INTERNATIONAL TELECOMMUNICATION UNION

ITU-T X.639

(10/96)

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

SERIES X: DATA NETWORKS AND OPEN SYSTEM COMMUNICATION

OSI networking and system aspects – Efficiency

Basic connection-oriented requirements for ROSE-based profiles

ITU-T Recommendation X.639

(Previously CCITT Recommendation)

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FOREWORD

The ITU-T (Telecommunication Standardization Sector) is a permanent organ of the International Telecommunication Union (ITU). The ITU-T is responsible for studying technical, operating and tariff questions and issuing Recommendations on them with a view to standardizing telecommunications on a worldwide basis.

The World Telecommunication Standardization Conference (WTSC), which meets every four years, establishes the topics for study by the ITU-T Study Groups which, in their turn, produce Recommendations on these topics.

The approval of Recommendations by the Members of the ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, March 1-12, 1993).

ITU-T Recommendation X.639 was prepared by ITU-T Study Group 7 (1993-1996) and was approved under the WTSC Resolution No. 1 procedure on the 5th of October 1996.

NOTE

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

CONTENTS

SUMMARY

This Recommendation describes the common upper layer requirements above and beyond those specified in Recommendation X.637 to support ROSE-based profiles which do not use the services of the RTSE. These common elements are specified by reference to the OSI connection-mode Recommendations for the ROSE protocol, the ACSE protocol, the Presentation layer protocol and the Session layer protocol.

This is one of a series of Recommendations to support the minimal OSI functions in the upper layers. It is technically aligned with ISO/IEC ISP 11188-2.

Recommendation X.639

BASIC CONNECTION-ORIENTED REQUIREMENTS FOR ROSE-BASED PROFILES

(Geneva, 1996)

1 Scope

1.1 General

This Recommendation specifies the common upper layer elements of ROSE-based A-profiles, which do not use RTSE. It documents ROSE-specific upper layer requirements over and above the common upper layer requirements specified in Recommendation X.638. The common elements are specified by reference to OSI connection-mode standards for the ROSE protocol, the ACSE protocol, the presentation layer protocol, and the session layer protocol.

A specification defining a ROSE-based A-profile may reference Recommendation X.638 and this Recommendation as the common basis for the selection of elements of the upper layer protocols (ROSE, ACSE, presentation and session) that it uses.

The use of this Recommendation is supplemented by a statement of the referencing specification's specific upper layer requirements for the use of ROSE, ACSE, presentation and session protocol standards.

The rest of an A-profile definition, including, for instance, its use of standards for Application Service Elements (ASE, see also Figure 1), follows the general rules of ISO/IEC TR 10 000-1.

1.2 Scenario

The model used is one of two-end systems running an end-to-end association using the ROSE, ACSE, presentation and session services and protocols (see Figure 1).

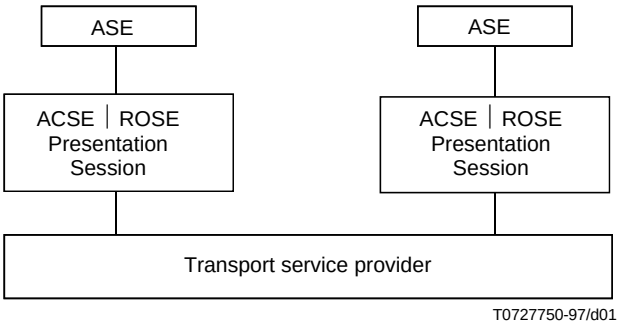

FIGURE 1/X.639

Model of the supportive layers for ROSE-based ASEs

2 Normative references

The following Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision: all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

