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SERIES X: DATA COMMUNICATION NETWORKS:
OPEN SYSTEMS INTERCONNECTION (OSI) – MODEL
AND NOTATION, SERVICE DEFINITION

RELIABLE TRANSFER: MODEL AND SERVICE DEFINITION

Reedition of CCITT Recommendation X.218 published in
the Blue Book, Fascicle VIII.4 (1988)

NOTES

1   CCITT Recommendation X.218 was published in Fascicle VIII.4 of the *Blue Book*. This file is an extract from the *Blue Book*. While the presentation and layout of the text might be slightly different from the *Blue Book* version, the contents of the file are identical to the *Blue Book* version and copyright conditions remain unchanged (see below).

2   In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

Recommendation X.218

<h1 style="text-align:center">RELIABLE TRANSFER: MODEL AND SERVICE DEFINITION[1]</h1>

<p style="text-align:center">(Melbourne, 1988)</p>

The CCITT,

considering

(a)   that Recommendation X.200 defines the Basic Reference Model of Open Systems Interconnection (OSI) for CCITT applications;

(b)   that Recommendation X.210 defines the service conventions for describing the services of the OSI reference model;

(c)   that Recommendation X.216 defines the Presentation Layer service;

(d)   that Recommendation X.217 defines the Association Control service;

(e)   that Recommendation X.228 defines the Reliable Transfer protocol;

(f)   that there is a need for common Reliable Transport support for various applications,

unanimously declares

that this Recommendation defines the Reliable Transfer service of Open Systems Interconnection for CCITT Applications as given in the Scope and Field of Application.

<p style="text-align:center">CONTENTS</p>

0   Introduction

This Recommendation defines the services provided by application-service-element – the Reliable Transfer Service Element (RTSE) – to provide for the Reliable Transfer of application-protocol-data-units (APDUs) between open systems. This Recommendation is one of a set of Recommendations defining sets of application-service-elements commonly used by a number of applications.

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[1]   Recommendation X.218 and ISO 9066-1 [Information processing systems – Text Communication – Reliable Transfer Part 1: Model and Service Definition] were developed in close collaboration and are technically aligned.

Reliable Transfer provides an application-independent mechanism to recover from communication and end-system failure minimizing the amount of retransmission.

This Recommendation is technically aligned with ISO 9066-1.

1   Scope and field of application

This Recommendation defines the services provided by the Reliable Transfer Service Element (RTSE). The RTSE services are provided by the use of the RTSE protocol (Recommendation X.228) in conjunction with the Association Control Service Element (ACSE) services (Recommendation X.217) and the ACSE protocol (Recommendation X.227), and the presentation-service (Recommendation X.216).

No requirement is made for conformance to this Recommendation.

2   References

Recommendation X.200   Reference Model of Open Systems Interconnection for CCITT Applications (see also ISO 7498).

Recommendation X.208   Specification of abstract syntax notation (see also ISO 8824).

Recommendation X.209   Specification of Basic Encoding Rules for the abstract syntax notation (see also ISO 8825).

Recommendation X.210   Open Systems Interconnection Layer Service Definition Conventions (see also ISO/TR 8509).

Recommendation X.216   Presentation Service Definition for Open Systems Interconnection for CCITT Applications (see also ISO 8822).

Recommendation X.217   Association Control Service Definition for CCITT Applications (see also ISO 8649).

Recommendation X.227   Association Control Protocol Specification for CCITT Applications (see also ISO 8650).

Recommendation X.228   Reliable Transfer: Protocol Specification (see also ISO 9066-2).

3   Definitions

3.1   *Reference model definitions*

This Recommendation is based on the concepts developed in Recommendation X.200 and makes use of the following terms defined in it:

    a)   Application Layer;

    b)   application-process;

    c)   application-entity;

    d)   application-service-element;

    e)   application-protocol-data-unit;

    f)   application-protocol-control-information;

    g)   Presentation Layer;

    h)   presentation-service;

    i)   presentation-connection;

    j)   session-service;

    k)   session-connection;

    l)   transfer syntax;

    m)   two-way-alternate interaction; and

    n)   user-element.

3.2   *Service convention definitions*

This Recommendation makes use of the following terms defined in Recommendation X.210:

a)   service-provider;

b)   service-user;

c)   confirmed service;

d)   non-confirmed service;

e)   provider-initiated service;

f)   service-primitive; primitive;

g)   request (primitive);

h)   indication (primitive);

i)   response (primitive); and

j)   confirm (primitive).

3.3   *Presentation service definitions*

This Recommendation makes use of the following terms defined in Recommendation X.216:

a)   abstract syntax;

b)   abstract syntax name;

c)   default context;

d)   presentation context;

e)   transfer syntax name.

3.4   *Association control definitions*

This Recommendation makes use of the following terms defined in Recommendation X.217:

a)   application-association; association;

b)   application context;

c)   Association Control Service Element;

d)   X.410-1984 mode.

