

BS ISO 10161-1:2014



BSI Standards Publication

Information and documentation — Open Systems Interconnection — Interlibrary Loan Application Protocol Specification

Part 1: Protocol specification

bsi.

...making excellence a habit.
AVA Documents™
Document Sharing Hub

National foreword

This British Standard is the UK implementation of ISO 10161-1:2014. It supersedes BS ISO 10161-1:1997 which is withdrawn.

The UK participation in its preparation was entrusted to Technical Committee IDT/2/7, Computer applications in Information and Documentation.

A list of organizations represented on this committee can be obtained on request to its secretary.

This publication does not purport to include all the necessary provisions of a contract. Users are responsible for its correct application.

© The British Standards Institution 2014. Published by BSI Standards Limited 2014

ISBN 978 0 580 86136 9

ICS 35.240.30

Compliance with a British Standard cannot confer immunity from legal obligations.

This British Standard was published under the authority of the Standards Policy and Strategy Committee on 30 November 2014.

Amendments issued since publication

Date	Text affected
------	---------------

INTERNATIONAL STANDARD

ISO
10161-1

Third edition
2014-11-01

Information and documentation — Open Systems Interconnection — Interlibrary Loan Application Protocol Specification —

Part 1: Protocol specification

*Information et documentation — Interconnexion de systèmes ouverts
(OSI) — Spécification du protocole d'application pour les prêts entre
bibliothèques —*

Partie 1: Spécification du protocole



Reference number
ISO 10161-1:2014(E)

AVA Documents
Document Sharing Hub
© ISO 2014



COPYRIGHT PROTECTED DOCUMENT

© ISO 2014

All rights reserved. Unless otherwise specified, no part of this publication may be reproduced or utilized otherwise in any form or by any means, electronic or mechanical, including photocopying, or posting on the internet or an intranet, without prior written permission. Permission can be requested from either ISO at the address below or ISO's member body in the country of the requester.

ISO copyright office
Case postale 56 • CH-1211 Geneva 20
Tel. + 41 22 749 01 11
Fax + 41 22 749 09 47
E-mail copyright@iso.org
Web www.iso.org

Published in Switzerland

Contents

Page

Foreword	iv
Introduction	v
1 Scope	1
2 Normative references	1
3 Terms and definitions	2
3.1 Reference Model definitions	2
3.2 Abstract Syntax Notation One definitions	3
3.3 Presentation Service definitions	3
3.4 Application Layer Structure Definitions	3
3.5 Service convention definitions	4
3.6 ILL definitions	5
4 Abbreviations	19
5 Overview of the Protocol	19
5.1 Service provision	19
5.2 Supporting services assumed	20
5.3 Model	20
6 ILL APDUs	20
7 Transaction information	21
7.1 Transaction identification	22
7.2 Protocol states	23
7.3 Protocol variables	26
7.4 Expiry timer	26
7.5 Request information	26
7.6 History information	27
8 Elements of procedure	28
8.1 Events and actions	28
8.2 Procedural rules for all parties	33
8.3 Procedural rules for intermediaries	40
9 Abstract syntax	44
9.1 ASN.1 Specification of ILL APDUs	44
10 Conformance	60
10.1 Static conformance	60
10.2 Dynamic conformance	61
10.3 Protocol Implementation Conformance Statement Requirements	61
Annex A (normative) ILL state tables	62
Annex B (normative) Transfer syntax	90
Annex C (normative) Object Identifiers assigned in this part of ISO 10161 and registration requirements	118
Annex D (normative) Registration procedures for ILL EXTERNAL data type definitions	119
Annex E (informative) Example of ILL external data type definition register entry	121
Annex F (informative) Use of supporting services	122
Annex G (informative) Invocation of external document delivery services	124
Bibliography	125

Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

The procedures used to develop this document and those intended for its further maintenance are described in the ISO/IEC Directives, Part 1. In particular the different approval criteria needed for the different types of ISO documents should be noted. This document was drafted in accordance with the editorial rules of the ISO/IEC Directives, Part 2 (see www.iso.org/directives).

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. ISO shall not be held responsible for identifying any or all such patent rights. Details of any patent rights identified during the development of the document will be in the Introduction and/or on the ISO list of patent declarations received (see www.iso.org/patents).

Any trade name used in this document is information given for the convenience of users and does not constitute an endorsement.

For an explanation on the meaning of ISO specific terms and expressions related to conformity assessment, as well as information about ISO's adherence to the WTO principles in the Technical Barriers to Trade (TBT) see the following URL: Foreword - Supplementary information

The committee responsible for this document is ISO/TC 46, *Information and documentation*, Subcommittee SC 4, *Technical Interoperability*.

This third edition cancels and replaces the second edition (ISO 10161-1:1997) of which it constitutes a minor revision.

It also incorporates the Amendments ISO 10161-1:1997/Amd 1:2002 and ISO 10161-1:1997/Amd 2:2002.

ISO 10161 consists of the following parts, under the general title *Information and documentation — Open Systems Interconnection — Interlibrary Loan Application Protocol Specification*:

- *Part 1: Protocol specification*
- *Part 2: Protocol implementation conformance statement (PICS) proforma*

Introduction

This part of ISO 10161 is one of a set of International Standards produced to facilitate the interconnection of computer systems. It is related to other international standards in the set as defined by the Reference Model for Open Systems Interconnection (ISO/IEC 7498). The Reference Model subdivides the area of standardization for interconnection into a series of layers of specification, each of manageable size.

