. Initiate Error PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	errorClass	m	m		m	m	
2	errorCode	m	m		m	m	

3	additionalCode	o	*		o	*	
4	additionalDescription	o	*		o	*	

A.4.1.4. Conclude Request PDU

No parameter.

A.4.1.5. Conclude Response PDU

No parameter.

A.4.1.6. Conclude Error PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	errorClass	m	m		m	m	
2	errorCode	m	m		m	m	
3	additionalCode	o	*		o	*	
4	additionalDescription	o	*		o	*	

A.4.1.7. Cancel Request PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	

A.4.1.8. Cancel Response PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	

A.4.1.9. Cancel Error PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	
2	errorClass	m	m		m	m	
3	errorCode	m	m		m	m	
4	additionalCode	o	*		o	*	
5	additionalDescription	o	*		o	*	

A.4.1.10. Reject PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	
2	rejectReason	m	m		m	m	

A.4.2. VMD Support

A.4.2.1. Status Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MODD	
3	extendedDerivation	m	m		m	m	
4	csStatusRequest	o	cs		o	cs	

A.4.2.2. Status Response PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	vmdLogicalStatus	m	m		m	m	
3	vmdPhysicalStatus	m	m		m	m	
4	localDetail	o	m		o	*	
5	csStatusResponse	o	cs		o	cs	

A.4.2.3. Status Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MODD			o	MODDD
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.2.4. Unsolicited Status PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	vmdLogicalStatus	m	m		m	m	
2	vmdPhysicalStatus	m	m		m	m	
3	localDetail	o	m		o	*	
4	csStatusResponse	o	cs		o	cs	

A.4.2.5. GetNameList Request PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MODD			o	MODDD
3	objectClass	m	m		m	m	
4	csObjectClass	o	cs		o	cs	
5	objectScope	m	m		m	m	
6	continueAfter	m	m		m	m	
7	csGetNameListRequest	o	cs		o	cs	

A.4.2.6. GetNameList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfIdentifier	m	m		m	m	
3	moreFollows	m	m		m	m	
4	csGetNameListResponse	o	cs		o	cs	

A.4.2.7. GetNameList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MODD			o	MODDD
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.2.8. Identify Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

A.4.2.9. Identify Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	vendorName	m	m		m	m	
3	modelName	m	m		m	m	
4	revision	m	m		m	m	
5	listOfAbstractSyntaxes	o	*		m	m	

A.4.2.10. Identify Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.2.11. GetCapabilityList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	continueAfter	m	m		m	m	
4	csGetCapabilityListRequest	o	cs		o	cs	

A.4.2.12. GetCapabilityList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfCapabilities	m	m		m	m	5.2.3.1
3	moreFollows	m	m		m	m	
4	csGetCapabilityListResponse	o	cs		o	cs	

A.4.2.13. GetCapabilityList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3. Domain Management

A.4.3.1. InitiateDownloadSequence Request PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	listOfCapabilities	m	m	5.2.3.1	m	m	
5	sharable	m	m		m	m	
6	csInitiateDownloadSequenceRequestt		o	cs		o	cs

A.4.3.2. InitiateDownloadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csInitiateDownloadSequenceResponse		o	cs		o	cs

A.4.3.3. InitiateDownloadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.4. DownloadSegment Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	csDownloadSegmentRequest	o	cs		o	cs	

A.4.3.5. DownloadSegment Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	loadData	m	m		m	m	
2.a	non-coded	o	m		o	*	
2.b	coded	o	*		o	*	
3	moreFollows	m	m		m	m	
4	csDownloadSegmentResponse	o	cs		o	cs	

A.4.3.6. DownloadSegment Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.7. TerminateDownloadSequence Request PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	discard	m	m		o	o	
4.1	errorClass	m	m		m	m	
4.2	errorCode	m	m		m	m	
4.3	additionalCode	o	*		o	*	
4.4	additionalDescription	o	*		o	*	
5	csTerminateDownloadSeqRequest	o	*		o	*	

A.4.3.8. TerminateDownloadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csTerminateDownloadSeqResponse	o	cs		o	cs	

A.4.3.9. TerminateDownloadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.10. InitiateUploadSequence Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	csInitiateUploadSequenceRequest	o	cs		o	cs	

A.4.3.11. InitiateUploadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	ulsmID	m	m		m	m	
3	listOfCapabilities	m	m		m	m	5.2.3.1
4	csInitiateUploadSequenceResponse	o	cs		o	cs	

A.4.3.12. InitiateUploadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.13. UploadSegment Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	ulsmID	m	m		m	m	
4	csUploadSegmentRequest	o	cs		o	cs	

A.4.3.14. UploadSegment Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	loadData	m	m		m	m	
2.a	non-coded	o	m		o	*	
2.b	coded	o	*		o	*	
3	moreFollows	m	m		m	m	
4	csUploadSegmentResponse	o	cs		o	cs	

A.4.3.15. UploadSegment Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.16. TerminateUploadSequence Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	ulsmID	m	m		m	m	
4	csTerminateUploadSequenceRequestt		o	cs		o	cs

A.4.3.17. TerminateUploadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csTerminateUploadSeqResponse	o	cs		o	cs	

A.4.3.18. TerminateUploadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.19. RequestDomainDownload Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	listOfCapabilities	m	m		o	*	5.2.3.1
5	sharable	m	m		m	m	
6	filename	m	m		m	m	
7	csRequestDomainDownloadRequest	o	cs		o	cs	

A.4.3.20. RequestDomainDownload Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csRequestDomainDownloadResponses		o	cs		o	cs

A.4.3.21. RequestDomainDownload Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.22. RequestDomainUpload Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	filename	m	m		m	m	
5	csRequestDomainUploadRequest	o	cs		o	cs	

A.4.3.23. RequestDomainUpload Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csRequestDomainUploadResponse	o	cs		o	cs	

A.4.3.24. RequestDomainUpload Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.25. LoadDomainContent Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	domainName	m	m		m	m	
4	listOfCapabilities	o	*	5.2.3.1	m	m	
5	sharable	m	m		m	m	
6	filename	m	m		m	m	
7	thirdParty	o	TPY		o	TPY	
8	csLoadDomainContentRequest	o	cs		o	cs	

A.4.3.26. LoadDomainContent Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csLoadDomainContentResponse	o	cs		o	cs	

A.4.3.27. LoadDomainContent Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.28. StoreDomainContent Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	filename	m	m		m	m	
5	thirdParty	o	TPY		o	TPY	
6	csStoreDomainContentRequest	o	cs		o	cs	

A.4.3.29. StoreDomainContent Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csStoreDomainContentResponse	o	cs		o	cs	

A.4.3.30. StoreDomainContent Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.31. DeleteDomain Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	domainName	m	m		m	m	
4	csDeleteDomainRequest	o	cs		o	cs	

A.4.3.32. DeleteDomain Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csDeleteDomainResponse	o	cs		o	cs	

A.4.3.33. DeleteDomain Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.3.34. GetDomainAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	csGetDomainAttributesRequest	o	cs		o	cs	

A.4.3.35. GetDomainAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfCapabilities	m	m		m	m	5.2.3.1
3	state	m	m		m	m	
4	mmsDeletable	m	m		m	m	
5	sharable	m	m		m	m	
6	listOfProgramInvocations	m	m		m	m	
7	uploadInProgress	m	m		m	m	
8	csGetDomainAttributesResponse	o	cs		o	cs	