3.5   *Reliable transfer definitions*

For the purpose of this Recommendation, the following definitions apply:

3.5.1   **Vassociation-initiating-application-entity; association-initiator**

The application-entity that initiates the application-association.

3.5.2   **Vassociation-responding-application-entity; association-responder**

The application-entity that responds to the initiation of an application-association by another AE.

3.5.3   **sending-application-entity; sender**

The application-entity that sends, or may send (i.e., possesses the TURN) the APDU to the receiving application-entity.

3.5.4   **receiving-application-entity; receiver**

The application-entity that receives, or may receive (i.e., does not possess the Turn) the APDU from the sending application-entity.

3.5.5   **requestor**

The part of an application-entity that issues a request primitive, or receives a confirm primitive for a particular RTSE service.

3.5.6   **acceptor**

The part of an application-entity that receives the indication primitive, or issues a response primitive for a particular RTSE service.

3.5.7 Reliable Transfer Service Element

The application-service-element defined in this Recommendation.

3.5.8 Reliable Transfer

An application-independent mechanism to provide for the transfer of application-protocol-data-units between open systems, and to recover from communication and end-system failure minimizing the amount of retransmission.

3.5.9 RTSE-user

The user of the Reliable Transfer Service Element. The user may be the user element, or another application service element, of the application entity.

3.5.10 RTSE-provider

The provider of the Reliable Transfer Service Element.

3.5.11 ACSE-provider

The provider of the Association Control Service Element.

3.5.12 monologue interaction

A mode of interaction where only one application-entity may be the sender.

3.5.13 syntax-matching services

Local services provided by the presentation-service provider enabling the transformation from the local representation of an application-protocol-data-unit value into a representation specified by a negotiated transfer syntax and vice versa.

3.5.14 X.410-1984 mode

A restricted mode of operation of the Reliable Transfer Service Element to allow interworking with application-entities based on CCITT Recommendation X.410-1984.

3.5.15 normal mode

A mode of operation of the Reliable Transfer Service Element providing full services.

4 Abbreviations

AE	application entity
ACSE	Association Control Service Element
APDU	application-protocol-data-unit
ASE	application-service-element
OSI	Open Systems Interconnection
RT (or RTS)	Reliable Transfer
RTSE	Reliable Transfer Service Element

5 Conventions

This Recommendation defines services for the RTSE following the descriptive conventions defined in Recommendation X.210. In § 9, the definition of each RTSE service includes a table that lists the parameters of its primitives. For a given primitive, the presence of each parameter is described by one of the following values.

Blank	not applicable
M	mandatory
U	user option
C	conditional
T	presence is an RTSE-provider option
A	presence subject to conditions defined in Recommendation X.217
P	presence subject to conditions defined in Recommendation X.216

In addition, the notation (=) indicates that a parameter value is semantically equal to the value to its left in the table.

6 Reliable Transfer model

In the OSI environment, communication between application-processes is represented in terms of communication between a pair of application-entities (AEs) using the presentation-service. Communication between some application-entities requires the Reliable Transfer of application-protocol-data-units (APDUs).

APDUs sent by one AE (the sender) are received by the other AE (the receiver). Reliable Transfer ensures that each APDU is completely transferred between AEs exactly once, or that the sending AE is warned of an exception. Reliable Transfer recovers from communication and end-system failure and minimizes the amount of retransmission needed for recovery. The APDUs transferred are transparent to the Reliable Transfer.

Reliable Transfer is carried out within the context of an application-association. An application-association defines the relationship between a pair of AEs, and is formed by the exchange of application-protocol-control-information through the use of presentation-services. The AE that initiates an application-association is called the association-initiating AE, or the association-initiator, while the AE that responds to the initiation of an application-association by another AE is called the association-responding AE, or the association-responder. Only the association-initiator may release an established application-association.

The functionality of an AE is factored into one user-element and a set of association-service-elements (ASEs). Each ASE may itself be factored into a set of (more primitive) ASEs. The interaction between AEs is described in terms of their use of ASEs.

The specific combination of a user-element and the set of ASEs which comprise an AE are defined by the association context.

Figure 1/X.218 illustrates an example of an application context involving the Reliable Transfer Service Element (RTSE).

The ASEs available to the user-element require communication over an application-association. The control of that application-association (establishment, release, abort) and the Reliable Transfer of APDUs over the application-association is performed by the Reliable Transfer Service Element (RTSE) defined in this Recommendation. The RTSE uses the Association Control Service Element (ACSE) defined in Recommendation X.217 for control of that application-association (establishment, release, abort).

Note that the application context depicted in Figure 1/X.218 is minimal for an application context involving RTSE. Another example, taken from message handling (Recommendation X.400), of an application context involving RTSE, could be that of a message transfer agent (MTA), and would include the message transfer service element (MTSE) in addition to the ACSE and the RTSE. Note also that, in general, it is the responsibility of a Recommendation defining a set of ASEs that make use of the RTSE (and the ACSE), to define what use is made of the RTSE and any restrictions that may apply.

