SLOVENSKI STANDARD
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Integrated Services Digital Network (ISDN); Signalling System No.7; Transaction Capabilities (TC) version 2; Part 1: Protocol specification [ITU-T Recommendations Q.771 to Q.775 (1993), modified]

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33.080	Digitalno omrežje z integriranimi storitvami (ISDN)	Integrated Services Digital Network (ISDN)

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[ITU-T Recommendations Q.771 to Q.775 (1993), modified]

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Foreword

This second edition European Telecommunication Standard (ETS) has been produced by the Signalling Protocols and Switching (SPS) Technical Committee of the European Telecommunications Standards Institute (ETSI).

The second edition of ETS 300 287 covering the Signalling System No.7 Transaction Capabilities (TC) version 2 is structured as a multi-part standard (of which this ETS forms part 1) as described below:

Part 1: **"Protocol specification [ITU-T Recommendations Q.771 to Q.775 (1993), modified]";**

Part 2: "Protocol Implementation Conformance Statement (PICS) proforma specification";

Part 3: "Abstract Test Suite (ATS) and partial Protocol Implementation eXtra Information for Testing (PIXIT) proforma specification".

Transposition dates	
Date of adoption	8 November 1996
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Endorsement notice

The text of ITU-T Recommendations Q.771, Q.772, Q.773, Q.774 and Q.775 (1993) was approved by ETSI as an ETS with agreed modifications as given below.

NOTE: New or modified text is indicated using sidebars. In addition, underlining and/or strike-out are used to highlight detailed modifications where necessary.

Whilst every care has been taken in the preparation and publication of this document, errors in content, typographical or otherwise, may occur. If you have comments concerning its accuracy, please write to "ETSI Editing and Committee Support Dept." at the address shown on the title page.

Global modifications to ITU-T Recommendations Q.771 to Q.775

Insert the following two clauses (scope and normative references):

Scope

This first part of ETS 300 287 defines the Transaction Capabilities[1)] (TC) signalling protocol to be used in and between networks, for non-circuit related services which use Signalling System No.7 for inter-network dialogues. Only those parts of TC which are used by the above services need to be provided.

The support of TC by terminal equipment is outside the scope of this ETS.

This ETS covers only TC for use over a network layer consisting of Signalling System No.7 Message Transfer Part (MTP) plus Signalling Connection Control Part (SCCP).

NOTE: This is valid for both 1988 and 1993 versions.

Normative references

This ETS incorporates by dated and undated reference, provisions from other publications. These normative references are cited at the appropriate places in the text and the publications are listed hereafter. For dated references, subsequent amendments to or revisions of any of these publications apply to this ETS only when incorporated in it by amendment or revision. For undated references the latest edition of the publication referred to applies.

[1]   CCITT Recommendation X.219 (1988): "Information Technology - Open Systems Interconnection - Association Control Service Element (ACSE)".

[2]   ITU-T Recommendation X.680 (1994): "Information Technology - Abstract Syntax Notation One (ASN.1): Specification of Basic Notation".

[3]   ITU-T Recommendation X.880 (1994): "Information Technology - Remote Operations - Concept, Model and Notation".

[4]   ITU-T Recommendation X.881 (1994): "Information Technology - OSI Realisations: Remote Operations Service Element (ROSE) Service Definition".

[1)]   For historical reasons, the terms Transaction Capabilities (TC) and Transaction Capabilities Application Part (TCAP) are used interchangeably.

Modifications to ITU-T Recommendation Q.771

Page 9, subclause 3.1.2.1, first bullet item

Replace the definition of "Abort Reason" with the following:

- **"Abort Reason"** - Indicates whether a dialogue is aborted because the received application context name is not supported and no alternative one can be proposed (abort reason = application context not supported), because the dialogue cannot be established for any other user reason (abort reason = dialogue refused) or because a user abort situation has been encountered (abort reason = user specific).

Modifications to ITU-T Recommendation Q.772

Pages 4 and 5, subclauses 3.7.2.3, 3.7.3.3 and 3.7.4.5 "mistyped parameter"

The definition of "mistyped parameter" provided in subclauses 3.7.2.3, 3.7.3.3 and 3.7.4.5 shall also cover error conditions such as ENUMERATED error, value range error, size constraint error, value constraint error and presence constraint error.

Page 7, subclause 4.2.5 "result source diagnostic"

Modify the first sentence of the last paragraph as follows:

The "dialogue service user" can further qualify the result with a diagnostic with values "null" or "no reason given" (for the case where no diagnostic is offered) or "application-context-name-not-supported" (for the case when the dialogue is refused because the application context is not supported).

