INTERNATIONAL STANDARDIZED PROFILE

ISO/IEC ISP 11185-3

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Information technology — International Standardized Profiles FVT2nn — Virtual Terminal Basic Class — Register of control object type definitions —

Part 3:

FVT215, FVT216 — Application RIO Record Loading Control Object, Terminal RIO Record Notification Control Object

Technologies de l'information — Profils normalisés internationaux FVT2nn — Classe de base de terminal virtuel — Registre de définitions de type d'objet de commande —

Partie 3: FVT215, FVT216 — Objet de commande de charge d'enregistrement RIO pour application, objet de commande de notification d'enregistrement RIO

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in this work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC1. In addition to developing International Standards, ISO/IEC JTC1 has created a Special Group on Functional Standardization for the elaboration of International Standardized Profiles.

An International Standardized Profile is an internationally agreed, harmonized document which identifies a standard or group of standards, together with options and parameters, necessary to accomplish a function or set of functions.

Draft International Standardized Profiles are circulated to national bodies for voting. Publication as an International Standardized Profile requires approval by at least 75% of the national bodies casting a vote.

International Standardized Profile ISO/IEC ISP 11185-3 was prepared with the collaboration of

— *OSI Asia-Oceania Workshop (AOW);*
— *European Workshop for Open Systems (EWOS);*
— ***Open Systems Environment Implementors Workshop (OIW).***

This International Standardized Profile ISO/IEC ISP 11185 forms an International Register of information objects in accordance with the procedures for the operation of OSI Registration Authorities laid down in ISO/IEC 9834. It is issued in parts, with additional parts being issued as further entries are added to the register. Each part is prepared in accordance with an approval and maintenance process laid down by the Special Group on Functional Standardization of ISO/IEC JTC1, *Information technology.*

ISO/IEC ISP 11185 is issued under the general title *Information technology — International Standardized Profiles FVT2nn ---- Virtual Terminal Basic Class — Register of control object type definitions.* At present the following parts are published or are in the course of preparation:

— *Part 1: FVT211, FVT212 — Sequenced and Unsequenced Application Control Objects*
— *Part 2: FVT213, FVT214 — Sequenced and Unsequenced Terminal Control Objects*
— *Part 3: FVT215, FVT216 — Application RIO Record Loading Control Object, Terminal RIO Record Notification Control Object*
— *Part 4: FVT217 ---- Horizontal Tabulation Control Object*
— *Part 5: FVT218 ---- Logical Image Control Object*
— *Part 6: FVT219 ---- Status Message Control Object*
— *Part 7: FVT2110 — Entry-Control Control Object*
— *Part 8: FVT221 ---- Forms FEICO (Field Entry Instruction Control Object) No.1*
— *Part 9: FVT222 ---- Paged FEICO (Field Entry Instruction Control Object) No.1*
— *Part 10: FVT231 — Forms FEPCO (Field Entry Pilot Control Object) No.1*
— *Part 11: FVT232 — Paged FEPCO (Field Entry Pilot Control Object) No.1*
— *Part 12: FVT2116, FVT2117, FVT2118, FVT2119 — Generalized Telnet Sync,Signal, Negotiation and Subnegotiation Control Objects*
— *Part 13: FVT2111 — Waiting Time Control Object*
— *Part 14: FVT2112 — Printer Control Object*
— *Part 15: FVT2113 — Field Definition Management Control Object*
— *Part 16: FVT2114 — Terminal Signal Titles Control Object*
— *Part 17: FVT2115 — Help Text Control Object*

Annexes A and C of this part of ISO/IEC ISP 11185 form an integral part of this International Standardized Profile. Annex B is for information only.

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Introduction

This International Standardized Profile ISO/IEC ISP 11185 is defined within the context of Functional Standardization, in accordance with the principles specified in 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.

The Open Systems Interconnection (OSI) Standard ISO 9040 for the Virtual Terminal Basic Class Service identified a requirement for an International Register of VT Control Object type definitions. Procedures for the operation of this International Register are laid down in ISO/IEC 9834-5. This International Standardized Profile provides this register. The individual entries in this register constitute Interchange Format and Representation Profiles (F-Profiles) within the framework of ISO/IEC TR 10000.

This part of ISO/IEC ISP 11185 was developed in close cooperation between the three Regional OSI Workshops, namely the OSI Implementors' Workshop (OIW) of the United States, the European Workshop for Open Systems (EWOS) and the OSI Asia-Oceania Workshop (AOW). It was developed under the editorship of EWOS. The text is harmonized between these three Workshops and it has been ratified by the plenary assemblies of each Workshop.

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Information technology — International Standardized Profiles FVT2nn — Virtual Terminal Basic Class — Register of control object type definitions

Part 3:

FVT215, FVT216 — Application RIO Record Loading Control Object, Terminal RIO Record Notification Control Object

1 Scope

1.1 General

The concept of Profiles for OSI, and the structure of the International Standardized Profiles that document them, are defined in ISO/IEC TR 10000-1. Such Profiles are divided into a number of different classes and sub-classes. Two of these classes contain sub-classes comprising functions of the Virtual Terminal Basic Class Service and Protocol specified in the base standards ISO 9040 and ISO 9041. These are the Application Profiles (A-Profiles) and the Interchange Format and Representation Profiles (F-Profiles).

The relationship between A-Profiles and F-Profiles is described in 7.3.2 of ISO/IEC TR 10000-1 and is as follows. Application Layer base standards require, implicitly or explicitly, the structure of information carried or referenced by them to be specified for each instance of communication. It is the purpose of F-Profiles to specify such information structures. Particular functional requirements may then be met by the combination of an A-Profile with one or more F-Profiles.

Establishment of a VT-association involves the selection by negotiation of a particular Virtual Terminal Environment profile (VTE-profile), and of particular values for any arguments of that VTE-profile. The VTE-profile specification, and possibly also the values of certain VTE-profile arguments, may in turn reference the definitions of VT control object types and assignment types. These VTE-profiles, control object types and assignment types are thus information structures that require explicit reference within the VT protocol. Particular instances of these structures are fully defined within the base standards, but the base standards also provide for further instances to be defined by registration. Each registered instance constitutes an F-Profile within the framework of ISO/IEC TR 10000.