7 Overview of service

This Recommendation defines the following services for Reliable Transfer:
a) RT-OPEN
b) RT-CLOSE
c) RT-TRANSFER
d) RT-TURN-PLEASE
e) RT-TURN-GIVE
f) RT-P-ABORT
g) RT-U-ABORT

The RT-OPEN service enables an RTSE-user to request the establishment of an application-association with another AE.

The RT-CLOSE service enables the association-initiating RTSE-user to request the release of an established application-association. It may do so only if it possesses the Turn.
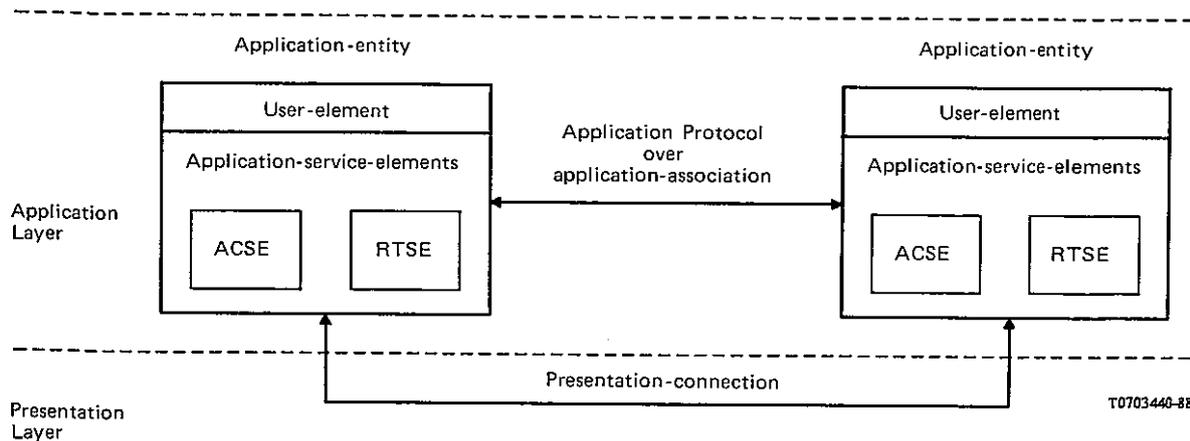
FIGURE 1/X.218

Model of an application context involving reliable transfer

The RT-TRANSFER service enables an RTSE-user that possesses the Turn, to request the Reliable Transfer of an APDU over an application-association. It may do so on an established application-association and where there is no outstanding RT-TRANSFER confirm positive.

The RT-TURN-PLEASE service enables an RTSE-user to request the Turn. It may do so only if it does not already possess the Turn. The Turn is requested by either RTSE-user to allow the RTSE-user to transfer APDUs. The Turn is requested by the association-initiating RTSE-user to allow it to release the application-association. The request conveys the priority of the action to be taken so that the other RTSE-user can decide when to actually relinquish the Turn.

The RT-TURN-GIVE service enables an RTSE-user to relinquish the Turn to its peer. It may do so only if it possesses the Turn.

The RT-P-ABORT service provides an indication to the RTSE-user that the application-association cannot be maintained (e.g., because recovery not possible, etc.). If it is the sender, the RTSE-provider first issues a negative RT-TRANSFER confirm for the APDU not yet transferred. If it is the receiver, the RTSE-provider deletes the partially received APDU prior to issuing the RT-P-ABORT indication.

the RT-U-ABORT service enables an RTSE-user to abort the application-association.

The Reliable Transfer is provided in two modes of operation:

a)   X.410-1980 mode: is provided solely to allow interworking with older implementations based on CCITT Recommendation X.410-1984. This mode implies some restriction in the use of RTSE services;

b)   normal mode: is provided to allow full use of RTSE services.

8   Relationship with other ASEs and Lower Layer services

8.1   *Other application service elements*

The RTSE is intended to be used with other ASEs in order to support specific information processing tasks that require the Reliable Transfer of application-protocol-data-units. Therefore, it is expected that the RTSE will be included in a number of application context specifications.

The collection of the RTSE and other ASEs (in particular ACSE) included in an application context are required to use the facilities of the presentation-service in a co-ordinated manner among themselves.

The RTSE requires the control of an application-association by the ACSE. For application contexts that involve RTSE, the RTSE-provider is the user of the A-P-ABORT service; the A-P-ABORT service is not used directly by the user-element nor by any other ASE. In the event of the RTSE-provider receiving an A-P-ABORT indication from the ACSE-provider, the RTSE-provider will attempt to recover the presentation-connection by issuing an A-ASSOCIATE request. If the presentation-connection cannot be recovered, the RTSE-provider will issue an

RT-P-ABORT indication to the RTSE-user. The A-ABORT service provided by the ACSE is used by the RTSE-provider.