A.4.3.36. GetDomainAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.4. Program Invocation Management

A.4.4.1. CreateProgramInvocation Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	listOfDomainNames	m	m		m	m	
5	reusable	m	m		m	m	
6	monitorType	o	i		o	i	
7	csCreateProgramInvocationRequest	o	cs		o	cs	

A.4.4.2. CreateProgramInvocation Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csCreateProgramInvocationResponse	o	cs		o	cs	

A.4.4.3. CreateProgramInvocation Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.4.4. DeleteProgramInvocation Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csDeleteProgramInvocationRequest	o	cs		o	cs	

A.4.4.5. DeleteProgramInvocation Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csDeleteProgramInvocationResponse	o	cs		o	cs	

A.4.4.6. DeleteProgramInvocation Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.4.7. Start Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	executionArgument	o	*		o	*	

4.a	simpleString	o	m		o	*	
4.b	encodedString	o	*		o	*	
5	csStartRequest	o	cs		o	cs	

A.4.4.8. Start Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csStartResponse	o	cs		o	cs	

A.4.4.9. Start Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	serviceSpecificInformation	m	m		m	m	5.2.4.1

A.4.4.10. Stop Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	

4	csStopRequest	o	cs		o	cs	

A.4.4.11. Stop Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csStopResponse	o	cs		o	cs	

A.4.4.12. Stop Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	serviceSpecificInformation	m	m		m	m	5.2.4.2

A.4.4.13. Resume Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	executionArgument	o	*		o	*	
4.a	simpleString	o	m		o	*	

4.b	encodedString	o	*		o	*	
5	csResumeRequest	o	cs		o	cs	

A.4.4.14. Resume Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csResumeResponse	o	cs		o	cs	

A.4.4.15. Resume Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	serviceSpecificInformation	m	m		m	m	5.2.4.3

A.4.4.16. Reset Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csResetRequest	o	cs		o	cs	

A.4.4.17. Reset Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csResetResponse	o	cs		o	cs	

A.4.4.18. Reset Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	serviceSpecificInformation	m	m		m	m	5.2.4.4

A.4.4.19. Kill Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csKillRequest	o	cs		o	cs	

A.4.4.20. Kill Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csKillResponse	o	cs		o	cs	

A.4.4.21. Kill Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	serviceSpecificInformation	m	m		m	m	5.2.4.5

A.4.4.22. GetProgramInvocationAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csGetPIAttributesRequest	o	cs		o	cs	

A.4.4.23. GetProgramInvocationAttributes Response PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	State	m	m		m	m	
3	listOfDomainNames	m	m		m	m	
4	mmsDeletable	m	m		m	m	
5	reusable	m	m		m	m	
6	monitor	m	m		m	m	
7	executionArgument	m	m		m	m	
7.a	simpleString	o	m		o	*	
7.b	encodedString	o	*		o	*	
8	csGetPIAttributesResponse	o	cs		o	cs	

A.4.4.24. GetProgramInvocationAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5. Variable Access

A.4.5.1. Read Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	listOfModifier	o	MOD		o	MOD	
3	specificationWithResult	m	m		m	m	
4	VariableAccessSpecification	m	m		m	m	

A.4.5.1.1. VariableAccessSpecification

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	listOfVariable	o	m		m	m	
1.a.1	VariableSpecification	m	m		m	m	
1.a.2	AlternateAccess	o	VALT		o	VALT	
1.b	variableListName	o	VLIS		o	VLIS	

A.4.5.1.2. VariableSpecification

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	name	o	VNAM		o	VNAM	
1.b	Address	o	VADR		o	VADR	
1.c	variableDescription	o	VADR		o	VADR	
1.c.1	Address	m	m		m	m	
1.c.2	TypeSpecification	m	m		m	m	
1.d	scatteredAccessDescription	o	VSCA		o	VSCA	
1.e	invalidated	m	m		m	m	

A.4.5.1.3. Address

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	numericAddress	o	m		o	c1	

1.b	symbolicAddress	o	m		o	c1	
1.c	unconstrainedAddress	o	*		o	*	

c1: at least one of these address types must be supported (see section 5.2.5.6).

A.4.5.1.4. TypeSpecification

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	typeName	o	*		o	*	
1.b	array	o	STR1		o	STR1	
1.b.1	packed	m	m		m	m	
1.b.2	numberOfElements	m	m		m	m	
1.b.3	TypeSpecification	m	m		m	m	
1.c	structure	o	STR2		o	STR2	
1.c.1	packed	m	m		m	m	
1.c.2	components	m	m		m	m	
1.c.2.1	componentName	o	VALT		o	VALT	
1.c.2.		Type	m	m		m	m
1.d	boolean	o	*		o	*	
1.e	bit-string	o	*		o	*	
1.f	integer	o	*		o	*	
1.g	unsigned	o	*		o	*	
1.h	floatingPoint	o	*		o	*	
1.i	real	o	REAL		o	REAL	
1.j	octet-string	o	*		o	*	
1.k	visible-string	o	*		o	*	
1.l	generalized-time	o	*		o	*	
1.m	binary-time	o	*		o	*	
1.n	bcd	o	*		o	*	
1.o	objId	o	*		o	*	

A.4.5.1.5. AlternateAccess

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	unnamed	o	STR1		o	STR1	
1.a.1	selectAlternateAccess	m	m		m	m	
1.a.1.1	AccessSelection	m	m		m	m	
1.a.1.2	AlternateAccess	m	m		m	m	
1.a.2	SelectAccess	m	m		m	m	
1.b	named	o	STR2		o	STR2	
1.b.1	componentName	m	m		m	m	
1.b.2	AlternateAccessSelection	m	m		m	m	
1.b.2.1	selectAlternateAccess	o	m		m	m	
1.b.2.2	SelectAccess	o	m		m	m	

A.4.5.1.6. AccessSelection

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	component	o	STR2		o	STR2	
1.b	index	o	STR1		o	STR1	
1.c	IndexRange	o	STR1		o	STR1	
1.d	allElements	o	STR1		o	STR1	

A.4.5.1.7. SelectAccess

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	component	o	STR2		o	STR2	
1.b	index	o	STR1		o	STR1	
1.c	IndexRange	o	STR1		o	STR1	

1.d	allElements	o	STR1		o	STR1	

A.4.5.1.8. IndexRange

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	lowIndex	m	m		m	m	
2	numberOfElements	m	m		m	m	

A.4.5.2. Read Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	
3	listOfAccessResult	m	m		m	m	
3.a	failure	m	m		m	m	
3.b	Data	m	m		m	m	

A.4.5.2.1. Data

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
a	array	o	STR1		o	STR1	
b	structure	o	STR2		o	STR2	
c	boolean	o	*		o	*	
d	bit-string	o	*		o	*	
e	integer	o	*		o	*	
f	unsigned	o	*		o	*	
g	floating-point	o	*		o	*	

h	real	o	REAL		o	REAL	
i	octet-string	o	*		o	*	
j	visible-string	o	*		o	*	
k	generalized-time	o	*		o	*	
l	binary-time	o	*		o	*	
m	bcd	o	*		o	*	
n	booleanArray	o	*		o	*	
o	objectId	o	*		o	*	

A.4.5.3. Read Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.4. Write Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	
4	listOfData	m	m	A.4.5.2.1.	m	m	