The Virtual Terminal Basic Class Service and Protocol may be used to realise a wide range of distinct functions. Particular functions may be realised through the selection of appropriate VT functional units, F-Profiles and other VTE-profile argument values. The specification of the selection required to realise a particular function and to promote interoperability constitutes a Virtual Terminal A-Profile within the framework of ISO/IEC TR 10000.

The three International Registers of VT information structures and the specifications of VT Application Profiles are each published as a separate multi-part ISP as follows:

ISO/IEC ISP 11184 is the Register of VTE-profiles;

ISO/IEC ISP 11185 is the Register of control object type definitions;

ISO/IEC ISP 11186 is the Register of assignment-type definitions;

ISO/IEC ISP 11187 contains the specifications of VT Application Profiles.

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This part of ISO/IEC ISP 11185 contains the type definitions of two control objects that may be used to

a) load the contents of a RIO record from local storage at a terminal;

b) store the contents of a RIO record to local storage at a terminal;

c) remove VT data items from local storage at a terminal; and

d) enquire the status of a VT data item held in local storage at a terminal.

1.2 Position within the taxonomy

The taxonomy of International Standardized Profiles for OSI is laid down in ISO/IEC TR 10000-2. Within the classification scheme of this taxonomy, the OSI Profiles specified in this International Standardized Profile are in the Virtual Terminal Registered Object sub-class of the class of Interchange Format and Representation Profiles.

A Profile within this subclass has a Profile identifier of the form FVTabc, where abc is a structured numerical identifier that identifies the position of the Profile within each of the three levels of subdivision of the subclass. The values of a and b are single digits but c is an integer that is not necessarily a single digit.

In principle the ISO Virtual Terminal model allows for multiple classes of operation, although at the time of publication of this International Standardized Profile only the Basic Class has been defined. The value of the identifier component a distinguishes between distinct types of information object as follows:

a = 1 for Basic Class VTE-profiles;

a = 2 for Basic Class Control Objects;

a = 3 for Basic Class Assignment Types.

Values of a greater than 3 are reserved for future developments.

This International Standardized Profile ISO/IEC ISP 11185 contains the specifications of the Profiles with identifiers of the form FVT2bc. For this form of identifier, the component b distinguishes between the five major classifications of Basic Class Control Objects as follows:

b = 1 for Miscellaneous Control Objects;

b = 2 for Field Entry Instruction Control Objects;

b = 3 for Field Entry Pilot Control Objects;

b = 4 for Reference Information Objects;

b = 5 for Termination Conditions Control Objects.

Each of these classifications corresponds to a sub-register under the procedures of ISO/IEC 9834-5. The identifier component c is the serial number of the control object type in the appropriate sub-register. Values of b greater than 5 are reserved for new classifications of Basic Class Control Objects that may be defined in future amendments to ISO 9040.

This part of ISO/IEC ISP 11185 contains the type definitions of the Basic Class Control Objects with the Profile identifiers

FVT215 — Application RIO Record Loading CO;

FVT216 — Terminal RIO Record Notification CO.

1.3 Scenario

The specification of the Virtual Terminal Service is given in ISO 9040. It is based on a model in which two VT-users communicate by means of a shared Conceptual Communication Area (CCA) that is a conceptual part of the VT service-provider. Information exchange is modelled by one VT-user updating the content of the CCA and the changed state of the CCA then being made accessible to the peer VT-user.

Control objects (COs) form one of the types of information object that may be present in the CCA. This is illustrated in figure 1, in which CO-1, CO-2, ... CO-n represent a number of different control objects present in the CCA. The negotiation during establishment of a VT-association will determine whether or not these will include control objects of either or both of the types whose definitions are given in this part of ISO/IEC ISP 11185.

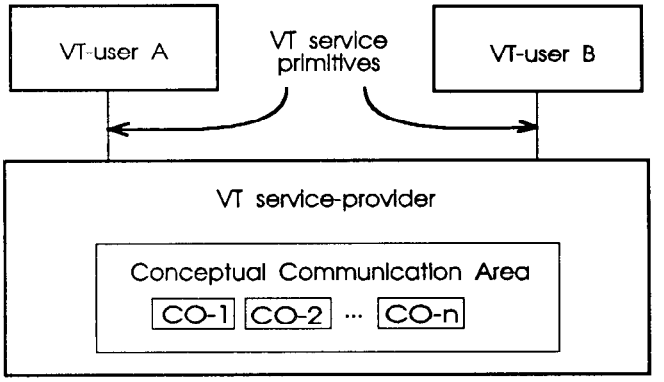


Figure 1 - Control objects in the VT Service Model

The CCA is structured by the Virtual Terminal Service into a number of components. For a control object the Data Structure Definition (DSD) component of the CCA contains the syntax of its information content, including the range of possible values and the permitted update operations. The current value of its information content is contained in the Control, Signal and Status store (CSS) component. Updates to the current value take place through the issue of VT service primitives by one VT-user to the service-provider. Changes of state of the CCA are made accessible through the issue of VT service primitives by the service-provider to the peer VT-user.

By clause 14 of ISO 9040, COs enable VT-users to handle control information related to virtual terminal functions and to real devices. This control is exercised by the VT-users through semantics associated with the information content and with the update operations of the CO. Definition of the semantics, or specification of the source of the semantics if the semantic details are not fully prescribed, forms part of the registered definition of the CO. These semantics are not however of concern to the VT service-provider itself. The DSD will contain an ASN.1 object identifier that identifies the regis-

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tered definition, but the VT service-provider merely acts as a repository of this value. It is only the VT-user that requires knowledge of the registered definition.

NOTE 1 – The VTE-parameter values that determine the syntax of the information content may not be negotiated explicitly during association establishment. Moreover, in the case of non-parametric COs these values do not determine the details of the syntax. Such values and details form part of the registered definition of the CO. Since the VT service-provider is not required to have knowledge of this registered definition, in principle the VT-users provide the VT service-provider with such information through local management procedures. Whether or not this is necessary in practice depends on the configuration of the implementations concerned.