An RTSE-user protocol specification defines the type of User-data parameter values of the RTSE services forming one or more abstract syntaxes and provides an unique abstract syntax name of type object identifier for each abstract syntax.

The User-data parameter values (if any) for the RT-OPEN and RT-U-ABORT services shall share one single named abstract syntax with the RTSE APDUs defined in Recommendation X.228. The Types for User-data parameter values (if any) of the RT-OPEN request/confirm, RT-OPEN response/confirm positive, RT-OPEN response/confirm negative and RT-U-ABORT request/indication primitives shall be any single ASN.1 type each. If no types for User-data parameter values are defined, the abstract syntax name rTSE-abstract-syntax defined in Recommendation X.228 identifies an abstract syntax formed by the RTSE APDUs.

The types of User-data parameter values for the RT-CLOSE services (if any) and the RT-TRANSFER service may form one or more named abstract syntaxes. Within a single named abstract syntax the type shall be a single ASN.1 type usually (but not necessarily) a choice type. This types may share a single abstract syntax with the RTSE APDUs, if and only if they use tags distinct from context-specific tags with the numbers [16], [17], [18] and [22] and distinct from the ASN.1 integer type and octetstring type. These conditions are ensured, if the RTSE-user protocol uses the RO-notation of Recommendation X.219.

In X.410-1984 mode there exists only a single abstract syntax, however this abstract syntax is not identified by an abstract syntax name but by the value of the Application-protocol parameter value of the RT-OPEN service.

8.2 *ACSE services*

The RTSE services require access to the A-ASSOCIATE, A-RELEASE, A-ABORT, and A-P-ABORT services. The inclusion of the RTSE in an application context precludes the use of any of the above ACSE services by any other ASE or the user-element.

The X.410-1984 mode of RTSE implies the X.410-1984 mode of ACSE.

8.3 *Presentation-service*

The RTSE services require access to the P-ACTIVITY-START, P-DATA, P-MINOR-SYNCHRONIZE, P-ACTIVITY-END, P-ACTIVITY-INTERRUPT, P-ACTIVITY-DISCARD, P-U-EXCEPTION-REPORT, P-ACTIVITY-RESUME, P-P-EXCEPTION-REPORT, P-TOKEN-PLEASE and P-CONTROL-GIVE services. This Recommendation recognizes that the ACSE services require access to the P-CONNECT, P-RELEASE, P-U-ABORT and P-P-ABORT services. The inclusion of the RTSE in an application context precludes the use of any of the above, or of any other, presentation-services by any other ASE or the user-element.

The RT protocol machine makes use of syntax-matching-services in the local system environment for its operation. These services are used to transform the representation of APDUs transferred between ASEs which use the RTSE. The syntax-matching-services provide for the transformation from a local representation of an APDU into a representation specified by a transfer syntax determined by the Presentation Service and vice versa. The method used to access this transfer syntax information is a local matter outside the scope of this Recommendation.

The X.410-1984 mode of RTSE implies the X.410-1984 mode of the Presentation-service.

A named abstract syntax associated with a compatible transfer syntax (negotiated by the Presentation Layer) constitutes a presentation context.

The object identifier value {joint-iso-ccitt asn1(1)basic-encoding(1)} specified in Recommendation X.209 may be used as a transfer syntax name. In this case the RTSE-user protocol specification need not name and specify a transfer syntax.

In X.410-1984 mode the default presentation context is constituted by the single abstract syntax identified by the Application-protocol parameter value of the RT-OPEN service associated with basic ASN.1 encoding rules of Recommendation X.209.

9   Service definition

The RTSE services are listed in Table 1/X.218.

TABLE 1/X.218

RTSE services

Service	Type
RT-OPEN	Confirmed
RT-CLOSE	Confirmed
RT-TRANSFER	Confirmed
RT-TURN-PLEASE	Non-confirmed
RT-TURN-GIVE	Non-confirmed
RT-P-ABORT	Provider-initiated
RT-U-ABORT	Non-confirmed

Identification of the named abstract syntax in use is assumed for all RTSE services; however, this is a local matter and outside the scope of this Recommendation.

9.1   *RT-OPEN service*

The RT-OPEN service is used by the association-initiator to request the establishment of an application-association for the ASE procedures identified by the Application Context Name parameter (in normal mode), or by the Application-protocol parameter (in X.410-1984 mode). This service is a confirmed service.

The related service structure consists of four service primitives, as illustrated in Figure 2/X.218.
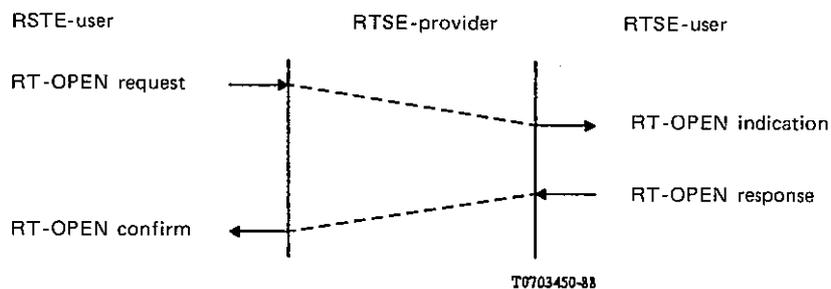

FIGURE 2

RT-OPEN Service-primitives

9.1.1   *Parameters of RT-OPEN*

Table 2/X.218 lists the RT-OPEN service parameters.