2.1 Identical ITU-T Recommendations | International Standards

- ITU-T Recommendation X.225 (1995) | ISO/IEC 8327-1:1996, *Information technology – Open Systems Interconnection – Connection-oriented session protocol: Protocol specification*.
- ITU-T Recommendation X.226 (1994) | ISO/IEC 8823-1:1994, *Information technology – Open Systems Interconnection – Connection-oriented presentation protocol: Protocol specification*.
- ITU-T Recommendation X.227 (1995) | ISO/IEC 8650-1:1996, *Information technology – Open Systems Interconnection – Connection-oriented protocol for the association control service element: Protocol specification*.
- ITU-T Recommendation X.245 (1995) | ISO/IEC 8327-2:1996, *Information technology – Open Systems Interconnection – Connection-oriented session protocol: Protocol Implementation Conformance Statement (PICS) proforma*.
- ITU-T Recommendation X.246 (1996) | ISO/IEC 8823-2:1997, *Information technology – Open Systems Interconnection – Connection-oriented presentation protocol: Protocol Implementation Conformance Statement (PICS) proforma*.
- ITU-T Recommendation X.247 (1996) | ISO/IEC 8650-2:1997, *Information technology – Open Systems Interconnection – Protocol specification for the association control service element: Protocol Implementation Conformance Statement (PICS) proforma*.

2.2 Paired Recommendations | International Standards equivalent in technical content

- CCITT Recommendation X.219 (1988), *Remote operations: Model, notation and service definition*.

  ISO/IEC 9072-1:1989, *Information processing systems – Text communication – Remote Operations – Part 1: Model, notation and service definition*.
- CCITT Recommendation X.229 (1988), *Remote operations: Protocol specification*.

  ISO/IEC 9072-2:1989, *Information processing systems – Text communication – Remote Operations – Part 2: Protocol specification*.
- ITU-T Recommendation X.637 (1996), *Basic connection-oriented common upper layer requirements*.

  ISO/IEC ISP 11188-1:1995, *Information technology – International Standardized Profile – Common upper layer requirements – Part 1: Basic connection oriented requirements*.
- ITU-T Recommednation X.638 (1996), *Minimal OSI facilities to support basic communications applications*.

  ISO/IEC ISP 11188-3:1996, *Information technology – International Standardized Profile – Common upper layer requirements – Part 3: Minimal OSI upper layer facilities*.

2.3 Additional references

- ISO/IEC 9072-4[1)], *Information technology – Remote Operations Service Element (ROSE) – Part 4: Protocol Implementation Conformance Statement (PICS) proforma*.

NOTE – This Recommendation makes detailed references to subclauses of the specified editions of some of the above references.

3 Definitions

The definitions in ITU-T Recommendation X.638 are also valid for this Recommendation.

1) Presently at the stage of draft.

3.1 Support level

To specify the support level of protocol features for this Recommendation the following terminology is defined:

a) Column 1 of Table 1 lists the support level identifiers for a profile used in this Recommendation;

b) Column 2 of Table 1 defines the use of these requirements classifications of column 1 by a referencing specification;

c) Column 3 of Table 1 defines the use of the requirements classifications by an implementation.

4 Abbreviations

In addition to the abbreviations defined in Recommendation X.638, the following abbreviations are used in this Recommendation.

ROSE Remote Operations Service Element

RTSE Reliable Tranfer Service Element

Support level for protocol features:

m supported

o optionally supported

* open

x excluded

c conditionally supported

i out of scope

– not applicable

5 Remote Operations Service Element (ROSE)

The support of functions and parameters for the Remote Operations Service Element is as specified in A.5 and in the Specific Upper Layer Requirements section of the referencing specification.

6 Association Control Service Element (ACSE)

The support of functions and parameters for the Association Control Service Element is as specified in A.6 and in the Specific Upper Layer Requirements section of the referencing specification.

7 Presentation layer

The support of functions and parameters for the presentation protocol is as specified in A.7 and in the Specific Upper Layer Requirements section of the referencing specification.

8 Session layer

The support of functions and parameters for the session protocol is as specified in A.8 and in the Specific Upper Layer Requirements section of the referencing specification.