The control object types defined in this part of ISO/IEC ISP 11185 assume an asymmetry between the two communicating end systems. One end system is assumed to have a terminal role and to contain devices for the input and display of data and for signalling. These devices form part of the VT-user component of that end system. The other end system is assumed to have an application role and to contain an application package that the terminal end system desires to access. This asymmetry may, but need not, be recognised by the VT Service; provision for such recognition exists only in an S-mode VT-association.

The Virtual Terminal Protocol specification given in ISO 9041-1 models the VT service-provider in terms of protocol exchange between two Virtual Terminal Protocol Machines (VTPMs), each with its own CCA. The CCA of each VTPM is updated both by service primitives received from its own VT-user and by protocol elements received from the peer VTPM. Corresponding service primitives and protocol elements are issued by the VTPM to provide notification of changes to the content of its CCA. This is illustrated in figure 2 in the context of the asymmetric end systems described above. The control object type definitions given in this part of ISO/IEC ISP 11185 are expressed in terms of this model.

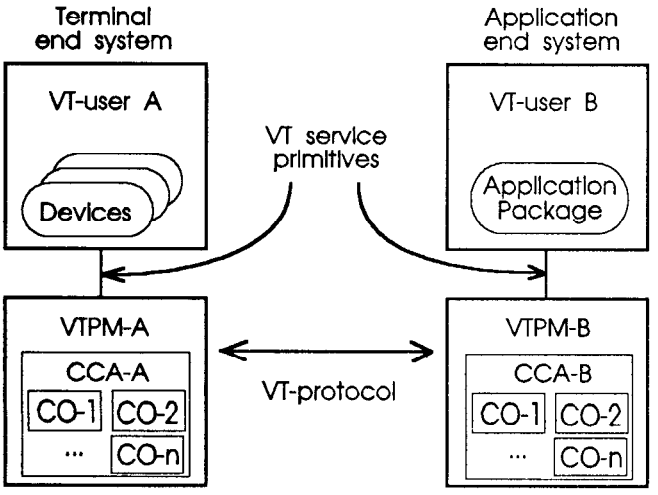


Figure 2 - Control objects in the VT Protocol model

For certain types of control object the abstract syntax of ISO 9041-1 does not provide a complete specification for the representation of CO update operations. This arises where the abstract syntax of ISO 9041-1 makes use of an ASN.1 any type, or where symbolic values have to be encoded in terms of an ASN.1 integer type. Control object type definitions are required by ISO/IEC 9834-5 to provide the necessary refinement of the abstract syntax.

NOTE 2 – Since an abstract syntax is made available for use through its inclusion in a presentation context, and since the Presentation service-provider has no knowledge of control object type definitions, in principle the VT-users provide the Presentation service-provider with these refinements to the abstract syntax through local management procedures. Whether or not this is necessary in practice depends on the configuration of the implementations concerned.

2 Normative references

The following documents contain provisions which, through reference in this text, constitute provisions of this part of ISO/IEC ISP 11185. At the time of publication, the editions indicated were valid. All documents are subject to revision, and parties to agreements based on this International Standardized 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 7498:1984, *Information processing systems - Open Systems Interconnection - Basic Reference Model.*

ISO/TR 8509:1987, *Information processing systems - Open Systems Interconnection - Service conventions.*

ISO 8822:1988, *Information processing systems - Open Systems Interconnection - Connection oriented presentation service definition.*

ISO/IEC 8824:1990, *Information technology - Open Systems Interconnection - Specification of Abstract Syntax Notation One (ASN.1).*

ISO 9040:1990, *Information technology - Open Systems Interconnection - Virtual Terminal Basic Class Service.*

ISO 9041-1:1990, *Information technology - Open Systems Interconnection - Virtual Terminal Basic Class Protocol - Part 1: Specification.*

ISO/IEC 9041-2:1993, *Information technology - Open Systems Interconnection - Virtual Terminal Basic Class Protocol - Part 2: Protocol Implementation Conformance Statement (PICS) Proforma.*

ISO 9834-1:1993, *Information technology - Open Systems Interconnection - Procedures for the Operation of OSI Registration Authorities - Part 1: General Procedures.*

ISO 9834-5:1991, *Information technology - Open Systems Interconnection - Procedures for the Operation of OSI Registration Authorities - Part 5: Register of VT Control Object Definitions.*

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ISO/IEC/TR 10000-1:1990, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 1: Framework.*

ISO/IEC/TR 10000-2:1990, *Information technology - Framework and taxonomy of International Standardized Profiles - Part 2: Taxonomy of Profiles.*

3 Definitions

For the purposes of this part of ISO/IEC ISP 11185 the following definitions apply.

3.1 General OSI terminology

3.1.1 This part of ISO/IEC ISP 11185 makes use of the following terms defined in ISO/TR 8509:

a) service primitive;

b) service-provider.

3.1.2 This part of ISO/IEC ISP 11185 makes use of the following terms defined in ISO 8822:

a) abstract syntax;

b) presentation context.

3.1.3 This part of ISO/IEC ISP 11185 makes use of the following terms defined in ISO/IEC 8824:

a) any type;

b) object descriptor type;

c) object identifier.

3.1.4 This part of ISO/IEC ISP 11185 makes use of the following terms defined in ISO/IEC 9834-1:

a) registration;

b) registration-hierarchical-name.

3.2 Terminology of VT base standards

3.2.1 This part of ISO/IEC ISP 11185 makes use of the following terms defined in ISO 9040:

a) control object;

b) device object;

e) VT-association;

f) VT-environment (VTE);

g) VT-user;

h) VTE-parameter;

i) VTE-profile;

j) VTE-profile argument.

3.2.2 This part of ISO/IEC ISP 11185 makes use of the following term defined in ISO 9041-1:

a) protocol element.

3.3 Terminology of RIO Record Usage

3.3.1 Page Template: the set of display object updates and control object updates which are necessary to set up the display and control environment for a single y-array.

3.3.2 VT data item: the unit of information used to update a RIO record and contained in a single invocation of the VT-DATA request primitive.

4 Abbreviations

For the purposes of this part of ISO/IEC ISP 11185 the following abbreviations apply.