A.4.5.5. Write Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfWriteResult	m	m		m	m	
2.a	dataAccessError	m	m		m	m	
2.b	success	m	m		m	m	

A.4.5.6. Write Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.7. InformationReport PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	
2	listOfAccessResult	m	m	A.4.5.2.1.	m	m	
2.a	failure	m	m		m	m	
2.b	Data	m	m		m	m	

A.4.5.8. GetVariableAccessAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	variableName	o	VNAM		o	VNAM	
4	variableAddress	o	VADR		o	VADR	

A.4.5.9. GetVariableAccessAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	mmsDeletable	m	m		m	m	
3	Address	o	VADR		o	VADR	
4	TypeSpecification	m	m		m	m	

A.4.5.10. GetVariableAccessAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.11. DefineNamedVariable Request PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	variableName	m	m		m	m	
4	Address	m	m	A.4.5.1.3.	m	m	
5	TypeSpecification	o	o	A.4.5.1.4.	m	m	

A.4.5.12. DefineNamedVariable Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

A.4.5.13. DefineNamedVariable Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.14. DeleteVariableAccess Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	scopeOfDelete	m	m		m	m	
4	listOfName	o	o		m	m	
5	domainName	o	o		m	m	

A.4.5.15. DeleteVariableAccess Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	numberMatched	m	m		m	m	
3	numberDeleted	m	m		m	m	

A.4.5.16. DeleteVariableAccess Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	numberDeleted	m	m		m	m	

A.4.5.17. DefineNamedVariableList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	variableListName	m	m		m	m	
4	listOfVariable	m	m	A.4.5.1.1.	m	m	
4.1	VariableSpecification	m	m		m	m	
4.2	AlternateAccess	o	VALT		o	VALT	

A.4.5.18. DefineNamedVariableList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

A.4.5.19 DefineNamedVariableList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.20. GetNamedVariableListAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	variableListName	m	m		m	m	

A.4.5.21. GetNamedVariableListAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	mmsDeletable	m	m		m	m	
3	listOfVariable	m	m		m	m	
3.1	VariableSpecification	m	m		m	m	
3.2	AlternateAccess	o	VALT		o	VALT	

A.4.5.22. GetNamedVariableListAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.23. DeleteNamedVariableList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	scopeOfDelete	m	m		m	m	
4	listOfVariableListName	o	o		m	m	
5	domainName	o	o		m	m	

A.4.5.24. DeleteNamedVariableList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	numberMatched	m	m		m	m	
3	numberDeleted	m	m		m	m	

A.4.5.25. DeleteNamedVariableList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	numberDeleted	m	m		m	m	

A.4.5.26. DefineNamedType Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	typeName	m	m		m	m	
4	TypeSpecification	m	m		m	m	

A.4.5.27. DefineNamedType Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

A.4.5.28. DefineNamedType Error PDU

Ref	Parameter	Server-CR			Client-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.29. GetNamedTypeAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	typeName	m	m		m	m	

A.4.5.30. GetNamedTypeAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	mmsDeletable	m	m		m	m	
3	TypeSpecification	m	m		m	m	

A.4.5.31. GetNamedTypeAttributes Error PDU

Ref	Parameter	Server-CR			Client-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.5.32. DeleteNamedType Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	scopeOfDelete	m	m		m	m	
4	listOfTypeName	o	o		m	m	
5	domainName	o	o		m	m	

A.4.5.33. DeleteNamedType Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	numberMatched	m	m		m	m	
3	numberDeleted	m	m		m	m	

A.4.5.34. DeleteNamedType Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	
7	numberDeleted	m	m		m	m	

A.4.6. Semaphore Management

Out of Scope.

A.4.7. Operator Communication

A.4.7.1. Input Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	operatorStationName	m	m		m	m	
4	echo	m	m		m	m	
5	listOfPromptData	o	*		o	*	
6	inputTimeOut	o	*		o	*	
7	csInputRequest	o	cs		o	cs	

A.4.7.2. Input Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	inputString	m	m		m	m	
3	csInputResponse	o	cs		o	cs	

A.4.7.3. Input Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.7.4. Output Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	operatorStationName	m	m		m	m	
4	listOfOutputData	m	m		m	m	
5	csOutputRequest	o	cs		o	cs	

A.4.7.5. Output Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csOutputResponse	o	cs		o	cs	

A.4.7.6. Output Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	*		o	*	
6	additionalDescription	o	*		o	*	

A.4.8. Event Management

Out of Scope

A.4.9. Journal Management

Out of Scope

A.4.10. File Access

Out of Scope

A.4.11. File Management

Out of Scope

A.4.12. Data Exchange Management

Out of Scope

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This document has been prepared based on the comments from the OIW's MMS SIG, EWOS's EG MMS and AOW's MMS SIG. The text has been revised to be as close to the final document as possible at this time. Additions to draft six text are denoted by highlighted text. Deletions are denoted by strikeout.

Contents

Foreword

The ISO/IEC ISP 14226 specifies the AMM11 MMS General Application international standardized profile. This ISP has three parts:

Part 1 - Specification of ACSE, Presentation, and Session Protocols for the use by MMS

Part 2 - Common MMS Requirements

Part 3 - Specific MMS Requirements

This part of the ISO/IEC ISP 14226 is produced and approved by ISO TC 184. This Group includes ISO/IEC Member Bodies and S-liaison organizations. The S-liaison organizations that have contributed to the production of this draft are

Asia-Oceania Workshop (AOW)

European Workshop for Open Systems (EWOS)

OSE Implementors Workshop (OIW)

Introduction

This draft for an International Standardized Profile (ISP) is defined within the context of Functional Standardization, in accordance with the principles specified by ISO/IEC TR 10000, "Framework and Taxonomy of International Standardized Profiles". The context of Functional Standardization is one part of the overall field of Information Technology (IT) standardization activities, covering base standards, profiles, and registration mechanisms. A profile defines a combination of base standards that collectively perform a specific well-defined IT function. Profiles standardize the use of options and other variations in the base standards, and provide a basis for the development of uniform, internationally recognized system tests.

Information Technology – International Standardized Profile AMM11 – MMS General Applications Base Profile –

PART 3: Specific MMS Requirements

1. Scope

1.1. General

This part of ISO/IEC ISP 14226 specifies the MMS requirements specific to this ISP. This part, when used in conjunction with Part 1 and Part 2, forms the AMM11 Profile that specifies how the MMS standard shall be used to provide MMS functions required by general applications.

1.2. Position within the Taxonomy

This part of ISO/IEC ISP 14226 is the third part of a multi-part ISP identified in ISO/IEC TR 10000-2 as "AMM11, MMS General Applications Base Profile".

It may be combined with any T-Profile specifying the OSI connection-mode transport service.

2. Normative References

The following documents contain provisions which, through reference in this text, constitute provisions of this profile. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this profile are warned against automatically applying any more recent editions of the documents listed below, since the nature of references made by ISPs to such documents is that they may be specific to a particular edition. Members of IEC and ISO maintain registers of currently valid International Standards and ISPs, and CCITT maintains published editions of its current Recommendations.

- ISO/IEC 9506-1:1990, Industrial automation systems - Manufacturing Message Specification - Part 1 - Service definition

- ISO/IEC 9506-2:1990, Industrial automation systems - Manufacturing Message Specification - Part 2 - Protocol specification

- ISO/IEC TR 10000-1:1992, Information Technology - Framework and taxonomy of International Standardized Profiles - Part 1 : Framework.

