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Information technology — Open Systems Interconnection — Virtual Terminal Basic Class Protocol

Part 1: Specification

AMENDMENT 2: Additional functional units

Technologies de l'information — Interconnexion des systèmes ouverts — Protocole de classe de base de terminal virtuel

Partie 1: Spécification

AMENDEMENT 2: Unités fonctionnelles supplémentaires

Reference number
ISO 9041-1 : 1990/Amd.2: 1992 (E)

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Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) together form a 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 the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75% of the national bodies casting a vote.

Amendment 2 to International Standard ISO 9041–1:1990 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*.

Annex A forms an integral part of this amendment.

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Introduction

This amendment provides the services of the Additional Functional Units of the Basic Class Virtual Terminal Service defined in ISO 9040:1990/Amd.2:1991.

The following clauses and annex in ISO 9041-1:1990 apply unchanged:

Clause 7	Procedures
Clause 12	Conformance
Annex B	Defined OBJECT IDENTIFIER names

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Information technology — Open Systems Interconnection — Virtual Terminal Basic Class Protocol

Part 1: Specification

AMENDMENT 2: Additional functional units

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1 Scope

ISO 9041–1, clause 1 applies with item a) of subclause 1.1 amended to read:

a) a set of procedures for the connection-oriented transfer of data and control information between protocol machines which implement the functions of a provider of the Basic Class Virtual Terminal service including the Additional Functional Units;

2 Normative references

ISO 9041–1, clause 2 applies with the additional reference:

ISO 9040:1990/Amd.2:1992, *Information technology - Open Systems Interconnection – Virtual Terminal Basic Class Service – Amendment 2: Additional functional units.*

3 Definitions

The Definitions given in ISO 9041–1, clause 3 apply with the addition to subclause 3.4 (Virtual Terminal Service Definitions) of the following term defined in ISO 9040/Amd. 2:

34) Ripple

4 Abbreviations

The Abbreviations given in ISO 9041–1, clause 4 apply with the addition to subclause 4.3 (VT Protocol Elements) of the following abbreviations:

EXQ VT-P-EXCEPTION-REQ
EXR VT-P-EXCEPTION-RESP

5 Overview

5.1 References

ISO 9041–1, subclause 5.1 ("Virtual Terminal Service Summary") is replaced by 5.2 of this amendment; the latter also amends of ISO 9041–1, table 1.

ISO 9041–1, subclauses 5.2, 5.3 and 5.4 apply unchanged.

ISO 9041–1, subclause 5.5 ("Functions of the VT Protocol") is amended as defined in 5.3 of this amendment.

ISO 9041–1, subclauses 5.6, 5.7 and 5.8 apply unchanged.

5.2 Virtual Terminal Service – Additional Functional Units – summary

The protocol specified by this amendment applied to ISO 9041–1 provides the Additional Functional Units of the Basic Class Virtual Terminal Service defined by ISO 9040/Amd.2. The primitives of this service are as listed in ISO 9041–1, table 1 with the addition of parameters to VT-SWITCH-PROFILE and VT-END-NEG and the addition of VT-P-EXCEPTION as shown in table 1 of this amendment.

Table 1 – Virtual Terminal Service primitives

Primitive		Parameters
VT-SWITCH-PROFILE	request indication	VT-profile-name VT-profile-arg-offer-list VT-object-retention-list
	response confirm	VT-profile-arg-value-list VT-result VT-user-failure-reason VT-provider-failure-reason (confirm only) VT-object-retention-list
VT-END-NEG	request indication	VT-vte-choice VT-failure-allowed VT-object-retention-list
	response confirm	VT-vte-choice VT-result VT-user-failure-reason VT-provider-failure-reason (confirm only) VT-object-retention-list
VT-P-EXCEPTION	Indication	VT-exception-source VT-exception-type VT-information

5.3 Functions of the VT Protocol

The functions of the VT protocol defined by ISO 9041–1 with this amendment are as defined in ISO 9041–1, subclause 5.5. The Additional Functional Units defined by this amendment:

a) enhance the capability of the VT-environment which may be agreed by use of the Association Establishment or Negotiation functions;

b) extends the set of objects and operations provided by the Data Transfer function; and

c) enhances the error handling capabilities of the service provider.