AOW	OSI Asia-Oceania Workshop;
ARRLCO	Application RIO Record Loading CO;
EWOS	European Workshop for Open Systems;
OIW	OSE Implementors' Workshop;
OSE	Open Systems Environment;
RRLR	RIO Record Loading Record;
RRNR	RIO Record Notification Record;
TRRNCO	Terminal RIO Record Notification CO.

All other abbreviations used are defined in ISO/IEC TR 10000-1 or ISO 9040.

5 Principles of conformance to VT Profiles

An implementation of the Virtual Terminal Protocol conforms to an FVT2nn Profile that defines a control object type if the protocol implementation is capable of sending and receiving PDUs corresponding to all update operations permitted for that CO type. Conformance of a protocol implementation to an FVT2nn Profile does not place requirements on the ability of the implementation to negotiate the presence in the CCA of an instance of this CO type. Such requirements fall within the scope of conformance to an FVT1nn Profile that specifies a VTE-profile.

A system that includes an implementation of the VT Protocol may be claimed to conform also to an AVTnn Profile. Conformance to an AVTnn Profile may require that CO update operations received by the VT-user component of the system are interpreted in accordance with the semantics defined within the appropriate CO type definition. Conformance to CO semantics is not within the scope of conformance to any FVTnnn Profile.

The conformance requirements of the Virtual Terminal Protocol are specified in ISO 9041-1, clause 13. The supplier of a protocol implementation which is claimed to conform to ISO 9041-1 is required to complete a copy of the PICS proforma provided in ISO/IEC 9041-2. Annex A of this part of ISO/IEC ISP 11185 provides an ISPICS Requirements List (IPRL) for the Profiles FVT215 and FVT216 specified herein. This IPRL specifies constraints on the answers that may be given in the completed PICS for a protocol implementation that claims conformance to these Profiles.

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6 Application RIO record loading control object

6.1 Entry number

This is the fifth in the sub-register for Miscellaneous Control Objects. This register assigns it the entry number:

MISCO–05

6.2 Name of sponsoring authority

This entry is sponsored by the European Workshop for Open Systems (EWOS).

6.3 Date

The date of submission of this proposal is 1992-01-09.

6.4 Identifier

The name assigned to an information object by an International Register is required by ISO/IEC 9834-1 to be a registration-hierarchical-name. A registration-hierarchical-name may have more than one form. The permitted forms include an ASN.1 object identifier as defined in ISO/IEC 8824 and a relative distinguished name as defined in ISO/IEC 9594-2.

In accordance with A.4 of ISO/IEC 9834-5, this register assigns the following object identifier form for the name of this register entry:

{iso(1) standard(0) 9834 vt-co-def(5) misco(0) ARRL(5)}

In accordance with 20.1.1 of ISO 9040, this object identifier shall be used as the value of a CO-type-identifier VTE-parameter for a control object in order to identify this register entry as the source of the information structure and semantic content of the control object.

This register does not assign any other form to the name of this entry.

NOTE - By ISO 9834-1, a relative distinguished name for the purposes of the OSI directory entry may only be assigned together with an object identifier when the object identifier form is generated under the arc

{ joint-iso-ccitt(2) country(16) country-name }

6.5 Descriptor value

"EWOS VT CO for application RIO record loading".

6.6 CO parameters

To define a ARRLCO, the CO VTE-parameters take the following values:

CO-name:	any value unique within the VTE;
CO-structure:	"non-parametric", meaning the information structure is formally referenced by the value of CO-type-identifier; it is fully defined by this part of ISP 11185;
CO-access:	"WAVAR + WACI" if the Application VT-user is the association initiator, "WAVAR + WACA" if the Terminal VT-user is the association initiator;
CO-priority:	"normal";
CO-trigger:	"not selected".

6.7 CO values and semantics

The ARRLCO is defined as a mechanism by which commands may be sent by the application VT-user to the terminal VT-user concerning the management of the RIO record loading function. As such, the ARRLCO is a dynamic object where the semantics are associated with the reception of CO updates rather than with a static data structure.

The ARRLCO consists of a set of RIO Record Loading Records (RRLRs). The size of the ARRLCO is not explicitly bounded.

6.8 Definition of content of RRLR

Each RRLR relates to an operation of the RIO record management function. The components of a RRLR are defined below.

VT data item name:	ASN.1 type PrintableString, the characters "+" and "?" are reserved "wild cards" and shall not form part of the name for the load and store data item operations, see clause 9.
VT data item version:	ASN.1 type PrintableString
VT data item creation time:	ASN.1 type generalizedTime.
RIO name:	ASN.1 type PrintableString - identifies RIO in which VT data item is stored or should be stored.
RIO record identifier:	ASN.1 type PrintableString - identifies a RIO record in which a VT data item is stored or should be stored.
Operation type:	"load data item", "store data item", "remove data item", "status data item".

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6.9 Update Syntax

The following syntax shall be used to update an ARRLCO with a sequence of RRLRs:

```
ISP11185-ARRLCO
{iso(1) standard(0) 9834 vt-co-def(5) misco(0) ARRL(5)}
DEFINITIONS IMPLICIT TAGS::= BEGIN
EXPORTS ARRLCOupdate, RRLR
ARRLCOupdate ::= SEQUENCE OF RRLR
RRLR ::=  SEQUENCE {
  name          [0]  PrintableString,
  -- the characters "+" and "?" are reserved "wild cards"
  -- and shall not form part of the name for the load
  -- and store data item operations.
  version       [1]  PrintableString OPTIONAL,
  time          [2]  GeneralizedTime OPTIONAL,
  RIOname       [3]  PrintableString OPTIONAL,
  RIOrecord     [4]  PrintableString OPTIONAL,
  operation     [5]  INTEGER {
          loadDataItem     (0),
          storeDataItem    (1),
          removeDataItem   (2),
          statusDataItem   (3) }    }
END -- OF ARRLCO DEFINITIONS
```

6.10 Additional information

None

6.11 Usage

The usage of this CO is specified in clause 8.

7 Terminal RIO record notification control object

7.1 Entry number

This is the sixth in the sub-register for Miscellaneous Control Objects. This register assigns it the entry number:

MISCO-06

7.2 Name of sponsoring authority

This entry is sponsored by the European Workshop for Open Systems (EWOS).