- ISO/IEC TR 10000-2:1992, Information Technology - Framework and taxonomy of International Standardized Profiles - Part 2 : Taxonomy of Profiles.
- ISO/IEC ISP 10607-3:1991, Information Technology - International Standardized Profiles AFT nn-File

Transfer, Access and Management - Part 3: AFT 11 - Simple File Transfer Service (unstructured)

- ISO/IEC 9506 – Technical Corrigenda 1 (1992-12-17)

- ISO/IEC DISP 14226-1, Information Technology - International Standardized Profile AMM11-MMS General Applications Base Profile - Part 1: Specification of ACSE, Presentation, and Session Protocols for the use by MMS

- ISO/IEC DISP 14226-2, Information Technology - International Standardized Profile AMM11-MMS General Applications Base Profile - Part 2: Common MMS Requirements

3. Definitions

Terms used in this part are defined in ISO/IEC ISP 14226-2.

4. Abbreviations

Abbreviations used in this part are defined in ISO/IEC ISP 14226-2.

5. Conformance Requirements

This part of ISO/IEC ISP 14226 states requirements upon implementations to achieve interworking. A claim of conformance to this part of ISO/IEC ISP 14226 is a claim that all requirements in the relevant base standards are satisfied, and that all requirements in the following Clauses and in annex A are satisfied. Annex A states the relationship between these requirements and those of base standards.

The conformance requirements of this ISP are described in terms of "Client Conformance Requirements (Client-CR)" and "Server Conformance Requirements (Server-CR)" for each service.

An MMS implementation compliant with the Client-CR for all services in this ISP is called a "Client Implementation".

An MMS implementation compliant with the Server-CR for all services in this ISP is called a "Server Implementation".

5.1. General Requirements for use of all parts of MMS

An MMS implementation compliant with this ISP shall be only required to support the abstract syntax defined in Clause 19 of ISO/IEC 9506-2.

5.2. Service-specific Requirements

There are no requirements additional to those in ISO/IEC ISP 14226-2.

PART 3:

Annex A - ISPICS Requirements List

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Annex A - ISPICS Requirements List

A.1. General

This annex describes the specific MMS requirements in terms of tables which were derived from the base standard and ISO/IEC ISP 14226-2. They are intended to give a precise specification of requirements for general MMS applications.

A.2. Classification of Requirements

Throughout this annex, to specify the level of support for each feature, the following classification is used.

Client-CR : Client Conformance Requirement

Server-CR : Server Conformance Requirement

A.2.1. Base Column

The "Base" column reflects the definitions and specifications in ISO/IEC 9506-1:1990 and ISO/IEC 9506-2:1990. Each entry in this column is chosen from the following list:

mandatory; m : That feature shall be supported, i.e. its syntax and procedures shall be implemented as specified in the base standard.

However, it is not a requirement that the feature shall be used in all instances of communication, unless mandated by the base standard .

optional; o : Any feature denoted by "o" is left to the implementation as to whether that feature is implemented or not.

If a parameter is optionally supported, then the syntax shall be implemented, but it is left to each implementation whether the procedures are implemented or not.

A.2.2. F/S Column

The "F/S" column reflects the requirements of this Functional Standard. Each entry in this column is chosen from the following terminology:

supported; m : Any feature denoted by "m" is mandatory or optional in the base standard. That feature shall be supported, i.e. its syntax and procedures shall be implemented as specified in the base standard or in this ISP by all implementations claiming conformance to this ISP.

However, it is not a requirement that the feature shall be used in all instances of communication, unless mandated by the base standard or stated otherwise in this part of this A-Profile.

optionally supported; o : Any feature denoted by "o" is left to the implementation as to whether that feature is implemented or not.

If a parameter is optionally supported, then the syntax shall be implemented, but it is left to each implementation whether the procedures are implemented or not.

conditionally supported; c : Any feature denoted by "c<n>" shall be supported under the condition referenced c<n> specified in this ISP, where <n> stands for a number. If these conditions are not met, the feature is outside the scope of this ISP.

excluded; x : Any feature denoted by "x" is excluded in this ISP, i.e. an implementation shall behave as if the feature is not implemented.

outside of scope; i : Any feature denoted by "i" is outside the scope of this ISP, i.e. it may be ignored, and will therefore not be subject of an ISP conformance test. However the syntax of all parameters of supported PDUs shall be implemented, even if the procedures are not (i.e. the Receiver shall be able to decode the PDU).

A.2.3. Value/Reference

The "Value/Ref." column specifies constraints on values for the parameter and/or contains references to text in this or other documents.

A.2.4. Conditional MACROs

The following MACROs are used in the F/S Column:

STR1 : Any feature denoted by "STR1" is conditioned on the support of STR1 Parameter CBB.

STR2 : Any feature denoted by "STR2" is conditioned on the support of STR2 Parameter CBB.

VADR : Any feature denoted by "VADR" is conditioned on the support of VADR Parameter CBB.

VNAM : Any feature denoted by "VNAM" is conditioned on the support of VNAM Parameter CBB.

VLIS : Any feature denoted by "VLIS" is conditioned on the support of VLIS Parameter CBB.

VSCA : Any feature denoted by "VSCA" is conditioned on the support of VSCA Parameter CBB.

VALT : Any feature denoted by "VALT" is conditioned on the support of VALT Parameter CBB.

REAL : Any feature denoted by "REAL" is conditioned on the support of REAL Parameter CBB.

TPY : Any feature denoted by "TPY" is conditioned on the support of TPY Parameter CBB.

MOD : Any feature denoted by "MOD" is conditioned on the support of MMS modifiers.

A.3. Supported MMS PDU's

A.3.1. Environment and General Management

Ref	MMS PDU	Client-CR				Server-CR			
		Sending		Receiving		Sending		Receiving	
		Base	F/S	Base	F/S	Base	F/S	Base	F/S
1	InitiateRequest	o	m	o	o	o	o	m	m
2	InitiateResponse	o	o	o	m	m	m	o	o
3	InitiateError	o	o	o	m	m	m	o	o
4	ConcludeRequest	o	m	o	o	o	o	m	m
5	ConcludeResponse	o	o	o	m	m	m	o	o
6	ConcludeError	o	o	o	m	m	m	o	o
7	CancelRequest	o	o	o	o	o	o	o	o
8	CancelResponse	o	o	o	o	o	o	o	o
9	CancelError	o	o	o	o	o	o	o	o
10	Reject	m	m	m	m	m	m	m	m

Note: Abort service is provided by ACSE.

A.3.2. MMS Modifiers

Ref	Modifier	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	attachToEventCondition	o	i	o	i
2	attachToSemaphore	o	i	o	i

A.3.3. Parameter CBBs

Ref	Parameter	Base	Client-CR		Server-CR	
			F/S	Value/Ref.	F/S	Value/Ref.
1	str1	o	o		o	
2	str2	o	o		o	

3	vnam	o	o		o	
4	valt	o	o		o	
5	vadr	o	o		o	
6	vsca	o	x		x	
7	tpy	o	o		o	
8	vlis	o	o		o	
9	real	o	i		i	
10	cei	o	i		i	

A.3.4. VMD Support

In this subsection and the following subsections of A.3 the column "MMS PDU's" contains one single entry for each MMS service. In case of a confirmed service this single entry stands for the corresponding Request-, Response- and Error-PDU'S. In case of an unconfirmed service it stands for the corresponding Request-PDU.