6 Protocol elements

6.1 References

ISO 9041–1, clause 6 (Protocol elements) applies unchanged except for

a) Table 4 which is amended as defined by 6.2 of this amendment;

b) subclause 6.2.2 defining the parameters of ASQ which is amended as defined by 6.3 of this amendment;

c) subclause 6.9.2 defining the parameters of ENQ which is amended as defined by 6.4 of this amendment;

d) the subclause 6.10.2 defining the parameters of ENR which is amended as defined by 6.5 of this amendment;

e) subclause 6.23.2 defining the parameters of SPQ which is amended as defined by 6.6 of this amendment;

f) subclause 6.24.2 defining the parameters of SPR which is amended as defined by 6.7 of this amendment;

g) the addition of a new subclause 6.26 for EXQ (VT–P–EXCEPTION–REQ) as defined by 6.8 of this amendment;

h) the addition of a new subclause 6.27 for EXR (VT–P–EXCEPTION–RESP) as defined by 6.9 of this amendment.

6.2 *VT Protocol elements*

ISO 9041, table 4 is amended by the addition of a new entry as defined in table 2 of this amendment.

Table 2 – VT Protocol elements

Protocol element	Full Name	Cross reference
EXQ	VT-P-EXCEPTION-REQ	6.26
EXR	VT-P-EXCEPTION-RESP	6.27

6.3 ASQ (VT-ASSOCIATE-REQ) parameters

The following functional units are added to ISO 9041-1, subclause 6.2.2:

11) Ripple

12) Exceptions

13) Context retention

The other parameter descriptions are unchanged.

6.4 ENQ (VT-END-NEG-REQ)

The following parameter is added to ISO 9041-1, subclause 6.9.2:

c) vt-object-retention-list: if present contains a list of DO and CO names whose contents are requested to be retained.

6.5 ENR (VT-END-NEG-RESP)

The following parameter is added to ISO 9041-1, subclause 6.10.2:

d) vt-object-retention-list: if present contains a list of DO and CO names whose contents are agreed to be retained.

6.6 SPQ (VT-SWITCH-PROFILE-REQ)

The following parameter is added to ISO 9041-1, subclause 6.23.2:

c) vt-object-retention-list: if present contains a list of DO and CO names whose contents are requested to be retained.

6.7 SPR (VT-SWITCH-PROFILE-RESP)

The following parameter is added to ISO 9041-1, subclause 6.24.2:

d) vt-object-retention-list: if present contains a list of DO and CO names whose contents are agreed to be retained.

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6.8 EXQ (VT-P-EXCEPTION-REQ)

A new subclause 6.26 is added to ISO 9041-1 as follows:

6.8.1 Purpose:

To signal exception conditions between VTPMs

6.8.2 Parameters

vt-exception-type: Takes one of the following symbolic values:

"RIO full"
"too many fields"
"too many field elements"
"too many FERs"
"too many FEIs"

or a profile defined value of the form tag,value (INTEGER).

vt-information: Takes a value as defined in ISO 9040/Amd.2.

6.9 EXR (VT-EXCEPTION-RESP)

A new subclause 6.27 is added to ISO 9041-1 as follows:

6.9.1 Purpose

To acknowledge an EXQ.

6.9.2 Parameters

None.

7 Primary procedures

ISO 9041–1, clause 8 (Primary procedures) applies with the amendment of the subclause 8.8 (Break) as defined in 7.1 of this amendment.

7.1 Break and Exception

Subclause 8.8 (Break) is replaced by

8.8 Break and Exception

The VT–BREAK procedures provide the protocol facilities to support the VT–BREAK service, which is a destructive interrupt service available to either VT-user independently of the mode of operation or the ownership of access-rights.

The VT–EXCEPTION procedures provide the protocol facilities to support the VT–EXCEPTION service, which is a destructive interrupt service available to either VTPM independently of the mode of operation or the ownership of access-rights.

These procedures take precedence over other procedures and may be found in table 15.

8 Switch profile procedures

ISO 9041–1, clause 9 (Switch profile procedures) applies with the amendment of the subclause 9.8 (Break) as defined in 8.1 of this amendment and with the amendment of table 15 (Break procedures) as defined in 8.2 of this amendment.