TABLE 1/X.639

Profile status identifiers

	Identifier	Meaning when referenced by a specification	Meaning when referenced by an implementation
1	m	Mandatory – The feature shall be required for support. The status of the feature shall remain mandatory in a referencing specification (Note).	Mandatory – The implementation shall support the feature, i.e. its syntax and procedures shall be implemented as specified in the base standard or in this Recommendation. However, it is not a requirement that the feature shall be used in all instances of communication unless mandated by the base standard or stated otherwise in this Recommendation. The feature shall be the subject of an ISP conformance test (Note).
2	o	Optional – The choice of whether this feature is supported or it is not supported is made by the implementation. The status of the feature shall remain optional in a referencing specification.	Optional –The implementation may decide either to support or to not support the feature. • Supporting a feature means that the feature shall be handled as if it was mandatory. • Not supporting a feature depends on receiving or sending : For sending, the feature's capability is not used; For receiving an optional parameter, the syntax shall be implemented and the parameter may be ignored. The feature shall be the subject of an ISP conformance test.
3	*	Open – The status of this feature shall be decided by the referencing specification. The referencing specification shall indicate that the status of the feature is mandatory, optional, or out of scope. Alternately, the referencing specification may keep the feature open.	Open – same as optional.
4	x	Excluded – The feature shall not be used in a referencing specification. The status of the feature shall remain excluded in a referencing specification.	Excluded – The implementation shall not support the feature. When completing the associated PICS Proforma table, the answer for the support column shall be that the feature has not been implemented. The implementation shall abort if the feature is received. The exclusion should be the subject of an ISP conformance test.
5	i	Out of scope – The requirement for the support of this feature is not covered by this Profile. The status of the feature shall remain out of scope in a referencing specification.	Out of scope – Support for a feature shall follow the guidelines outlined for optional above with the exception that this feature shall not be the subject of an ISP conformance test.
6	–	Not applicable – The feature is not relevant where mentioned in a table. Support for the feature is either meaningless, logically impossible, or physically impossible, after some conditions are evaluated. The status of the feature shall remain not applicable in a referencing specification.	Not applicable – The feature is not defined by the base standard in the context where it is mentioned in a table. A support answer is not required from the implementor.
7	c[n]	Conditionally supported – Support for the feature is further defined in this Recommendation by condition ("n") annexed to the table. The value evaluated from the condition evaluates to one of the following values defined in this Table: "m"; "o"; "i", or "–".	Conditionally supported – Support for the feature is further defined by a condition ("n") which is annexed to the table. Depending on the condition, when completing the associated PICS Proforma table, the answer for the support column shall either be: the feature has been implemented; the feature has not been implemented; or not applicable.
	NOTE – The support of a feature can be conditional, depending on the support of a class of features to which it belongs, e.g. a parameter in a PDU, a PDU in a functional unit.		

9 Compliance

9.1 Compliance statement

A referencing specification may use the requirements in this Recommendation and claim compliance to them, in one of the following ways:

a) The referencing specification does not duplicate any of the requirements of this Recommendation within its own specifications and instead requires the implementation to conform to the requirements of this Recommendation. This is the preferred method.

b) The referencing specification replicates all of the requirements of this Recommendation as part of its requirements and related conformance statements.

In the case of b), a reference to this Recommendation shall be included in clause 1 (Scope) as well as in clause 2 (Normative references) of the referencing specification.

9.1.1 A referencing specification that replicates all of the requirements of this Recommendation complies if the specific upper layer requirements of the referencing specification do not conflict with the requirements of this Recommendation.

9.1.2 A specification that requires an implementation to conform to the requirements contained within this Recommendation complies if:

a) the conformance requirement of the referencing specification states that an implementation shall conform to the requirements of this Recommendation; and

b) the specific upper layer requirements of the referencing specification do not conflict with the requirements of this Recommendation.

9.1.3 This Recommendation states requirements upon implementations to achieve interworking.

A claim of compliance is a claim that all requirements in the relevant base standards are satisfied, and that all requirements in this Recommendation are satisfied. Annex B states the relationship between these requirements and those of the base standards.

9.2 Relationship with base standards

A compliant referencing specification shall require an implementation that claims conformance to the referencing specification to include the aspects specified in 9.2.1 through 9.2.5 and 9.3.