For responder role service CBBs, the Client-CR column indicates the support of sending the Request-PDU and receiving the Response-PDU and Error-PDU, whereas, the Server-CR column indicates the support of receiving the Request-PDU and sending the Response-PDU and Error-PDU.

For requester role service CBBs, the Client-CR column indicates the support of receiving the Request-PDU and (in case of a confirmed service) sending the Response-PDU and Error-PDU, whereas, the Server-CR column indicates the support of sending the Request-PDU and (in case of a confirmed service) receiving the Response-PDU and Error-PDU.

NOTE - As an example, the 'm' in the Server-CR column for the Identify service means that the Server implementation has to support the receiving of the Identify-Request PDU and the sending of the Identify-Response PDU and the Identify-Error PDU, whereas the 'o' in the Client-CR column means that the Client implementation may or may not support the sending of the Identify-Request PDU and the receiving of the Identify-Response PDU and the Identify-Error PDU.

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Status	o	m	o	m
2	UnsolicitedStatus	o	o	o	o
3	GetNameList	o	o	o	o
4	Identify	o	m	m	m
5	Rename	o	i	o	i
6	GetCapabilityList	o	o	o	o

A.3.5. Domain Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	InitiateDownloadSequence	o	o	o	o
2	DownloadSegment	o	o	o	o
3	TerminateDownloadSequence	o	o	o	o
4	InitiateUploadSequence	o	o	o	o
5	UploadSegment	o	o	o	o
6	TerminateUploadSequence	o	o	o	o
7	RequestDomainDownload	o	o	o	o
8	RequestDomainUpload	o	o	o	o
9	LoadDomainContent	o	o	o	o
10	StoreDomainContent	o	o	o	o
11	DeleteDomain	o	o	o	o
12	GetDomainAttributes	o	o	o	o

A.3.6. Program Invocation Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	CreateProgramInvocation	o	o	o	o
2	DeleteProgramInvocation	o	o	o	o
3	Start	o	o	o	o
4	Stop	o	o	o	o
5	Resume	o	o	o	o
6	Reset	o	o	o	o
7	Kill	o	o	o	o
8	GetProgramInvocationAttributes	o	o	o	o

A.3.7. Variable Access

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Read	o	o	o	o
2	Write	o	o	o	o
3	InformationReport	o	o	o	o
4	GetVariableAccessAttributes	o	o	o	o
5	DefineNamedVariable	o	o	o	o
6	DefineScatteredAccess	o	x	o	x
7	GetScatteredAccessAttributes	o	x	o	x
8	DeleteVariableAccess	o	o	o	o
9	DefineNamedVariableList	o	o	o	o
10	GetNamedVariableListAttributes	o	o	o	o
11	DeleteNamedVariableList	o	o	o	o
12	DefineNamedType	o	o	o	o
13	GetNamedTypeAttributes	o	o	o	o
14	DeleteNamedType	o	o	o	o

A.3.8. Semaphore Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	TakeControl	o	i	o	i
2	RelinquishControl	o	i	o	i
3	DefineSemaphore	o	i	o	i
4	DeleteSemaphore	o	i	o	i
5	ReportSemaphoreStatus	o	i	o	i
6	ReportPoolSemaphoreStatus	o	i	o	i
7	ReportSemaphoreEntryStatus	o	i	o	i

A.3.9. Operator Communication

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Input	o	o	o	o
2	Output	o	o	o	o

A.3.10. Event Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	DefineEventCondition	o	i	o	i
2	DeleteEventCondition	o	i	o	i
3	GetEventConditionAttributes	o	i	o	i
4	ReportEventConditionStatus	o	i	o	i
5	AlterEventConditionMonitoring	o	i	o	i
6	TriggerEvent	o	i	o	i
7	DefineEventAction	o	i	o	i
8	DeleteEventAction	o	i	o	i

9	GetEventActionAttributes	o	i	o	i
10	ReportEventActionStatus	o	i	o	i
11	DefineEventEnrollment	o	i	o	i
12	DeleteEventEnrollment	o	i	o	i
13	GetEventEnrollmentAttributes	o	i	o	i
14	ReportEventEnrollmentStatus	o	i	o	i
15	AlterEventEnrollment	o	i	o	i
16	EventNotification	o	i	o	i
17	AcknowledgeEventNotification	o	i	o	i
18	GetAlarmSummary	o	i	o	i
19	GetAlarmEnrollmentSummary	o	i	o	i

A.3.11. Journal Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	ReadJournal	o	i	o	i
2	WriteJournal	o	i	o	i
3	InitializeJournal	o	i	o	i
4	ReportJournalStatus	o	i	o	i
5	CreateJournal	o	i	o	i
6	DeleteJournal	o	i	o	i

A.3.12. File Access

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	ObtainFile	o	i	o	i

A.3.13. File Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	FileOpen	o	i	o	i
2	FileRead	o	i	o	i
3	FileClose	o	i	o	i

A.3.14. Data Exchange Management

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	GetDataExchangeAttributes	o	i	o	i
2	ExchangeData	o	i	o	i

A.3.15. Additional PDUs

Ref	MMS PDU	Client-CR		Server-CR	
		Base	F/S	Base	F/S
1	Additional PDU	o	x	o	x

A.4. PDU-Specific Requirements

This clause contains tables for all PDUs which have been marked as ’m’ or ’o’ in the F/S columns of clause A.3.

Some of the PDU parameters represent complex structures which are described using the following conventions:

a) If a parameter with label <x> is a CHOICE type, the corresponding alternatives are listed below this parameter, using the sub-labels <x>.a, <x>.b, <x>.c, etc.

b) If a parameter with label <x> is a SEQUENCE or SEQUENCE OF SEQUENCE type, the sequence members are listed below that parameter using the sub-labels <x>.1, <x>.2, <x>.3, etc.

c) Some of the complex parameters are described in separate tables. In these cases, parameter names start with an upper case letter, otherwise parameters start with a lower case letter.

A.4.1. Environment and General Management

A.4.1.1. Initiate Request PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	localDetailCalling	o	m	Part 2, 5.2.1.1.3	m	m	
2	proposedMaxServOutstandingCallingg		m	m	Part 2,	m	m
3	proposedMaxServOutstandingCalled	m	m	Part2, 5.2.1.1.2	m	m	
4	proposedDataStructureNestingLevel	m	m		m	m	
5	initiateRequestDetail	m	m		m	m	
5.1	proposedVersionNumber	m	m		m	m	
5.2	proposedParameterCBB	m	m		m	m	
5.3	servicesSupportedCalling	m	m		m	m	

A.4.1.2. Initiate Response PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	localDetailCalled	o	m	Part2, 5.2.1.1.4	m	m	
2	negotiatedMaxServOutstandingCalling		m	m	Part2,	m	m
3	negotiatedMaxServOutstandingCalledd		m	m	Part2,	m	m
4	negotiatedDataStructureNestingLevelel		m	m		m	m
5	initiateResponseDetail	m	m		m	m	
5.1	negotiatedVersionNumber	m	m		m	m	
5.2	negotiatedParameterCBB	m	m		m	m	
5.3	servicesSupportedCalled	m	m		m	m	

A.4.1.3. Initiate Error PDU

Ref	Parameter	Sending	Receiving

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	errorClass	m	m		m	m	
2	errorCode	m	m		m	m	
3	additionalCode	o	o		o	m	
4	additionalDescription	o	o		o	m	

A.4.1.4. Conclude Request PDU

No parameter.