RT-OPEN parameters

Parameter name	Request	Indication	Response	Confirmation
Dialogue-mode	M	M (=)		
Initial-turn	M	M (=)		
Application-protocol 4)	U	C (=)		
User-data 2)	U	C (=)	U	C (=)
Mode	A	A		
Application context name 3)	A	A	A	A
Calling AP title 3)	A	A		
Calling AP invocation-identifier 3)	A	A		
Calling AE qualifier 3)	A	A		
Calling AE invocation-identifier 3)	A	A		
Calling AP title 3)	A	A		
Called AP invocation-identifier 3)	A	A		
Calling AE qualifier 3)	A	A		
Called AE invocation-identifier 3)	A	A		
Responding AP title 3)			A	A
Responding AP invocation-identifier 3)			A	A
Responding AE qualifier 3)			A	A
Responding AE invocation-identifier 3)			A	A
Result			A	A
Result source				A
Diagnostic			A	A
Calling presentation address	P	P		
Called presentation address	P	P		
Responding presentation address			P	P
Presentation context definition list 3)	P	P		
Presentation context definition result list 3)		P	P	P
Default presentation context name 3)	P	P		
Default presentation context result 3)		P	P	P

Note 1 – If the parameter has the value "X.410-1984 mode" the X.410-1984 mode applies.

Note 2 – Restricted use of parameters in X.410-1984 mode (see following clauses).

Note 3 – Parameter absent in X.410-1984 mode.

Note 4 – Parameter only present in X.410-1984 mode.

9.1.1.1 *Dialogue-mode*

The type of use of the application-association:

– monologue, or

– two-way-alternate interaction.

9.1.1.2 *Initial turn*

The RTSE-user that is to have the turn initially:

– association-initiator, or

– association-responder.

9.1.1.3 *Application-protocol*

Designates the application protocol that will govern communication over the application-association.

This parameter is only present in X.410-1984 mode. In normal mode the parameter Application Context Name is used.

9.1.1.4 *User-data*

User data associated with establishing the application-association.

If the X.410-1984 mode is selected, and the Result parameter of the RT-OPEN response primitive has the value "rejected (permanent)", this parameter in the RT-OPEN response primitive is restricted to the values:

– authentication-failure, and

– unacceptable-dialogue-mode.

If the X.410-1984 mode is selected, and the Result parameter of the RT-OPEN response primitive has the value "rejected (transient)", this parameter in the RT-OPEN response primitive is absent.

In the normal mode the use of this parameter is not restricted.

9.1.1.5 *Mode*

This parameter specifies the mode in which the RTSE services will operate for this association. It takes one of the following symbolic values:

– normal mode, or

– X.410-1984 mode.

9.1.1.6 *Other parameters*

Parameters marked with an "A" in Table 2/X.218 are defined in Recommendation X.217.

Parameters marked with a "P" in Table 2/X.218 are defined in Recommendation X.216.

9.2 *RT-Close service*

The RT-CLOSE service is used by the association-initiator to request the release of an application-association. It may do so only if it possesses the Turn and there is no outstanding RT-TRANSFER confirm primitive. This service is a confirmed service.

The release of the application-association is without loss of information in transit. This service can not be rejected by the association-responding RTSE-user.

The related service structure consists of four service-primitives, as illustrated in Figure 3/X.218.
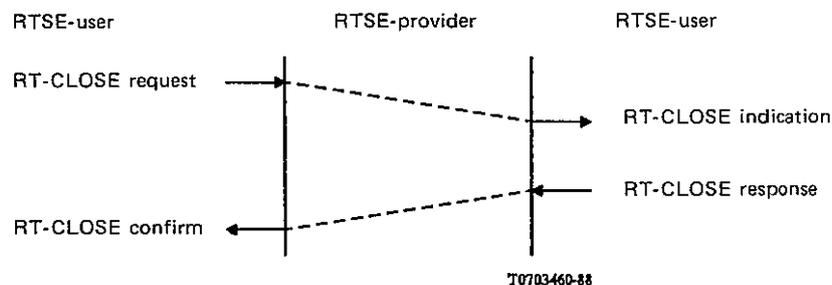

FIGURE 3/X.218

RT-CLOSE Service-primitives

9.2.1 *Parameters of RT-CLOSE*

Table 3/X.218 lists the RT-CLOSE service parameters. These parameters are only present in the normal mode and are defined in Recommendation X.217. In the X.410-1984 mode the RT-CLOSE service has no parameters.