Modifications to ITU-T Recommendation Q.773

Page 1, subclause 3.1

> NOTE: This correction does not change the transfer syntax.

Replace the EXPORTS statement by:

```
EXPORTS OPERATION, ERROR, MessageType, Component, InvokeIdType;
```

Pages 2 and 4, subclause 3.1

> NOTE: This correction does not change the transfer syntax.

Add a range constraint of "(0..127)" to all unconstrained INTEGERs, i.e., the following shall be modified:

```
P-AbortCause
GeneralProblem
InvokeProblem
ReturnResultProblem
ReturnErrorProblem
```

When a value, which is not assigned but is within the specified range, is received, this value should be ignored. Values out of range may lead to a syntax error.

Pages 4 and 5, subclause 3.2

> NOTE: This correction does not change the transfer syntax.

Add a size constraint of "(1..10)" to "user-information" when carried within AARQ-apdu, AARE-apdu, RLRQ-apdu, RLRE-apdu and ABRT-apdu:

```
user-information    [30] IMPLICIT SEQUENCE SIZE (1..10) OF EXTERNAL OPTIONAL
```

Page 5, subclause 3.2

> NOTE: This correction does not change the transfer syntax.

Add a range constraint of "(0..127)" to all unconstrained INTEGERs, i.e., the following shall be modified:

```
ABRT-source
Associate-result
dialogue-service-user
dialogue-service-provider
Release-request-reason
Release-response-reason
```

When a value, which is not assigned but is within the specified range, is received, this value should be ignored. Values out of range may lead to a syntax error.

Page 29, subclause 4.2.3.1, table 46/Q.773

The Result Tag shall be coded 1010 0010.

Page 32, subclause 4.2.3.1, tables 55/Q.773 and 56/Q.773

The integer element shall be "mandatory".

Page 32, subclause 4.2.3.1, table 57/Q.773

The Dialogue Service Provider Tag shall be coded 1010 0010.

The Dialogue Service User Tag shall be coded 1010 0001.

Modifications to ITU-T Recommendation Q.774

Page 10, table 3/Q.774, note 3

Insert at the end of note 3:

> or "dialogue-refused".

Page 12, subclause 3.2.1.2, "Dialogue End"

Replace the penultimate paragraph "If the ... described in 3.2.2" by:

When a TC-User has received a TC-BEGIN indication primitive including some user information it finds unacceptable, it may issue a TC-U-ABORT request primitive with the "Abort Reason" parameter set to "dialogue-refused". This causes a Dialogue Response (AARE) APDU to be formatted. The setting of the values for various fields in the AARE APDU are as follows: the "application-context-name" is identical to the received one, the result field is set to "reject-permanent", and the "result-source-diagnostic" is "dialogue-service-user (null)" or "dialogue-service-user (no-reason-given)".

If the "Abort reason" parameter in the TC-U-ABORT request primitive is absent or has a value other than "application-context-name-not-supported" or "dialogue-refused", this describes an abnormal termination of the dialogue and is described in subclause 3.2.2.

Page 41, figure A.5 (sheet 6 of 11)

Insert in the second decision box before the question mark:

> or "dialogue-refused"

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Modifications to ITU-T Recommendation Q.775

No modifications identified.

Annex ZA (informative): Realizing the X.880 generic ROS model using TC

ZA.1 Introduction

ZA.1.1 Overview

ITU-T Recommendation X.880 [3] defines a generic model for interactive communication between objects, where the basic interaction involves the invocation of an operation by one object (the invoker) and its performance by another (the performer). This model comes with a set of ASN.1 information object classes to be used by protocol designers in the specification of ROS-based applications.

ITU-T Recommendation X.880 [3] recognizes that there are multiple possible realizations of this model, as far as communication is concerned. The purpose of this annex is to demonstrate that TC can be considered as one of these realizations, by providing a mapping of the generic concepts onto TC services.

ZA.1.2 Notation and concept for the generic ROS model

ITU-T Recommendation X.880 [3] defines several information object classes that are useful in the specification of ROS-based application protocols. Such classes can be used by designers of TC-User applications, as an alternative to the methodology described in ITU-T Recommendation Q.775. These object classes are defined using the information object specification ASN.1 notation defined in ITU-T Recommendation X.881 [4].

The OPERATION class is used to define an operation. It is equivalent to the OPERATION MACRO defined in CCITT Recommendation X.219 [1] and ITU-T Recommendation Q.773 as modified by this ETS.

The ERROR class is used to define an error. It is equivalent to the ERROR MACRO defined in CCITT Recommendation X.219 [1] and ITU-T Recommendation Q.773 as modified by this ETS.