A.4.1.5. Conclude Response PDU

No parameter.

A.4.1.6. Conclude Error PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	errorClass	m	m		m	m	
2	errorCode	m	m		m	m	
3	additionalCode	o	o		o	m	
4	additionalDescription	o	o		o	m	

A.4.1.7. Cancel Request PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	

A.4.1.8. Cancel Response PDU

Ref	Parameter	Sending			Receiving		

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	

A.4.1.9. Cancel Error PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	
2	errorClass	m	m		m	m	
3	errorCode	m	m		m	m	
4	additionalCode	o	o		o	m	
5	additionalDescription	o	o		o	m	

A.4.1.10. Reject PDU

Ref	Parameter	Sending			Receiving		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	originalInvokeID	m	m		m	m	
2	rejectReason	m	m		m	m	

A.4.2. VMD Support

A.4.2.1. Status Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	extendedDerivation	m	m		m	m	
4	csStatusRequest	o	x		o	x	

A.4.2.2. Status Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	vmdLogicalStatus	m	m		m	m	
3	vmdPhysicalStatus	m	m		m	m	
4	localDetail	o	m		o	o	
5	csStatusResponse	o	x		o	x	

A.4.2.3. Status Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.2.4. Unsolicited Status PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	vmdLogicalStatus	m	m		m	m	
2	vmdPhysicalStatus	m	m		m	m	
3	localDetail	o	m		o	o	
4	csStatusResponse	o	x		o	x	

A.4.2.5. GetNameList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	objectClass	m	m		m	m	
4	csObjectClass	o	x		o	x	
5	objectScope	m	m		m	m	
6	continueAfter	m	m		m	m	
7	csGetNameListRequest	o	x		o	x	

A.4.2.6. GetNameList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfIdentifier	m	m		m	m	
3	moreFollows	m	m		m	m	
4	csGetNameListResponse	o	x		o	x	

A.4.2.7. GetNameList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.2.8. Identify Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

A.4.2.9. Identify Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	vendorName	m	m		m	m	
3	modelName	m	m		m	m	
4	revision	m	m		m	m	
5	listOfAbstractSyntaxes	o	m		m	m	

A.4.2.10. Identify Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.2.11. GetCapabilityList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	continueAfter	m	m		m	m	
4	csGetCapabilityListRequest	o	x		o	x	

A.4.2.12. GetCapabilityList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfCapabilities	m	m		m	m	Part2, 5.2.3.1
3	moreFollows	m	m		m	m	
4	csGetCapabilityListResponse	o	x		o	x	

A.4.2.13. GetCapabilityList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3. Domain Management

A.4.3.1. InitiateDownloadSequence Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	listOfCapabilities	m	m	Part2, 5.2.3.1	m	m	
5	sharable	m	m		m	m	
6	csInitiateDownloadSequenceRequestt		o	x		o	x

A.4.3.2. InitiateDownloadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csInitiateDownloadSequenceResponse		o	x		o	x

A.4.3.3. InitiateDownloadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.4. DownloadSegment Request PDU

Ref	Parameter	Client-CR	Server-CR

		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	csDownloadSegmentRequest	o	x		o	x	

A.4.3.5. DownloadSegment Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	loadData	m	m		m	m	
2.a	non-coded	o	m		o	m	
2.b	coded	o	i		o	i	
3	moreFollows	m	m		m	m	
4	csDownloadSegmentResponse	o	x		o	x	

A.4.3.6. DownloadSegment Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	o		o	m	
6	additionalDescription	o	o		o	m	

A.4.3.7. TerminateDownloadSequence Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	discard	m	m		o	o	
4.1	errorClass	m	m		m	m	
4.2	errorCode	m	m		m	m	
4.3	additionalCode	o	m		o	o	
4.4	additionalDescription	o	m		o	o	
5	csTerminateDownloadSeqRequest	o	x		o	x	

A.4.3.8. TerminateDownloadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csTerminateDownloadSeqResponse	o	x		o	x	

A.4.3.9. TerminateDownloadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	o		o	m	
6	additionalDescription	o	o		o	m	

A.4.3.10. InitiateUploadSequence Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	csInitiateUploadSequenceRequest	o	x		o	x	

A.4.3.11. InitiateUploadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	ulsmID	m	m		m	m	
3	listOfCapabilities	m	m		m	m	Part2, 5.2.3.1
4	csInitiateUploadSequenceResponse	o	x		o	x	

A.4.3.12. InitiateUploadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.13. UploadSegment Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	ulsmID	m	m		m	m	
4	csUploadSegmentRequest	o	x		o	x	

A.4.3.14. UploadSegment Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	loadData	m	m		m	m	
2.a	non-coded	o	m		o	m	
2.b	coded	o	i		o	i	
3	moreFollows	m	m		m	m	
4	csUploadSegmentResponse	o	x		o	x	

A.4.3.15. UploadSegment Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.16. TerminateUploadSequence Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	ulsmID	m	m		m	m	
4	csTerminateUploadSequenceRequest	o	x		o	x	

A.4.3.17. TerminateUploadSequence Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csTerminateUploadSeqResponse	o	x		o	x	

A.4.3.18. TerminateUploadSequence Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.19. RequestDomainDownload Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	listOfCapabilities	m	m		m	m	Part 2, 5.2.3.1
5	sharable	m	m		m	m	
6	filename	m	m		m	m	
7	csRequestDomainDownloadRequest	o	x		o	x	

A.4.3.20. RequestDomainDownload Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csRequestDomainDownloadResponses		o	x		o	x

A.4.3.21. RequestDomainDownload Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	o		o	m	
6	additionalDescription	o	o		o	m	

A.4.3.22. RequestDomainUpload Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	filename	m	m		m	m	
5	csRequestDomainUploadRequest	o	x		o	x	

A.4.3.23. RequestDomainUpload Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csRequestDomainUploadResponse	o	x		o	x	

A.4.3.24. RequestDomainUpload Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	o		o	m	
6	additionalDescription	o	o		o	m	

A.4.3.25. LoadDomainContent Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	domainName	m	m		m	m	
4	listOfCapabilities	m	m	Part 2, 5.2.3.1	m	m	
5	sharable	m	m		m	m	
6	filename	m	m		m	m	
7	thirdParty	o	TPY		o	TPY	
8	csLoadDomainContentRequest	o	x		o	x	

A.4.3.26. LoadDomainContent Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csLoadDomainContentResponse	o	x		o	x	

A.4.3.27. LoadDomainContent Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.28. StoreDomainContent Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	filename	m	m		m	m	
5	thirdParty	o	TPY		o	TPY	
6	csStoreDomainContentRequest	o	x		o	x	

A.4.3.29. StoreDomainContent Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csStoreDomainContentResponse	o	x		o	x	

A.4.3.30. StoreDomainContent Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.31. DeleteDomain Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	domainName	m	m		m	m	
4	csDeleteDomainRequest	o	x		o	x	