8.1 Break and Exception

Subclause 9.8 (Break) is replaced by:

9.8 Break and Exception

The procedures for switch profile negotiation are the same as the procedures in subclause 8.8, see table 15.

8.2 Break and Exception procedures

Table 15 is replaced by table 3 of this amendment.

Table 3 – Break and Exception procedures

Step	VTPM	Event	Action
1a	I	VT-BREAK request	If EXR is expected, store VT–BREAK parameters. Otherwise set contents of DO's and CO's to that of the "reset context". Clear out any outstanding wait for acknowledgement. Send BKQ.
2a	T	BKQ	Set contents of DO's and CO's to that of the reset context. Clear any outstanding wait for acknowledgement. Clear out any stored VT-Break parameters. Issue VT–BREAK indication.
3a	T	VT–BREAK response	Send BKR. Proceed using data transfer procedures.
4a	I	BKR	Proceed using data transfer procedures.
1b	I	Exception found	Clear out any outstanding wait for acknowledgement. Send EXQ and issue VT–EXCEPTION indication.
2b	T	EXQ	Clear out any outstanding wait for acknowledgement. Send EXR and issue VT–EXCEPTION indication.
3b	I	EXR	Process stored VT–BREAK if present as in 1a and go to 2a.

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9 Multiple interaction negotiation procedures

The multiple interaction negotiation procedures defined in the ISO 9041-1, clause 10 (Multiple interaction negotiation procedures") applies with the amendment of the subclause 10.8 (Break) as defined in 9.1 of this amendment.

9.1 Break and Exception

Subclause 10.8 (Break)is replaced by

10.8 Break and Exception

See 8.8.

10 Mapping of protocol elements

10.1 References

ISO 9041–1, clause 11 (Mapping of protocol elements) applies unchanged except for

a) Table 23 (Protocol element mapping) which is amended as defined in 10.2 of this amendment;

b) subclause 11.2.3 defining the use of P–RESYNCHRONISE request and indication which is amended as defined in 10.3 of this amendment;

c) subclause 11.2.4 defining the use of P–RESYNCHRONISE response and confirm which is amended as defined in 10.4 of this amendment.

10.2 Mapping of protocol elements

Table 23 is amended by the addition of two entries as defined in table 4 of this amendment.

Table 4 – Protocol element mapping

Protocol Element	Mapping
EXQ	P–RESYNCHRONISE request and indication
EXR	P–RESYNCHRONISE response and confirm

10.3 P–RESYNCHRONISE request and indication

The whole of ISO 9041-1, subclause 11.2.3 is replaced by

The P–RESYNCHRONIZE request and indication primitives convey the BKQ and EXQ protocol elements. This International Standard defines the following content for the P–RESYNCHRONIZE parameters:

a) User data contains the BKQ-pdu or the EXQ-pdu structured as required by clause 12;

b) Resynchronize type contains the value "restart";

c) Synchronization point serial number contains values as defined by ISO 8326;

d) For A-mode, Tokens has the value "acceptor chooses" for the all defined tokens;

e) For S-mode, Tokens takes values from the initiating VT–BREAK request primitive or for EXQ the value "acceptor chooses".

10.4 P–RESYNCHRONISE response and confirm

The whole of ISO 9041-1, subclause 11.2.4 is replaced by:

The P–RESYNCHRONIZE response and confirm primitives convey the BKR and EXR protocol elements. This International Standard defines the following content for the P–RESYNCHRONIZE parameters:

a) User Data contains the BKR-pdu structured as defined by clause 12, EXR does not require the User Data field;

b) For A-mode, Tokens takes values from the existing token position;

c) For S-mode, Tokens takes its value from the responding VT–BREAK response primitive or for EXR from the existing token position.

11 Protocol data unit structure

11.1 References

This amendment makes additions to of ISO 9041–1, clause 12 (Protocol data unit structure") as defined in 11.2 to 11.9 of this amendment.