7.3 Date

The date of submission of this proposal is 1992-01-09.

7.4 Identifier

The name assigned to an information object by an International Register is required by ISO/IEC 9834-1 to be a registration-hierarchical-name. A registration-hierarchical-name may have more than one form. The permitted forms include an ASN.1 object identifier as defined in ISO/IEC 8824 and a relative distinguished name as defined in ISO/IEC 9594-2.

In accordance with A.4 of ISO/IEC 9834-5, this register assigns the following object identifier form for the name of this register entry:

{iso(1) standard(0) 9834 vt-co-def(5) misco(0) TRRN(6)}

In accordance with 20.1.1 of ISO 9040, this object identifier shall be used as the value of a CO-type-identifier VTE-parameter for a control object in order to identify this register entry as the source of the information structure and semantic content of the control object.

This register does not assign any other form to the name of this entry.

NOTE - By ISO 9834-1, a relative distinguished name for the purposes of the OSI directory entry may only be assigned together with an object identifier when the object identifier form is generated under the arc

{ joint-iso-ccitt(2) country(16) country-name }

7.5 Descriptor value

"EWOS VT CO for terminal RIO record notification of status".

7.6 CO parameters

To define a TRRNCO, the CO VTE-parameters take the following values:

CO-name:	any value unique within the VTE;
CO-structure:	"non-parametric", meaning the information structure is formally referenced by the value of CO-type-identifier; it is fully defined by this part of ISP 11185:
CO-access:	"WAVAR + WACA" if the Application VT-user is the association initiator, "WAVAR + WACI" if the Terminal VT-user is the association initiator;
CO-priority:	"normal";
CO-trigger:	"not selected".

7.7 CO values and semantics

The TRRNCO is defined as a mechanism by which responses to commands may be sent by the terminal VT-user to the application VT-user concerning the management of the RIO record loading function. As such, the TRRNCO is a dynamic object where the semantics are associated with the reception of CO updates rather than with a static data structure.

The TRRNCO consists of a set of RIO Record Notification Records (RRNRs). The size of the TRRNCO is not explicitly bounded.

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7.8 Definition of content of RRNR

Each RRNR relates to an operation of the RIO record management function. The components of a RRNR are defined below.

RRLR index:	ASN.1 type INTEGER which points to the RRLR in the sequence of RRLRs sent by the application VT-user to which this RRNR refers.
VT data item name:	ASN.1 type PrintableString, the reserved "wild card" characters "+" and "?" shall not form part of the name, see clause 9.
VT data item version :	ASN.1 type PrintableString
VT data item creation time:	ASN.1 type generalizedTime.
Status:	"successful", "unsuccessful"
Reason code:	ASN.1 type PrintableString

7.9 Update Syntax

The following syntax shall be used to update an TRRNCO with a sequence of RRNRs:

```
ISP11185-TRRNCO
{iso(1) standard(0) 9834 vt-co-def(5) misco(0) TRRN(6)}
DEFINITIONS IMPLICIT TAGS::= BEGIN
EXPORTS TRRNCOupdate, RRNR
TRRNCOupdate ::= SEQUENCE OF RRNR
RRNR ::= SEQUENCE {
 rrlrIndex [0] INTEGER,
  name        [1] PrintableString OPTIONAL,
  -- the characters "+" and "?" are reserved "wild cards"
  -- and shall not form part of the name.
  version     [2] PrintableString OPTIONAL,
  time        [3] GeneralizedTime OPTIONAL,
  status      [4] INTEGER {
            success (0),
            failure   (1)  } DEFAULT success,
   reason     [5] PrintableString OPTIONAL }
END --OF TRRNCO DEFINITIONS
```

7.10 Additional information

None

7.11 Usage

The usage of this CO is specified in clause 8.

8 Usage of the RIO record control objects

The RIO loading COs may be used to perform the following RIO management functions:

- Local loading of one or more VT data items into the VT-context;
- Checking the status of one or more VT data items;
- Local storage of one or more VT data items; and
- Removal of locally held VT data items.

NOTE – The VT-environment contains object definitions whilst the VT-context contains the values of the contents of objects.

RIO management functions are sent by the application VT-user to the terminal VT-user as a sequence of RRLRs in an ARRLCO update. Each RRLR specifies one operation. The terminal VT-user shall carry out the operations specified in the sequence of RRLRs in the order in which they are received. If an operation fails, operations other than status requests later in the sequence of RRLRs shall be ignored.

If an S-mode profile is in use, the application VT-user relinquishes the token. The terminal VT-user may then respond to the sequence of operations it has carried out by a sequence of RRNRs in a TRRNCO update. The RRLR index component of each RRNR identifies the corresponding RRLR in the sequence of RRLRs with which this RRNR is associated. The sequence of RRNRs is optimised in that for each operation apart from the status operation, only exceptions need be reported. It is possible that a TRRNCO update consists of the empty sequence which means that every operation in the corresponding ARRLCO update was successfully completed.

8.1 Load locally stored VT data item

The following components of the RRLR are required for this operation:

VT data item name:	mandatory;
VT data item version:	optional;
VT data item creation time:	optional;
RIO name:	mandatory;
RIO record identifier:	mandatory;

operation type = "load data item": mandatory.

The application VT-user may request the loading of a VT data item with a particular version/date by including those components in the RRLR. If these components are missing, the latest dated version held by the terminal is loaded.

The terminal VT-user accesses the local file store to load the named VT data item into the named RIO record.

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The following components of the RRNR are required in the response:

RRLR index:	mandatory;
VT data item version:	mandatory if VT data item version was not present in the corresponding RRLR and status is "success", otherwise optional;
VT data item creation time:	mandatory if VT data item creation time was not present in the corresponding RRLR and status is "success", otherwise optional;
status:	mandatory if "failure", otherwise optional;
reason code:	optional if status is "failure",otherwise not present.

The application VT-user can examine the responding RRNR to ensure that the terminal has loaded the correct (and up to date) VT data item. On the assumption that the correct VT data item has been loaded, the application VT-user must ensure that a similar RIO load takes place at the application end so that the respective views of the CCA may remain consistent. The application VT-user may then call or execute the RIO record which has just been loaded.