TABLE 3/X.218

RT-CLOSE parameters

Parameter name	Request	Indication	Response	Confirmation
Reason	A	A	A	A
User-data	A	A	A	A

9.3 *RT-TRANSFER service*

The RT-TRANSFER service enables an RTSE-user that possesses the Turn, to request the Reliable Transfer of an APDU over an application-association. It may do so only on an established application-association and when there is no outstanding RT-TRANSFER confirm primitive. This service is a confirmed service.

The related service structure consists of three service-primitives, as illustrated in Figure 4/X.218.
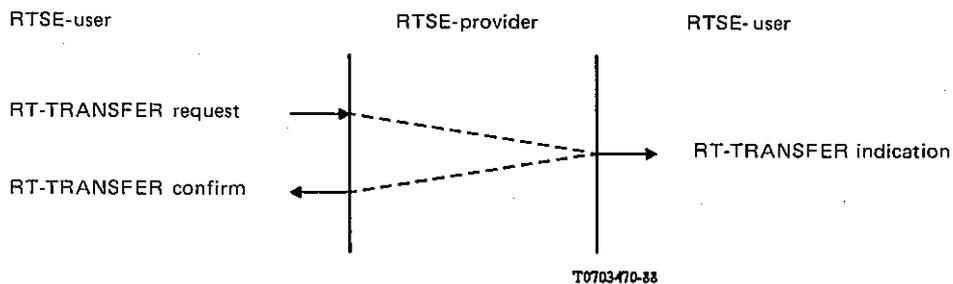

FIGURE 4/X.218

RT-TRANSFER Service-primitives

The RT-TRANSFER confirm primitive signifies that the APDU has been secured by the receiving RTSE-provider (positive confirm), or that the requested transfer of an APDU could not be completed within the specified transfer time (negative confirm).

9.3.1 *RT-TRANSFER parameters*

Table 4/X.218 lists the RT-TRANSFER service parameters.

RT-TRANSFER parameters

Parameter name	Request	Indication	Confirmation
APDU	M	M (=)	T (=)
Transfer-time	M		
Result			M

9.3.1.1   *APDU*

This parameter contains the RTSE-user APDU value to be transferred. This parameter has to be supplied by the requestor of the RT-TRANSFER service and, in the case of a negative confirm, by the service-provider.

9.3.1.2   *Transfer-time*

This parameter defines the time period within which the RTSE-provider shall successfully transfer the APDU to the other RTSE-user. This parameter has to be supplied by the requestor of the RT-TRANSFER service.

9.3.1.3   *Result*

This parameter specifies the result of the transfer as follows:

–   APDU-transferred: positive confirm; the APDU has been transferred to, and secured by, the receiving RTSE-provider;

–   APDU-not-transferred: negative confirm; the APDU could not be transferred within the specified transfer time. *Note* – In certain unusual circumstances a negative confirm may be reported even though the APDU has been transferred to, and secured by, the receiving RTSE-provider.

This parameter has to be supplied by the RTSE-provider.

9.4   *RT-TURN-PLEASE service*

The RT-TURN-PLEASE service enables an RTSE-user to request the Turn. It may do so only if it does not already possess the Turn. The Turn is requested by either RTSE-user to allow the RTSE-user to transfer APDUs. The Turn is requested by the association-initiating RTSE-user to allow it to release the application-association. The request conveys the priority of the action to be taken so that the other RTSE-user can decide when to actually relinquish the Turn. This service is a non-confirmed service.

The related service structure consists of two service-primitives, as illustrated in Figure 5/X.218.
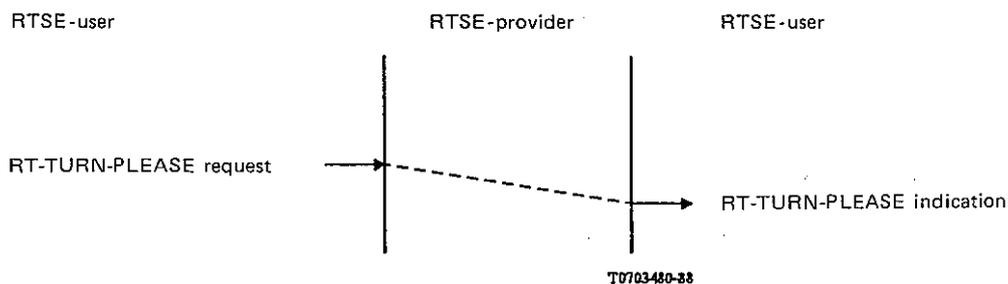

FIGURE 5/X.218

RT-TURN-PLEASE Service-primitives

9.4.1 *RT-TURN-Please parameters*

Table 5/X.218 lists the RT-TURN-PLEASE service parameters.