A.4.3.32. DeleteDomain Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csDeleteDomainResponse	o	x		o	x	

A.4.3.33. DeleteDomain Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.3.34. GetDomainAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	domainName	m	m		m	m	
4	csGetDomainAttributesRequest	o	x		o	x	

A.4.3.35. GetDomainAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfCapabilities	m	m		m	m	Part 2, 5.2.3.1
3	state	m	m		m	m	
4	mmsDeletable	m	m		m	m	
5	sharable	m	m		m	m	
6	listOfProgramInvocations	m	m		m	m	
7	uploadInProgress	m	m		m	m	
8	csGetDomainAttributesResponse	o	x		o	x	

A.4.3.36. GetDomainAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.4. Program Invocation Management

A.4.4.1. CreateProgramInvocation Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	listOfDomainNames	m	m		m	m	
5	reusable	m	m		m	m	
6	monitorType	o	i		o	i	
7	csCreateProgramInvocationRequest	o	x		o	x	

A.4.4.2. CreateProgramInvocation Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csCreateProgramInvocationResponse	o	x		o	x	

A.4.4.3. CreateProgramInvocation Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.4.4. DeleteProgramInvocation Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csDeleteProgramInvocationRequest	o	x		o	x	

A.4.4.5. DeleteProgramInvocation Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csDeleteProgramInvocationResponse	o	x		o	x	

A.4.4.6. DeleteProgramInvocation Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.4.7. Start Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	

4	executionArgument	m	m		m	m	
4.a	simpleString	o	m		o	m	
4.b	encodedString	o	i		o	i	
5	csStartRequest	o	x		o	x	

A.4.4.8. Start Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csStartResponse	o	x		o	x	

A.4.4.9. Start Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	serviceSpecificInformation	m	m		m	m	Part2, 5.2.4.1

A.4.4.10. Stop Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	programInvocationName	m	m		m	m	
4	csStopRequest	o	x		o	x	

A.4.4.11. Stop Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csStopResponse	o	x		o	x	

A.4.4.12. Stop Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	serviceSpecificInformation	m	m		m	m	Part2, 5.2.4.2

A.4.4.13. Resume Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	executionArgument	m	m		m	m	

4.a	simpleString	o	m		o	m	
4.b	encodedString	o	i		o	i	
5	csResumeRequest	o	x		o	x	

A.4.4.14. Resume Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csResumeResponse	o	x		o	x	

A.4.4.15. Resume Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	serviceSpecificInformation	m	m		m	m	part 2, 5.2.4.3

A.4.4.16. Reset Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	

4	csResetRequest	o	x		o	x	

A.4.4.17. Reset Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csResetResponse	o	x		o	x	

A.4.4.18. Reset Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	serviceSpecificInformation	m	m		m	m	part 2, 5.2.4.4

A.4.4.19. Kill Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csKillRequest	o	x		o	x	

A.4.4.20. Kill Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csKillResponse	o	x		o	x	

A.4.4.21. Kill Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	serviceSpecificInformation	m	m		m	m	Part2, 5.2.4.5

A.4.4.22. GetProgramInvocationAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	programInvocationName	m	m		m	m	
4	csGetPIAttributesRequest	o	x		o	x	

A.4.4.23. GetProgramInvocationAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	State	m	m		m	m	
3	listOfDomainNames	m	m		m	m	
4	mmsDeletable	m	m		m	m	
5	reusable	m	m		m	m	
6	monitor	m	m		m	m	
7	executionArgument	m	m		m	m	
7.a	simpleString	o	m		o	m	
7.b	encodedString	o	i		o	i	
8	csGetPIAttributesResponse	o	x		o	x	

A.4.4.24. GetProgramInvocationAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5. Variable Access

A.4.5.1. Read Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	specificationWithResult	m	m		m	m	
4	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	A.4.5.1.1.

A.4.5.1.1. VariableAccessSpecification

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	listOfVariable	o	m		m	m	
1.a.1	VariableSpecification	m	m	A.4.5.1.2.	m	m	A.4.5.1.2.
1.a.2	AlternateAccess	o	VALT	A.4.5.1.5.	o	VALT	A.4.5.1.5.
1.b	variableListName	o	VLIS		o	VLIS	

A.4.5.1.2. VariableSpecification

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	name	o	VNAM		o	VNAM	
1.b	Address	o	VADR	A.4.5.1.3.	o	VADR	A.4.5.1.3.
1.c	variableDescription	o	VADR		o	VADR	
1.c.1	Address	m	m	A.4.5.1.3.	m	m	A.4.5.1.3.
1.c.2	TypeSpecification	m	m	A.4.5.1.4.	m	m	A.4.5.1.4.
1.d	scatteredAccessDescription	o	VSCA		o	VSCA	
1.e	invalidated	m	m		m	m	

A.4.5.1.3. Address

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1.a	numericAddress	o	m		o	c1	
1.b	symbolicAddress	o	m		o	c1	
1.c	unconstrainedAddress	o	o		o	o	

c1: at least one of these address types must be supported (see part 2, clause 5.2.5.6).

A.4.5.1.4. TypeSpecification

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	typeName	o	o		o	o	
1.b	array	o	STR1		o	STR1	
1.b.1	packed	m	m		m	m	
1.b.2	numberOfElements	m	m		m	m	
1.b.3	TypeSpecification	m	m		m	m	
1.c	structure	o	STR2		o	STR2	
1.c.1	packed	m	m		m	m	
1.c.2	components	m	m		m	m	
1.c.2.1	componentName	o	VALT		o	VALT	
1.c.2.2	TypeSpecification	m	m		m	m	
1.d	boolean	o	m		o	c1	
1.e	bit-string	o	m		o	c1	
1.f	integer	o	m		o	c1	
1.g	unsigned	o	m		o	c1	
1.h	floatingPoint	o	m		o	c1	
1.i	real	o	REAL		o	REAL	
1.j	octet-string	o	o		o	o	
1.k	visible-string	o	m		o	c1	
1.l	generalized-time	o	m		o	c1	
1.m	binary-time	o	o		o	o	
1.n	bcd	o	o		o	o	
1.o	objId	o	o		o	o	

c1: Each server implementation shall be capable of supporting at least one of the data types marked as c1

A.4.5.1.5. AlternateAccess

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	unnamed	o	STR1		o	STR1	
1.a.1	selectAlternateAccess	m	m		m	m	
1.a.1.1	AccessSelection	m	m	A.4.5.1.6.	m	m	A.4.5.1.6.
1.a.1.2	AlternateAccess	m	m		m	m	
1.a.2	SelectAccess	m	m	A.4.5.1.7.	m	m	A.4.5.1.7.
1.b	named	o	STR2		o	STR2	
1.b.1	componentName	m	m		m	m	
1.b.2	AlternateAccessSelection	m	m		m	m	
1.b.2.1	selectAlternateAccess	o	m		m	m	
1.b.2.2	SelectAccess	o	m	A.4.5.1.7.	m	m	A.4.5.1.7.

A.4.5.1.6. AccessSelection

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	component	o	STR2		o	STR2	
1.b	index	o	STR1		o	STR1	
1.c	IndexRange	o	STR1	A.4.5.1.8.	o	STR1	A.4.5.1.8.
1.d	allElements	o	STR1		o	STR1	

A.4.5.1.7 SelectAccess

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1.a	component	o	STR2		o	STR2	
1.b	index	o	STR1		o	STR1	
1.c	IndexRange	o	STR1	A.4.5.1.8.	o	STR1	A.4.5.1.8.