The OPERATION-PACKAGE class is used to define a set of operations which may only be invoked by a ROS-object assuming the role of "consumer", the operations which may only be invoked by a ROS-object assuming the role of "supplier", and the operations which may be invoked by both ROS-objects. When using the communication services of SS7 or OSI, an operation package is realized as an Application Service Element (ASE).

The CONNECTION-PACKAGE class is used to define the bind and unbind operations used to establish and release an association. When realized using the communication services of SS7, a connection package is realized as the procedures that use the structured dialogue handling services of TC. Application contexts which do not require the explicit invocation of bind and unbind operations can still be considered as including a connection package which uses the emptyBind and emptyUnbind pre-defined operations.

The CONTRACT class is used to define an association contract in terms of a connection package and one or more operation packages. When specifying the contract, those packages in which either only the association initiator assumes the role of consumer, or only the association responder assumes the role of consumer, or either may assume the role of consumer, are identified. When using the communication services of SS7 or OSI, a contract is realized as an application context.

The ROS-OBJECT-CLASS class is used to define a set of common capabilities of a set of ROS-objects in terms of the (association) contracts they support as initiators and/or responders. When realized using TC or OSI, a ROS-object maps to an application process and a contract to an application context.

ZA.1.3   Communication model

The realization of ROS involves the selection of a suitable medium to convey invocations and replies between a pair of ROS-objects.

The possible media can be classified in two broad categories:

a)   those required when the invoker and the performer are to be implemented in a single physical equipment;

b)   those required when the invoker and the performer are to be implemented in separated physical equipment.

Category a) can be further divided into message-passing and procedure-calling facilities.

The medium in category b) depends on the type of network which interconnects the two objects and on some Quality of Service (QoS) criteria.

ITU-T Recommendation X.880 [3] models the medium as being composed of two stub objects (one for the invoker, one for the performer) and one information transfer object (see figure ZA.1). The information transfer object capabilities also includes the association control functionalities which might be required to set up an association between the application entities involved in the communication.
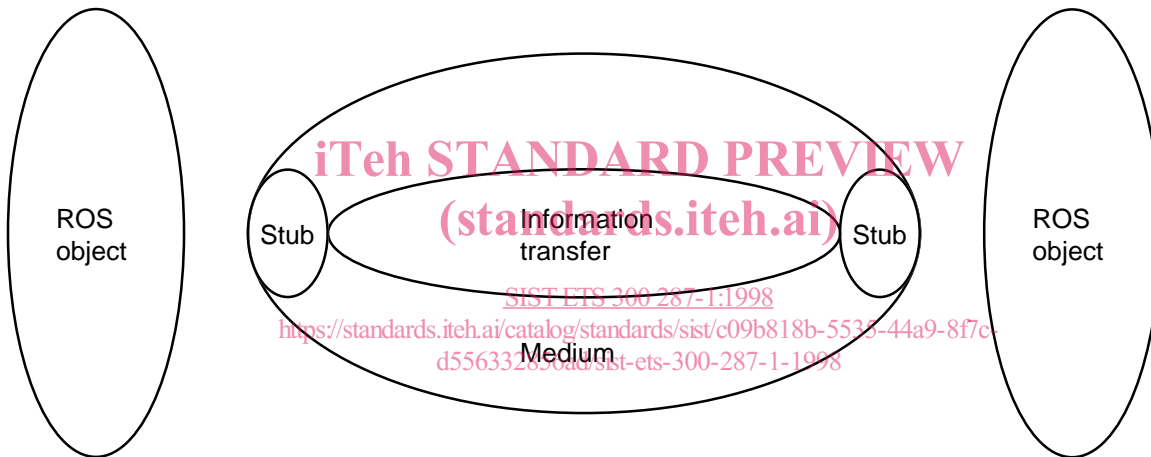

Figure ZA.1: Generic ROS communication model

The role of each stub object is merely to transform invocations and replies into protocol data units (and vice-versa) they exchange using the information transfer object. For a given type of stub objects there are several possible types of information transfer objects.

In the context of OSI, the stub objects are realized by the Remote Operation Service Element (ROSE) while several information transfer realizations are available, using suitable combination of Association Control Service Element (ACSE), Reliable Transfer Service Element (RTSE) and the presentation service.

The stub objects are realized by the Component Handling Block (CHA) of the TC Component Sub-Layer (CSL, see ITU-T Recommendation Q.774 as modified by this ETS) together with a collection of operation-specific ASEs (the TC-User ASEs). The CHA whose services are defined in subclause 3.1.3 of ITU-T Recommendation Q.771 as modified by this ETS drives the generic protocol required to invoke and report returns of arbitrary operations.