11.2 asq-pdu and asr-pdu

In the G module the definition of FunctionalUnits is changed to include the Additional Functional Units defined by this amendment as follows:

```
FunctionalUnits ::= BIT STRING {
        profileSwitch          (0) ,
        multipleIntNeg         (1) ,
        negotiatedRelease      (2) ,
        urgentData             (3) ,
        destructiveBreak       (4) ,
        enhancedAccess         (5) ,
        structuredCOs          (6) ,
        blocks                 (7) ,
        fields                 (8) ,
        referenceInfOs         (9) ,
        ripple                 (10) ,
        exceptions             (11) ,
        contextRetention       (12) }
```

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11.3 spq-pdu

The addition of the Context Retention functional unit requires an alternative definition to be added as follows:

a) in BasicVTPitem, add spq2-pdu to the CHOICE list:

spq2-pdu [23] IMPLICIT SPQ2content,

```
-- This form of spq shall be used when context retention
-- is required. Either form of spq is allowed when context
-- retention is not required even when the Context Reten-
-- tion functional unit is selected.
```

b) add to the ISO9041-VTP module the following definition:

```
SPQ2content ::= SEQUENCE
    { profile   [0]  IMPLICIT G.Profile,
      retList   [1]  IMPLICIT SEQUENCE OF
                     PrintableString OPTIONAL}
-- This form of spq shall be used when context retention
-- is required. Either form of spq is allowed when con-
-- text retention is not required even when the context re-
-- tention functional unit is selected.
```

11.4 spr-pdu

The addition of the Context Retention functional unit requires an alternative definition to be added as follows:

a) in BasicVTPitem, add spr2-pdu to the CHOICE list:

spr2-pdu [24] IMPLICIT SPR2content,

```
-- This form of spr shall be used when context retention
-- is required. Either form of spr is allowed when context
-- retention is not required even when the Context
-- Retention functional unit is selected.
```

b) add to the ISO9041-VTP module the following definition:

```
SPR2content ::= SEQUENCE
{ result      G.Result2,
  argList     [2] IMPLICIT G.ProfileArgumValueList
                  OPTIONAL,
  retList     [3] IMPLICIT SEQUENCE OF
                  PrintableString OPTIONAL}
-- This form of spr shall be used when context retention is
-- required. Either form of spr is allowed when Context
-- Retention is not required even when the Context
-- Retention functional unit is selected.
```

11.5 enq-pdu

The addition of the Context Retention functional unit requires this definition to be changed. In the ISO9041-VTP module change the definition of ENQcontent as follows:

```
ENQcontent ::= SEQUENCE
  {   vteChoice    [0] IMPLICIT INTEGER
                   { draft      (0),
                     current    (1),
                     either     (2) },
      failAllowed  [1] IMPLICIT BOOLEAN OPTIONAL,
      -- true = "yes", false = "no"
      retList      [2] IMPLICIT SEQUENCE OF
                       PrintableString OPTIONAL}
```

11.6 enr-pdu

The addition of the Context Retention functional unit requires this definition to be changed. In the ISO9041-VTP module change the definition of ENRcontent as follows:

```
ENRcontent ::= SEQUENCE {
      result          G.Result3,
      vteChoice  [3]  IMPLICIT BOOLEAN OPTIONAL,
          --true = "draft", false = "current"
      retList    [4]  IMPLICIT SEQUENCE OF
                      PrintableString OPTIONAL}
```

11.7 ndq-pdu

The addition of the Ripple functional unit requires this definition to be changed. In the ISO9041-VTP module change the definition of DOupdate by adding the following definitions to the CHOICE list:

```
    insertXarray   [22] IMPLICIT INTEGER,
    deleteXarray   [23] IMPLICIT INTEGER,
    insertYarray   [24] IMPLICIT INTEGER,
    deleteYarray   [25] IMPLICIT INTEGER,
    copyToBuffer   [26] SEQUENCE
          {   address      Pointer,
              rioName [10] IMPLICIT PrintableString
                                    OPTIONAL,
              recordId [11] IMPLICIT PrintableStrin
                                    OPTIONAL,
    -- when buffer-name is "temporary", RIOname and
    -- recordID are absent when there is only one RIO
    -- present in the VTE, RIOname may not be present,
    -- but recordId must be present
              rendition [12] IMPLICIT NULL OPTIONAL,
    -- presence implies "copy attributes" absence implies
    -- "no attribute copy"
              structure [13] IMPLICIT INTEGER
                  {   none    (0),
                      x       (1),
                      xAndy   (2) } OPTIONAL},
                      -- absence implies "none"
    copyFromBuffer [27] SEQUENCE
          {   address      Pointer,
              rioName [10] IMPLICIT PrintableString
                                    OPTIONAL,
              recordId [11] IMPLICIT PrintableString
                                    OPTIONAL,
          -- when buffer-name is "temporary", RIOname and
          -- recordID are absent when there is only one RIO
          -- present in the VTE, RIOname may not be
          -- present, but recordId must be present
              rendition [12] IMPLICIT NULL OPTIONAL,
```