If the application VT-user identifies an exception condition, then it may perform the down-line loading function defined in subclause 8.3 in order to ensure the correct VT data item is available at the terminal.

8.2 Check the status of a VT data item

The following components of the RRLR are required for this operation:

VT data item name:	mandatory;
Operation type = "status data item":	mandatory.

The terminal VT-user accesses the local file store to obtain the necessary status information.

One or more RRNRs may be contained in the response to a status operation request. The following components of each RRNR are required in the response:

RRLR index:	mandatory;
VT data item name	mandatory if VT data item name in the corresponding RRLR contained "wild card" characters, otherwise optional;
VT data item version:	mandatory if status = "success", otherwise optional;
VT data item creation time:	mandatory if status = "success", otherwise optional;
Status:	mandatory if "failure", otherwise optional.
Reason code:	optional if status is "failure", otherwise not present.

A status value of "failure" implies that either there was a terminal malfunction or that no versions of the particular VT data item were held by the terminal.

If more than one occurrence of the named VT data item is present in the local file store, an RRNR shall be sent for each occurrence present. If the VT data item name in the corresponding RRLR contains either or both the "wild card" characters "+" or "?", then an RRNR shall be sent for each match that is found in the local file store. The character "+" matches zero or more characters, e.g. "name+" matches any name starting with the string "name". The character "?" matches exactly one character, e.g. "name?" matches any name starting with the string "name" and consisting of 5 characters. There are no restrictions on the placement or repetition of the defined wild card characters in VT data item names supplied to the current operation.

NOTE – It is possible to have more than one instance of a VT data item with the same version but with different creation date. Such usage is not ambiguous. It is also possible to have more than one VT data item with the same version an the same creation date. Such usage is not policed. It is an implementation matter to differentiate between VT data items which have these characteristics.

The application VT-user can examine the responding RRNRs to ensure that the terminal has in local file storage correct (and up to date) VT data items. If the application VT-user identifies an exception condition, then it may perform the down-line loading function defined in subclause 8.3 and/or the removal function defined in subclause 8.4 in order to ensure the correct VT data items are available at the terminal.

8.3 Down-line load and store a VT data item locally

This procedure may be used to down-line load and store a new VT data item. This may be the normal way to distribute a VT data item or may be used when the load process defined in subclause 8.1 has failed (eg wrong version).

The application VT-user obtains from local storage the VT data item definition and uses this to build one CREATE-RECORD operation within a VT-DATA primitive which is then sent to the terminal VT-user to set up the appropriate RIO record. More than one such RIO record may be updated by a single VT-DATA primitive. For each VT data item that is to be stored, an RRLR is required. For each RRLR, the following components are required:

VT data item name:	mandatory;
VT data item version:	mandatory;
VT data item creation time:	mandatory;
RIO name:	mandatory;
RIO record identifier:	mandatory;
operation type "store data item":	mandatory.

The terminal VT-user uses the information contained in the RRLRs to store the VT data item definitions (now held in local RIOs) in local file storage. For each VT data item that is stored, an RRLR is required.

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For each RRNR, the following components are required:

RRLR index:	mandatory
VT data item version:	optional
VT data item creation time:	optional
status:	mandatory if failure, otherwise optional.
Reason code:	optional if status is "failure", otherwise not present.

8.4 Remove a VT data item

The following components of the RRLR are required for this operation:

VT data item name:	mandatory;
VT data item version:	optional;
VT data item creation time:	optional;
operation type "remove data item":	mandatory.

The terminal VT-user uses the information contained in the RRLR to remove one or more VT data items from local file storage.

If the version component of the RRLR is absent, then every occurrence of the named VT data item with the given time is removed and an RRNR is sent. If the time component of the RRLR is absent, then every occurrence of the named VT data item with the given version is removed and an RRNR is sent. If the version and time components of the RRLR is absent, then every occurrence of the named VT data item is removed and an RRNR is sent.

If the VT data item name in the corresponding RRLR contains either or both the "wild card" characters "+" or "?", then an RRNR shall be sent for each match that is found in the local file store and the corresponding VT data item is removed. The character "+" matches zero or more characters, e.g. "name+" matches any name starting with the string "name". The character "?" matches exactly one character, e.g. "name?" matches any name starting with the string "name" and consisting of 5 characters. There are no restrictions on the placement or repetition of the defined wild card characters in VT data item names supplied to the current operation.

NOTE – It is possible to have more than one instance of a VT data item with the same version but with different creation date. Such usage is not ambiguous. It is also possible to have more than one VT data item with the same version an the same creation date. Such usage is not policed. It is an implementation matter to differentiate between VT data items which have these characteristics.

For each VT data item that is removed, an RRNR is required. For each RRNR, the following components are required:

RRLR index:	mandatory;
VT data item name:	mandatory if VT data item name in the corresponding RRLR contained "wild card" characters, otherwise optional;
VT data item version:	mandatory if VT data item version was not present in the corresponding RRLR and status is "success", otherwise optional;
VT data item creation time:	mandatory if VT data item creation time was not present in the corresponding RRLR and status is "success", otherwise optional;
status:	mandatory if failure, otherwise optional.
Reason code:	optional if status is "failure", otherwise not present.

A status value of "failure" implies that either there was a terminal malfunction or that the specified VT data item was not present at the terminal, or the terminal does not support/allow the remove function. It is unlikely that all terminal implementations would be willing to honour:

VT data item name:	+;
operation type:	remove data item".

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Annex A

(normative)

ISPICS Requirements List

A.1 Protocol requirements

This annex provides an ISPICS Requirements List (IPRL) for the Profiles FVT215 and FVT216 specified in this part of ISO/IEC ISP 11185. The PICS proforma for the VT protocol is given in ISO/IEC 9041-2. This IPRL specifies constraints on the answers that may be given in the completed PICS for an implementation that claims conformance to these Profiles.

These constraints are given in tables A.1 to A.4. The notation used in the tables is as follows. Individual items in a PICS proforma are referenced by the means specified in A.9.1 of ISO 9646-2. Such a reference has the form x-y/z, where x is the number of the ISO Standard that specifies the protocol, y is a reference within the PICS proforma of this Standard to the smallest subclause that contains the item concerned, and z is the reference number of the item within that subclause. Where this IPRL needs to present the constraints on a particular item as two or more separate cases, a suffix of the form '.n' is added to the item reference where n is a serial number that labels the different cases.