TABLE 5/X.218

RT-TURN-PLEASE parameters

Parameter name	Request	Indication
Priority	U	C (=)

9.4.1.1 *Priority*

This parameter defines the priority of the action, governed by the Turn, that the requestor of the RT-TURN-PLEASE service wishes to carry out. A priority is assigned to each RTSE-user action. Priority zero is the highest priority and is reserved for the action of releasing an application-association. The actions of transferring various APDUs will be assigned other priorities. The range of valid priorities is a property of the application context in use. This parameter has to be supplied by the requestor of the RT-TURN-PLEASE service.

If the Priority parameter is absent, priority zero is assumed.

9.5 *RT-TURN-GIVE service*

The RT-TURN-GIVE service enables an RTSE-user to relinquish the Turn to its peer. It may do so only if it possesses the Turn and there is no outstanding RT-TRANSFER confirm primitive. This service is a non-confirmed service.

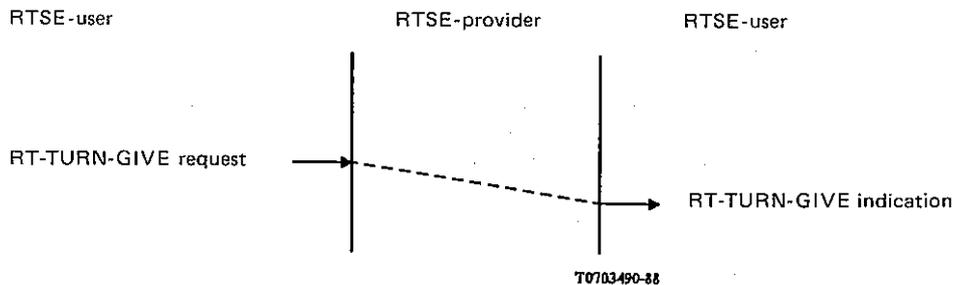The related service structure consists of two service-primitives, as illustrated in Figure 6/X.218.

FIGURE 6/X.218

RT-TURN-GIVE Service-primitives

9.5.1 *RT-TURN-GIVE parameters*

The RT-TURN-GIVE service has no parameters.

9.6 *RT-P-ABORT service*

The RT-P-ABORT services provides an indication to both the RTSE-users that the application-association cannot be maintained (e.g., because recovery not possible, etc.). If it is the sender, the RTSE-provider first issues a negative RT-TRANSFER confirm primitive for the APDU not yet transferred. If it is the receiver, the RTSE-provider deletes any partially received APDUs prior to issuing the RT-P-ABORT indication. This service is a provider-initiated service.

The related service structure consists of two service-primitives, as illustrated in Figure 7/X.218.
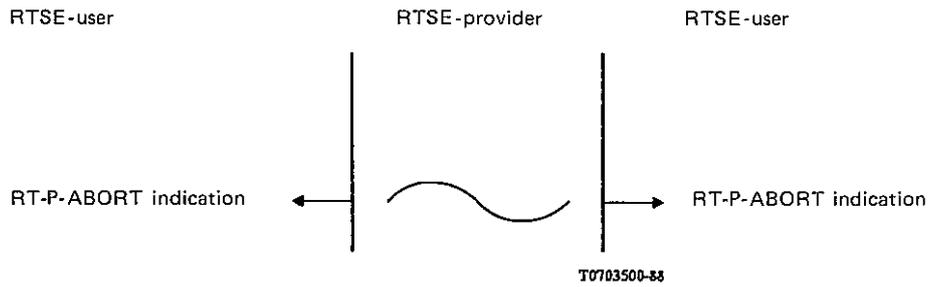
FIGURE 7/X.218

RT-P-ABORT Service-primitives

9.6.1   *RT-P-ABORT parameters*

The RT-P-ABORT service has no parameters.

9.7   *RT-U-ABORT service*

The RT-U-ABORT service enables an RTSE-user to abort the application-association. The abort may be requested by either RTSE-user. This service is a non-confirmed service.

Note – This service is not supported in X.410-1984 mode.

The related service structure consists of two service-primitives, as illustrated in Figure 8/X.218.
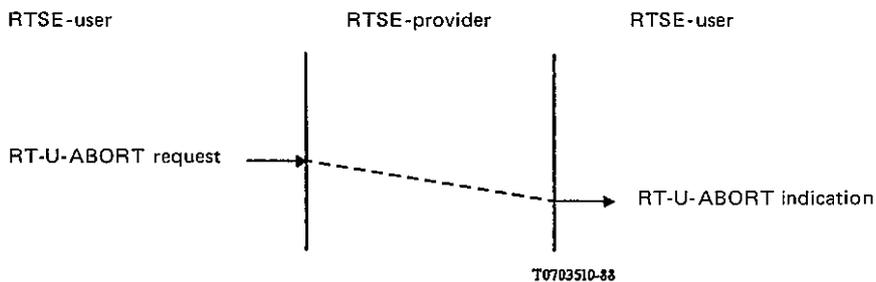

FIGURE 8/X.218

RT-U-ABORT Service-primitives

9.7.1   *RT-U-ABORT parameters*

Table 6/X.218 lists the RT-U-ABORT service parameters.