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```
        -- presence implies "copy attributes" absence implies
        -- "no attribute copy"
            structure [13] IMPLICIT INTEGER
                { none      (0),
                  x         (1),
                  xAndy     (2)} OPTIONAL,
                  -- absence implies "none"
            ripple    [14] IMPLICIT NULL OPTIONAL},
                  -- presence implies "on"
                  -- absence implies "off"
copyLogToBuffer [28] SEQUENCE
        {   address       LogPointer,
            rioName [8]   IMPLICIT PrintableString
                                        OPTIONAL,
            recordId [9]  IMPLICIT PrintableString
                                        OPTIONAL,
        -- when buffer-name is "temporary", RIOname and
        -- recordID are absent when there is only one RIO
        -- present in the VTE, RIOname may not be
        -- present, but recordId must be present
            rendition [10] IMPLICIT NULL OPTIONAL,
        -- presence implies "copy attributes"
        -- absence implies "no attribute copy"
            structure [11] IMPLICIT NULL OPTIONAL},
        -- presence implies "x"
        -- absence implies "none"
copyLogFromBuffer [29] SEQUENCE
        {   address LogPointer,
            rioName [8]   IMPLICIT PrintableString
                                        OPTIONAL,
            recordId [9]  IMPLICIT PrintableString
                                        OPTIONAL,
        -- when buffer-name is "temporary", RIOname and
        -- recordID are absent when there is only one RIO
        -- present in the VTE, RIOname may not be
        -- present, but recordId must be present
            rendition [10] IMPLICIT NULL OPTIONAL,
        -- presence implies "copy attributes"
        -- absence implies "no attribute copy"
            structure [11] IMPLICIT NULL OPTIONAL,
        -- presence implies "x", absence implies "none"
            rippleOff [12] IMPLICIT NULL OPTIONAL}
        -- presence implies "on" absence implies "off"
```

11.8 Various pdus for negotiation

The addition of the Ripple functional unit requires the definitions of pdus involved in negotiation (ASQ, ASR, SPQ, SPR, SNQ, SNR, NIQ, NOQ, NAQ, NJQ) to be changed as follows:

a) In the CDS module add the following item to the ParameterIdents SEQUENCE:

```
rippleCapability    [12] IMPLICIT NULL OPTIONAL
```

b) In the CDS module add the following item to the ParameterOffers SEQUENCE:

```
rippleCapability    [12] IMPLICIT BIT STRING
                         {yes (0), no (1) } OPTIONAL
```

c) In the CDS module add the following item to the ParameterValues SEQUENCE:

```
rippleCapability    [12] IMPLICIT BOOLEAN OPTIONAL
                         -- true= "yes"  false= "no"
```

11.9 exq-pdu

In the ISO9041-VTP module, an exq-pdu is added to the CHOICE list of BasicVTPitem and the definition EXQcontent is added to the body of the module as follows:

```
exq-pdu    [22] IMPLICIT EXQcontent

EXQcontent    ::=  SEQUENCE {
 exceptionType [0]CHOICE
        {   stdException [0]   IMPLICIT INTEGER
                { RIOfull                 (0),
                  tooManyFields           (1),
                  tooManyFieldElements    (2),
                  tooManyFERs             (3),
                  tooManyFEIs             (4) },
            proException [1]   IMPLICIT INTEGER },
  standard      [1]   IMPLICIT SEQUENCE
        {   pointer       [0]  IMPLICIT G.ExplicitPointer
                                    OPTIONAL,
            logPointer    [1]  IMPLICIT G.LogExpPointer
                                    OPTIONAL } OPTIONAL,
  profile         [2] IMPLICIT SEQUENCE OF SEQUENCE
  {ptag     INTEGER, OCTET STRING} OPTIONAL }
-- the service parameter VT-exception-source shall take
-- the value "local" for the sender of the EXQ and "remote"
-- for the receiver of the EXQ.
```

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