The item name is taken from the PICS proforma. The "status" columns of the IPRL tables take priority over the corresponding "status" columns of the PICS proforma and they use the notation of that proforma. They refine the PICS proforma status values by evaluating conditional expressions or converting optional values to a more specific form. The following conditional values are used in these tables:

c1 If 9041-A.2.2/1 then m else -;
c2 If application implementation then m else –
c3 If terminal implementation then m else –

the referenced predicate from ISO/IEC 9041-2 is that S-mode is supported.

Where an IPRL table has a "Profile values" column, the status value applies separately to each listed Profile value.

For any column in an IPRL table that corresponds to an answer column in the PICS proforma, the values listed are the acceptable answers for the item concerned. The following special notation is used in these columns:

Any The IPRL places no constraint on the answer;
n/a The column is not relevant to this item.

A.2 Profile-specific requirements

An IPRL may also specify constraints on the answers to additional questions that concern Profile-specific conformance requirements which are outside the scope of any referenced base standard. These questions will be given in the IPRL itself.

This IPRL does not specify any Profile-specific constraints.

Table A.1 — VTE requirements for FVT215 (Application RIO Record Loading Control Object)

Item reference no. 9041 –	Name of item	Status	Numbers supported	Negotiable
A.2.1/6	Enhanced Access-rules	c1	n/a	n/a
A.2.1/7	Structured COs	m	n/a	n/a
A.3.8/12	Non-parametric COs	m - see note	2	Any
NOTE – One each of the ARRLCO and TRRNCO should be listed as supported in A.3.8				

Table A.2 — PDU requirements for FVT215 (Application RIO Record Loading Control Object)

Item reference no. 9041 –	Name of item	Profile values	Sending status	Receiving status
A.5.15.4/16	other	see note	c2	c3
NOTE – Support is mandatory for the ASN.1 types exported from the module ISP11185-ARRLCO				

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Table A.3 — VTE requirements for FVT216 (Terminal RIO Record Notification Object)

Item reference no. 9041 –	Name of item	Status	Numbers supported	Negotiable
A.2.1/6	Enhanced Access-rules	c1	n/a	n/a
A.2.1/7	Structured COs	m	n/a	n/a
A.3.8/12	Non-parametric COs	m - see note	2	any
NOTE – One each of the ARRLCO and TRRNCO should be listed as supported in A.3.8				

Table A.4 — PDU requirements for FVT216 (Terminal RIO Record Notification Control Object)

Item reference no. 9041 –	Name of item	Profile values	Sending status	Receiving status
A.5.15.4/16	other	see note	c3	c2
NOTE – Support is mandatory for the ASN.1 types exported from the module ISP11185-TRRNCO				

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Annex B

(informative)

Form Template Service

B.1 Introduction

This annex describes an application of the RIO loading control objects to load a VT information object called a page template.

B.2 Characteristics of a form

A form is a logical data structure. A form has the following characteristics:

The data it contains may be transferred from one application entity to another using the services of the OSI Virtual Terminal Forms or Paged Profiles;

A form is independent of the layout or representation of the data it contains on a physical display device;

A form is independent of the national language used;

When the S-mode Forms or Paged profile is used in conjunction with OSI Distributed Transaction Processing, a form has a one to one relationship with a Transaction as defined in that standard (ISO/IEC 10026-1);

A form as defined here has a one to one relationship with the definition of a form found in the Draft CODASYL Standard - Form Interface Management System (FIMS).

Notes

1 — The concept of Viewport in FIMS maps on to a window in a windowing environment or on to a portion of the physical display surface in a non-windowing environment.

2 — The capabilities of the Forms or Paged Profile VT association can be seen as equivalent to a FIMS layout within which there is a Formatted Panel for each y-array (page) in the display object and (if negotiated) a Formatted Panel for each of the top and bottom status message areas supported by the Status Message Control Object.

3 — The purpose of drawing these relationships with FIMS is to provide a straightforward mapping on to FIMS which can then be used as a potential high level API to the ISO VT Forms or Paged Profiles.

B.3 Transactions, interaction units and screens

The structure of a transaction is related to the interaction which takes place between the human user at a work station and the remote application during the course of a transaction. The interaction is a dialogue in which control is passed between the human user (work station) and the application. Whilst control of the dialogue is with the work station (ie the WAVAR access right is held by the work station), the human user interacts with the work station to fill in fields contained in one or more pages. A page consists of a set of fields contained in a single y-array of the VT Display Object. The unit of work represented by this human user interaction with the work station is an interaction unit.

An interaction unit starts when the application causes the work station environment to be initialised so that the human user may fill in fields contained in one or more pages. The interaction unit ends when control (WAVAR) is passed back to the application together with the field updates associated with that set of pages. A transaction may consist of one or more interaction units.

These concepts are illustrated in figure B.1.

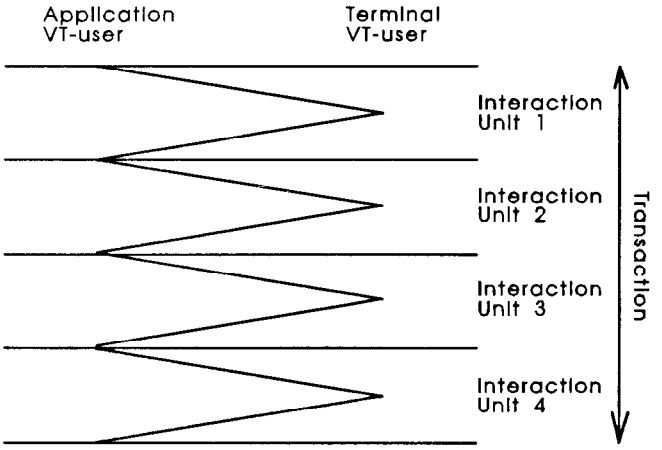


Figure B.1 - Example of transaction structure

B.4 Templates

In order to realise the efficiency savings associated with form handling that are possible with the use of the VT S-mode Forms or the S-mode Paged profile, it is necessary to define a number of mechanisms associated with the storage of y-array initialisation information local to the work station. Thus at the start of an interaction unit, the application may cause one or more y-arrays to be initialised without having to send all the display object and control object updates every time across the open network.