9.2.1 ROSE conformance

To conform to the Remote Operations Service Element (ROSE) protocol used in this Recommendation, implementations shall implement all supported features (identified in A.5).

9.2.2 ACSE conformance

To conform to the Association Control Service Element (ACSE) protocol as constrained by this Recommendation, implementations shall implement the normal mode and shall implement all supported features (identified in A.6).

9.2.3 Presentation layer conformance

To conform to the presentation protocol as constrained by this Recommendation, implementations shall implement the normal mode and shall implement all supported features (identified in A.7).

9.2.4 Transfer syntax conformance

An implementation shall support the "Basic Encoding of a single ASN.1 type" (BER) as specified in ITU-T Rec. X.690 | ISO/IEC 8825-1, except where the referencing specification or the associated base standard specifies some other mandatory encoding, together with the additional rules defined in clause 7/X.637, for the generation of protocol encoding specified in ASN.1. The referencing specification may require support of this or other transfer syntaxes for any abstract syntaxes which it defines.

NOTE – At the time of publication, the BER was adequate to satisfy all proposed profiles.

9.2.5 Session layer conformance

To conform to the session protocol as constrained by this Recommendation, implementations shall implement all the features identified in A.8 as required to be implemented.

9.3 Relationship with Recommendation X.638

Each implementation conforming to this Recommendation shall also conform to Recommendation X.638.

Annex A

Profile Requirements Lists for ROSE, ACSE, Presentation and Session

A.1 General

This Annex describes the ROSE, ACSE, Presentation and Session requirements for ROSE-based profiles. The requirements are presented in terms of tables that reference the base standards PICS proformas. The tables are used when writing a PRL of a referencing specification or when completing the PICS proforma of the base standards. The tables specify the values that shall be used for items within identified tables of the PICS proformas. The tables in A.4 to A.8 complement the requirements stated in Annexes A, B and C of Recommendation X.638. Recommendation X.638 leaves options for some features which are redefined by the tables in this Annex. Together with the tables in Annexes A, B and C of Recommendation X.638, they are intended to give a precise specification of requirements on responses given in a completed PICS. All open parameters in Recommendation X.638 remain open, if they are not redefined by the tables in this Annex. In case of arbitration or dispute, this Annex takes precedence over any clause in either Recommendation X.637 or Recommendation X.638.

A.2 References

In the PICS proforma reference column of A.5 to A.8 tables within the base standard PICS proformas are referenced. The first letter identifies the specific PICS proforma:

R: ROSE – ISO/IEC 9072-4

A: ACSE – ITU-T Rec. X.247 | ISO/IEC 8650-2

P: Presentation – ITU-T Rec. X.246 | ISO/IEC 8823-2

S: Session – ITU-T Rec. X.245 | ISO/IEC 8327-2

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

A.3 Classification of requirements

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

A.3.1 Status column

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

o: optional

c: conditional

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

The definitions of conditional items may be found in the respective PICS proformas.

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

A.3.2 Profile column

The profile column reflects the requirement of this Recommendation. Each entry in this column is chosen from the following list (for definitions see 3.1):

m: mandatory support

C: conditional support as mandated by this Recommendation

c: conditional support as mandated in the base standard PICS

O.N: optional with at least one of the marked items being selected

i: outside the scope

–: not applicable

The definitions of conditional items mandated by this Recommendation are listed in A.9. Where the profile entry contains two classifications separated by a comma, these reference the sending and receiving capabilities, respectively.

A.4 Value of the ’Role-Variables’ used in Annexes A, B and C of Recommendation X.638