TABLE 6/X.218

RT-U-ABORT parameters

Parameter name	Request	Indication
User-data	U	C (=)

9.7.1.1   *User-data*

User-data associated with aborting the application-association. This parameter has to be supplied by the requestor of the RT-U-ABORT service.

10   Sequencing information

This clause defines the interaction among the RTSE services.

10.1   *RT-OPEN*

10.1.1   *Type of service*

The RT-OPEN service is a confirmed service.

10.1.2   *Usage restrictions*

The RT-OPEN service is not used on an established application-association.

10.1.3   *Disrupted services*

The RT-OPEN service does not disrupt any service.

10.1.4   *Disrupting services*

The RT-OPEN service is disrupted by the RT-P-ABORT service and the RT-U-ABORT service.

10.1.5   *Collisions*

An RT-OPEN collision results when requestors in both AEs simultaneously issue an RT-OPEN request primitive for each other. In this case two independent application-associations are established.

10.2   *RT-CLOSE*

10.2.1   *Type of service*

The RT-CLOSE service is a confirmed service.

10.2.2   *Usage restrictions*

The RT-CLOSE service is used only on an established application-association by the association-initiator. It is only used when the association-initiator possesses the Turn, and when there is no outstanding RT-TRANSFER confirm primitive.

10.2.3   *Disrupted services*

The RT-CLOSE service does not disrupt any service.

10.2.4   *Disrupting services*

The RT-CLOSE service is disrupted by the RT-P-ABORT service and the RT-U-ABORT service.

10.2.5   *Collisions*

Because only the association-initiator uses this service, there is no collision of the RT-CLOSE service.

10.3   *RT-TRANSFER service*

10.3.1   *Type of service*

The RT-TRANSFER service is a confirmed service.

10.3.2   *Usage restriction*

The RT-TRANSFER service is only used on an established application-association, and if the RTSE-user possesses the Turn, and if there is no outstanding RT-TRANSFER confirm primitive.

10.3.3   *Disrupted services*

The RT-TRANSFER service does not disrupt any services.

10.3.4   *Disrupting services*

The RT-TRANSFER service is disrupted by the RT-P-ABORT service and the RT-U-ABORT service, in the sense that a negative RT-TRANSFER confirm primitive and no RT-TRANSFER indication primitive may occur.

10.3.5   *Collision*

There is no collision of RT-TRANSFER services.

10.4   *RT-TURN-PLEASE service*

10.4.1   *Type of service*

The RT-TURN-PLEASE service is a non-confirmed service.

10.4.2   *Usage restriction*

The RT-TURN-PLEASE service is only used on an established application-association, and if the RTSE-user does not already possess the Turn.

10.4.3   *Disrupted services*

The RT-TURN-PLEASE service does not disrupt any services.

10.4.4   *Disrupting services*

The RT-RETURN-PLEASE service is disrupted by the RT-P-ABORT service and the RT-U-ABORT service.

10.4.5   *Collision*

There is no collision of RT-TURN-PLEASE services.

10.5   *RT-TURN-GIVE service*

10.5.1   *Type of service*

The RT-TURN-GIVE service is a non-confirmed service.

10.5.2   *Usage restriction*

The RT-TURN-GIVE service is only used on an established application-association, and if the RTSE-user possesses the Turn, and if there is no outstanding RT-TRANSFER confirm primitive.

10.5.3   *Disrupted services*

The RT-TURN-GIVE service does not disrupt any services.

10.5.4   *Disrupting services*

The RT-TURN-GIVE service is disrupted by the RT-P-ABORT service and the RT-U-ABORT service.

10.5.5   *Collision*

There is no collision of RT-TURN-GIVE services.

10.6   *RT-P-ABORT service*

10.6.1   *Type of service*

The RT-P-ABORT service is provider initiated service.

10.6.2   *Usage restriction*

Not applicable.

10.6.3   *Disrupted services*

The RT-P-ABORT service disrupts all other RTSE services.

10.6.4   *Disrupting services*

The RT-P-ABORT service is not disrupted by any other service.

10.6.5 *Collision*

If the RT-P-ABORT service causes an abort of an application-association, it is a local matter to inform the service-user about the outstanding negative RT-TRANSFER confirm primitive for an APDU not transferred.

10.7 *RT-U-ABORT service*

10.7.1 *Type of service*

The RT-U-ABORT service is a non-confirmed service.

10.7.2 *Usage restriction*

The RT-U-ABORT service is only used on an established application-association.

10.7.3 *Disrupted services*

The RT-U-ABORT service disrupts all other RTSE services, except the RT-P-ABORT service.

10.7.4 *Disrupting services*

The RT-U-ABORT service is disrupted by the RT-P-ABORT service.

10.7.5 *Collision*

If the RT-U-ABORT service causes an abort of an application-association, it is a local matter to inform the service-user about the outstanding negative RT-TRANSFER confirm primitive for an APDU not transferred.

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