A page template contains all the information necessary to define the field structure on a single y-array (FDCO contents), together with the specification of FEICO and FEPCO contents (field entry rules) and also the specification of the contents of related COs defined in the VT Forms or Paged Profile. It also contains text and associated attributes which make up the initial background (in FIMS terminology) of the screen. An interaction unit may use one or more page templates.

An application designer may group page templates into an interaction unit template and interaction unit templates into form templates. The representation of a form by a form template is just one instance of a form. The mapping of a form onto different physical display surfaces may be accomplished

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by the specification of different form templates. National language variants may, but need not necessarily, result in the specification of more form templates for the same form. The definition of form and interaction templates is application dependent and is outside the scope of this ISP.

Figure B.2 illustrates the possible structure of a form and its related templates.

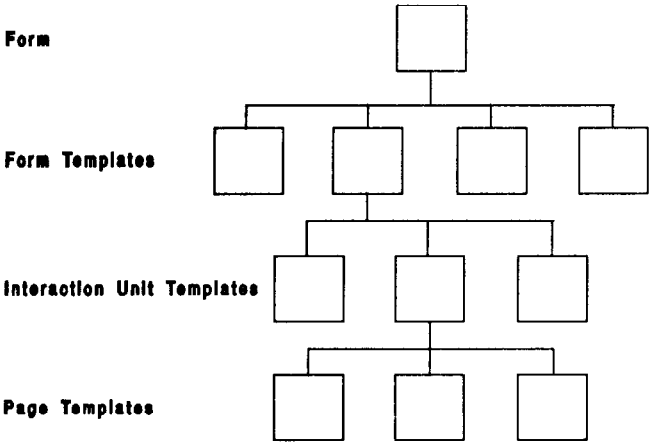


Figure B.2 - Hierarchy of templates

Page templates will reside in file storage local to the work station. The specification of the manner of storage and its structure is outside the scope of this ISP. Within the VT environment of the work station, a page template will be held in one or more RIOs as one or more RIO Records. The mapping of a page template on to RIOs and RIO records is application dependent and is outside the scope of this ISP. An application may initialise the VT environment at the start of an interaction unit by issuing one or more RIO reference operations (Call RIO or Execute RIO).

NOTE — An example of the use of multiple RIO records for holding a page template is where parts of the template vary depending on the natural language being used. A separate RIO record may then hold each language variant and another RIO record may hold the common parts of the screen template. A decision can then be taken at run time by the application to load a specific variant of the screen template.

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Annex C

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VT data item file format definition

C.1 Introduction

This part of ISO/ISP 11185 specifies on-line management functions for handling VT data items in relation to RIO records. For large scale distribution of VT data item definitions, it may be more appropriate to use off-line FTAM or store and forward MHS communication services or even portable magnetic media such as floppy disks. This annex defines a file format that could be used for this purpose.

C.2 Overview

The file format for VT data item distribution is based upon the abstract syntax of the Basic Class Virtual Terminal Protocol as specified in ISO 9041-1, clause 12. If it is intended to use the distribution mechanism for form and page templates, then the FEICO/FEPCO update syntax as defined in ISP 11185, Parts 8 & 10 (FVT221 & FVT231) for the S-mode forms profile and in Parts 9 & 11 (FVT222 & FVT232) for the S-mode paged profile may be used to satisfy the ASN.1 ANY type found in the base standard update syntax for FEICO and FEPCO updates.

The file format syntax specified in this annex allows a limited form of file management to be performed. This allows VT data items to be deleted from local storage at the terminal, for VT data items to be replaced or for VT data items to be added.

For the delete operation, wild card characters may be used for the VT data item name so that more than one VT data item may be deleted at once. The character "+" may match zero or more characters, e.g. "name+" matches any name starting with the string "name". The character "?" matches any one character, e.g. "name?" matches any name starting with the string "name" and consisting of 5 characters.

C.3 File record mapping

The VT data item file is logically a variable length record sequential binary file with unbounded records. The physical representation of the file is outside the scope of this Functional Standard.

The VT data item file consists of a sequence of one or more records. Each record contains a value of the ASN.1 type VTdataItem.

C.4 File syntax

```
VT-DATA-ITEM-FILE DEFINITIONS
{iso(1) standard(0) 9834 vt-co-def(5) misco(0) ARRL(5)
file-syntax(1)}
IMPLICIT TAGS ::= BEGIN
IMPORTS ObjectUpdate FROM ISO9041-1-VTP
--as defined in ISO 9041-1
VTdataITEM ::= CHOICE {
  delete              [0]  SEQUENCE {
      name     [0]  PrintableString,
      -- "+" and "?" may be included as
      -- wild card characters.
      version  [1]  PrintableString OPTIONAL,
      -- absence of version allows deletion of all
      -- occurrences of a named file for a given time.
      time     [2] GeneralizedTime OPTIONAL  },
      -- absence of time allows deletion of all
      -- occurrences of a named file for a given version.
      -- absence of version and time allows deletion
      -- of all occurrences of a named file
  addOrReplace    [1]  SEQUENCE {
      name     [0]  PrintableString,
      -- name must not contain "+" or "?"
      version  [1]  PrintableString,
      time     [2]  GeneralizedTime,
      body     [3]  SEQUENCE OF ObjectUpdate  }}
      -- for replacement to occur, an exact match of
      -- name, version and time is required,
      -- otherwise addition takes place.
END -- OF VT-DATA-ITEM-FILE DEFINITIONS
```

C.5 Usage

When a VT data item file is to be sent using FTAM, either the unstructured binary or sequential binary document types may be used. When a VT data item file is to be distributed using MHS, the unidentified body part type may be used in 1984 implementations and either the bilaterally defined or externally defined body part types may be used in 1988 implementations. The externally defined body part type requires an object identifier value to be assigned. It is suggested that the object identifier value defined in clause C.4 be used for this purpose.

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