Each TC-User ASE embodies knowledge of the definitions of the specific operations involved in some operation package. Collectively, the CSL and the TC-User ASEs have knowledge of all the operations of the association contract.
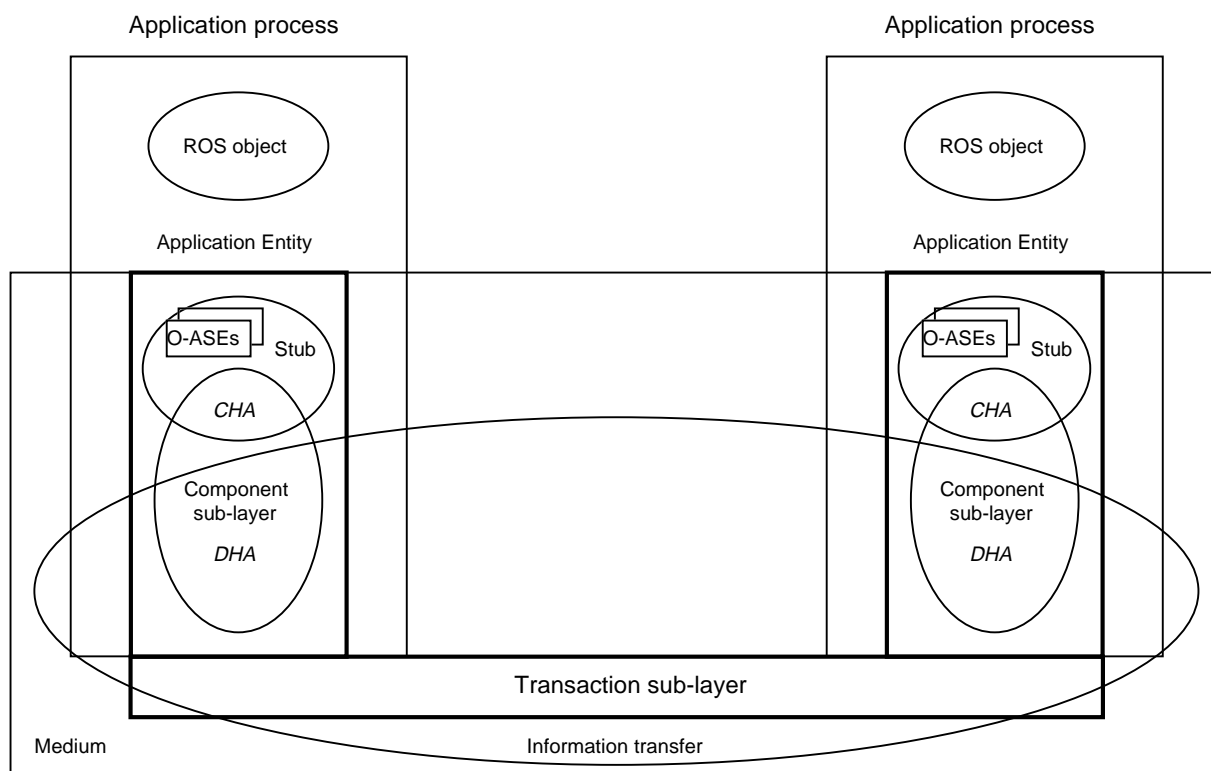
Application process   Application process

Figure ZA.2: TC realization of ROS

ZA.2   Remote operation service realization

ZA.2.1   Basic services (Stub)

The TC CSL provides the necessary services for supporting the invocation of operations and reporting responses. It also provides additional local services for cancelling operation (TC-U-CANCEL request, TC-L-CANCEL indication) or reporting locally detected protocol error (TC-L-REJECT indication).

NOTE: The following restrictions apply:
-            whether an operation is synchronous or not is not taken into account (from a TC point of view operations are always considered as being asynchronous. However, the TC-User might behave in a synchronous manner);
-            the set of allowed InvokeIds is restricted to the integer range (-128 to 127);
-            the priority field is ignored[2].

ZA.2.2   Bind and unbind operations

NOTE: In order to minimize the impact of Bind and Unbind operations on TC specifications, this annex assumes that the TC-User constructs the bind and unbind APDUs and transfers them to TC as if it would be ordinary user information. As a consequence, TC is not aware that these operations are being invoked and cannot check that they are used consistently with respect to the dialogue service and component handling service (e.g. it cannot verify that no operation is requested after an unbind operation has been invoked).

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[2]   This might evolve as the studies on priority handling in SS7 will progress.