1.d	allElements	o	STR1		o	STR1	

A.4.5.1.8. IndexRange

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	lowIndex	m	m		m	m	
2	numberOfElements	m	m		m	m	

A.4.5.2. Read Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	A.4.5.1.1.
3	listOfAccessResult	m	m		m	m	
3.a	failure	m	m		m	m	
3.b	Data	m	m	A.4.5.2.1.	m	m	A.4.5.2.1.

A.4.5.2.1. Data

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
a	array	o	STR1		o	STR1	
b	structure	o	STR2		o	STR2	
c	boolean	o	m		o	c1	
d	bit-string	o	m	n2	o	c1	
e	integer	o	m	n1	o	c1	
f	unsigned	o	m	n1	o	c1	
g	floating-point	o	m		o	c1	

h	real	o	REAL		o	REAL	
i	octet-string	o	o	n2	o	o	
j	visible-string	o	m	n2	o	c1	
k	generalized-time	o	m		o	c1	
l	binary-time	o	o		o	o	
m	bcd	o	o		o	o	
n	booleanArray	o	o		o	o	
o	objectId	o	o		o	o	

c1: Each server implementation shall be capable of supporting at least one of the data types marked as c1

n1: Client implementations shall be capable of supporting a DataSize parameter of value 32.

n2: Client implementations shall be capable of supporting a DataSize parameter the value of which is determined by the InitiateResponse PDU localDetailCalled parameter.

A.4.5.3. Read Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.4. Write Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	

3	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	A.4.5.1.1.
4	listOfData	m	m	A.4.5.2.1.	m	m	A.4.5.2.1.

A.4.5.5. Write Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfWriteResult	m	m		m	m	
2.a	dataAccessError	m	m		m	m	
2.b	success	m	m		m	m	

A.4.5.6. Write Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.7. InformationReport PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	VariableAccessSpecification	m	m	A.4.5.1.1.	m	m	A.4.5.1.1.
2	listOfAccessResult	m	m		m	m	
2.a	failure	m	m		m	m	

2.b	Data	m	m	A.4.5.2.1.	m	m	A.4.5.2.1.

A.4.5.8. GetVariableAccessAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	variableName	o	VNAM		o	VNAM	
4	variableAddress	o	VADR		o	VADR	

A.4.5.9. GetVariableAccessAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	mmsDeletable	m	m		m	m	
3	Address	o	VADR		o	VADR	
4	TypeSpecification	m	m		m	m	

A.4.5.10. GetVariableAccessAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.11. DefineNamedVariable Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	variableName	m	m		m	m	
4	Address	m	m	A.4.5.1.3.	m	m	A.4.5.1.3.
5	TypeSpecification	o	o	A.4.5.1.4.	m	m	A.4.5.1.4.

A.4.5.12. DefineNamedVariable Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

A.4.5.13. DefineNamedVariable Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.14. DeleteVariableAccess Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	scopeOfDelete	m	m		m	m	
4	listOfName	o	o		m	m	
5	domainName	o	o		m	m	

A.4.5.15. DeleteVariableAccess Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	numberMatched	m	m		m	m	
3	numberDeleted	m	m		m	m	

A.4.5.16. DeleteVariableAccess Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	numberDeleted	m	m		m	m	

A.4.5.17. DefineNamedVariableList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	listOfModifier	o	MOD		o	MOD	
3	variableListName	m	m		m	m	
4	listOfVariable	m	m		m	m	
4.1	VariableSpecification	m	m	A.4.5.1.2.	m	m	A.4.5.1.2.
4.2	AlternateAccess	o	VALT	A.4.5.1.5.	o	VALT	A.4.5.1.5.

A.4.5.18. DefineNamedVariableList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

A.4.5.19. DefineNamedVariableList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.20. GetNamedVariableListAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	variableListName	m	m		m	m	

A.4.5.21. GetNamedVariableListAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	mmsDeletable	m	m		m	m	
3	listOfVariable	m	m		m	m	
3.1	VariableSpecification	m	m	A.4.5.1.2.	m	m	A.4.5.1.2.
3.2	AlternateAccess	o	VALT	A.4.5.1.5.	o	VALT	A.4.5.1.5.

A.4.5.22. GetNamedVariableListAttributes Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.23. DeleteNamedVariableList Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	scopeOfDelete	m	m		m	m	
4	listOfVariableListName	o	o		m	m	

5	domainName	o	o		m	m	

A.4.5.24. DeleteNamedVariableList Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	numberMatched	m	m		m	m	
3	numberDeleted	m	m		m	m	

A.4.5.25. DeleteNamedVariableList Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	numberDeleted	m	m		m	m	

A.4.5.26. DefineNamedType Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	typeName	m	m		m	m	
4	TypeSpecification	m	m	A.4.5.1.4.	m	m	A.4.5.1.4.

A.4.5.27. DefineNamedType Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

A.4.5.28. DefineNamedType Error PDU

Ref	Parameter	Server-CR			Client-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.29. GetNamedTypeAttributes Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	typeName	m	m		m	m	

A.4.5.30. GetNamedTypeAttributes Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.

1	invokeID	m	m		m	m	
2	mmsDeletable	m	m		m	m	
3	TypeSpecification	m	m	A.4.5.1.4.	m	m	A.4.5.1.4.

A.4.5.31. GetNamedTypeAttributes Error PDU

Ref	Parameter	Server-CR			Client-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.5.32. DeleteNamedType Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	scopeOfDelete	m	m		m	m	
4	listOfTypeName	o	o		m	m	
5	domainName	o	o		m	m	

A.4.5.33. DeleteNamedType Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	

2	numberMatched	m	m		m	m	
3	numberDeleted	m	m		m	m	

A.4.5.34. DeleteNamedType Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	
7	numberDeleted	m	m		m	m	

A.4.6. Semaphore Management

Out of Scope.

A.4.7. Operator Communication

A.4.7.1. Input Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	operatorStationName	m	m		m	m	
4	echo	m	m		m	m	
5	listOfPromptData	o	o		o	o	
6	inputTimeOut	o	o		o	m	
7	csInputRequest	o	x		o	x	

A.4.7.2. Input Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	inputString	m	m		m	m	
3	csInputResponse	o	x		o	x	

A.4.7.3. Input Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	

5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.7.4. Output Request PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	listOfModifier	o	MOD		o	MOD	
3	operatorStationName	m	m		m	m	
4	listOfOutputData	m	m		m	m	
5	csOutputRequest	o	x		o	x	

A.4.7.5. Output Response PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	csOutputResponse	o	x		o	x	

A.4.7.6. Output Error PDU

Ref	Parameter	Client-CR			Server-CR		
		Base	F/S	Value/Ref.	Base	F/S	Value/Ref.
1	invokeID	m	m		m	m	
2	modifierPosition	o	MOD		o	MOD	
3	errorClass	m	m		m	m	
4	errorCode	m	m		m	m	
5	additionalCode	o	m		o	o	
6	additionalDescription	o	m		o	o	

A.4.8. Event Management

Out of Scope

A.4.9. Journal Management

Out of Scope

A.4.10. File Access

Out of Scope

A.4.11. File Management

Out of Scope

A.4.12. Data Exchange Management

Out of Scope