Subclause 9.3/X.638 describes a concept of roles for association establishment, normal data transfer and association-release. These roles are expressed as boolean values of 'role-variables'. The 'Role-variables' are used to formulate conditional requirements in Annexes A, B and C of Recommendation X.638. For ROSE-based profiles, the values of some role-variables can be determined:

default	*Establishment-initiator* = ’i’
	Establishment-responder = ’i’
	Release-requestor = ’i’
	Release-acceptor = ’i’
	normal-data-requestor = ’i’
	normal-data-acceptor = ’i’
if A.3/1 then	*Establishment-initiator* = ’m’ and *Release-requestor* = ’m’
if A.3/2 then	*Establishment-responder* = ’m’ and *Release-acceptor* = ’m’
if [A.5/5 and A.5/6 and not (A.5/1 or A.5/2 or A.5/3 or A.5/4 or A.5/7)] then	
	normal-data-requestor = ’m’
if [A.5/5 and A.5/7 and not (A.5/1 or A.5/2 or A.5/3 or A.5/4 or A.5/6)] then	
	normal-data-acceptor = ’m’
if [(A.5/1 or A.5/2 or A.5/3 or A.5/4) or (A.5/5 and A.5/6 and A.5/7)] then	
	normal-data-requestor = ’m’ and *normal-data-acceptor* = ’m’

A.5 ROSE PRL

	PICS Proforma Reference	Name of item	Normative reference	Status	Profile
1	R.A.6.6/2	operation-value (*RORS origination*)		o	O.1
2	R.A.6.6/3	result (*RORS origination*)		o	O.1
3	R.A.6.7/2	operation-value (*RORS reception*)		o	O.2
4	R.A.6.7/3	result (*RORS reception*)		o	O.2
	NOTE – The requirements O.1 and O.2 in the Profile column are clear from the base standard; this may be an error in the PICS.				

A.6 ACSE PRL

	PICS Proforma Reference	Name of item	Normative reference	Status	Profile
1	A.A.10.1/15	User Information (*AARQ*)		c6, c7	C3, m
2	A.A.10.2/13	User Information (*AARE*)		c10, c6	C4, m
3	A.A.10.3/1	Reason (*RLRQ*)		c12, c4	C1, m
4	A.A.10.3/2	User Information (*RLRQ*)		c12, c4	C5, m
5	A.A.10.4/1	Reason (*RLRE*)		c13, c3	C2, m
6	A.A.10.4/2	User Information (*RLRE*)		c13, c3	C6, m

A.7 Presentation PRL

No additional requirements over and above those stated in Annex B/X.638.

A.8 Session PRL

	PICS Proforma Reference	Name of item	Normative reference	Status	Profile
1	S.A.8.5.2/5	Reason Code (*RF – single items*)		c6, c5	C2, C1
2	S.A.8.6/3	User Data (*FN*)		c87, c12	C1, m
3	S.A.8.7/2	User Data (*DN*)		c8, c11	C2, m

A.9 List of conditional statements

The conditional statements in this Annex are based on the tables in Annex A.

C1: if A.4/1 then m else i

C2: if A.4/2 then m else i

C3: if A.4/1 and A.5/1 then m else i

C4: if A.4/2 and (A.5/2 or A.5/3) then m else i

C5: if A.4/1 and A.5/4 then m else i

C6: if A.4/2 and (A.5/5 or A.5/6) then m else i

Annex B

Profile ICS Proforma for ROSE implementations

B.1 General

This Annex provides an Implementation Conformance Statement Proforma to describe the support of ROSE mechanisms by a ROSE implementation.

B.2 Classification of requirements

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

B.2.1 Status column

The status column reflects the classification to be found in the ROSE base standard.

o : optional

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

B.2.2 Support column

The support column reflects the support of a specific implementation.

y : supported

n : not supported

B.3 Supported roles

Index	Supported role	Status	Support
1	invoker of a ROSE BIND/UNBIND operation	o.1	
2	performer of a ROSE BIND/UNBIND operation	o.1	

B.4 Support of BIND/UNBIND parameters

Index	Supported Parameters	Status	Support
1	BIND Argument	o	
2	BIND Result	o	
3	BIND Error	o	
4	UNBIND Argument	o	
5	UNBIND Result	o	
6	UNBIND Error	o	

B.5 Support of Operations

Index	Operation support	Status	Support
1	Operation Class 1	o.1	
2	Operation Class 2	o.1	
3	Operation Class 3	o.1	
4	Operation Class 4	o.1	
5	Operation Class 5	o.1	
6	invoking operations	o.2	
7	performing operations	o.2	

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