The aim of Open Systems Interconnection is to allow, with a minimum of technical agreement outside the interconnection standards, the interconnection of computer systems

- a) from different manufacturers,
- b) under different managements,
- c) of different levels of complexity, and
- d) of different ages.

This part of ISO 10161 provides a protocol specification for Interlibrary Loan (ILL) communication. The ILL Protocol operates in the Application Layer and allows the parties involved in an ILL-transaction to progress through the ILL-transaction in an orderly and defined way.

The ILL Protocol has been designed to support the ILL services defined in ISO 10160, the ILL Application Service Definition, which generally requires invocation of external delivery services to fulfill an ILL request. The ILL Protocol carries information that permits both automatic and operator-mediated invocation of external delivery services.

This part of ISO 10161 is one of a number of related standards supporting the interconnection of library systems. These standards can be used by themselves or in a cooperative manner to support library applications requiring a mixture of communications services. For example, ISO 23950, which supports remote access to bibliographic databases, could be used in conjunction with the ILL Protocol to obtain item identification information. The control and management of interactions among such bibliographic applications are local matters that are outside the scope of this International Standard.

Security and accounting issues as they relate to ILL operations are for further study.

The specification technique used in this part of ISO 10161 is consistent with techniques used in defining other OSI Protocols. Within most of this document, the technique is self-explanatory. The Abstract Syntax of the ILL Application Protocol Data Units (APDUs) is defined by means of the ASN.1 specification technique specified in ISO 8824.

This part of ISO 10161 contains seven annexes. [Annexes A to D](#) are normative. [Annex A](#) specifies the state tables for the ILL Protocol. [Annex B](#) specifies the encoding rules for generating a transfer syntax compatible with EDIFACT as defined in ISO 9735. [Annex C](#) specifies the object identifiers assigned in this standard and registration requirements. [Annex D](#) defines the registration procedures for ILL EXTERNAL data type definitions. [Annex E](#) is an example of an ILL EXTERNAL data type registry entry. [Annex F](#) describes the possible mappings of this protocol onto supporting services. [Annex G](#) describes possible methods of using a document delivery protocol in conjunction with the ILL Protocol.

Information and documentation — Open Systems Interconnection — Interlibrary Loan Application Protocol Specification —

Part 1: Protocol specification

1 Scope

This part of ISO 10161 defines the protocol for an ILL application-service-element (ASE). It specifies the behaviour which must be exhibited by a system in order to take part in the provision of the ISO interlibrary loan service.

It provides a formal statement of the rules of behaviour of each of the two or more entities participating in an ILL transaction. It specifies

- a) the actions to be taken on receiving request service primitives issued by an ILL service-user,
- b) the actions to be taken on receiving application-protocol-data-units (APDUs), and
- c) the actions to be taken as a result of events within the local system.

It provides a specification (in [Clause 9](#)) of the abstract syntax required to convey the ILL Protocol APDUs.

It states the conformance requirements to be met by implementors of this protocol (in [Clause 10](#)).

The scope of the ILL Protocol is restricted to the interconnection of systems; it does not specify or restrict the possible implementation of interfaces within a computer system. Computer systems can range from stand-alone workstations to mainframes.

This part of ISO 10161 is intended for use by libraries, information utilities such as union catalogue centres, and any other system which processes bibliographic information. These systems can participate in an interlibrary loan transaction in the role of requester (i.e. an initiator of ILL requests), responder (i.e. a provider of bibliographic material or information) and/or intermediary (i.e. an agent that acts on behalf of a requester to find suitable responders).

Various interworking topologies are supported, ranging from simple two-party interactions, to multi-party interactions.

2 Normative references

The following documents, in whole or in part, are normatively referenced in this document and are indispensable for its application. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

ISO 646¹⁾, *Information processing — ISO 7-bit coded character set for information interchange*

ISO 2108:2005, *Information and documentation — International standard book number (ISBN)*

ISO 3297:2007, *Information and documentation — International standard serial number (ISSN)*

1) ISO/IEC 646:1991 supersedes ISO 646:1983. However, when this part of ISO 10161 was under development, the previous edition was valid and this part of ISO 10161 is therefore based on that edition.

ISO 4217:2008, *Codes for the representation of currencies and funds*

ISO 8601, *Data elements and interchange formats — Information interchange — Representation of dates and times*

ISO/IEC 8824-1:2008, *Information technology — Open Systems Interconnection — Specification of Abstract Syntax Notation One (ASN.1)*

ISO/IEC 8825, *Information technology — Open Systems Interconnection — Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)*

ISO 9735, *Electronic data interchange for administration, commerce and transport (EDIFACT) — Application level syntax rules*

ISO/IEC 9834-1:2012, *Information technology — Procedures for the operation of object identifier registration authorities: General procedures and top arcs of the international object identifier tree — Part 1*

ISO/IEC 9834-2, *Information technology — Open Systems Interconnection — Procedures for the operation of OSI Registration Authorities — Part 2: Registration procedures for OSI document types*

ISO 10160, *Information and documentation — Open Systems Interconnection — Interlibrary Loan Application Service Definition*

3 Terms and definitions

For the purposes of this document, the following terms and definitions apply.

3.1 Reference Model definitions

NOTE This part of ISO 10161 is based on the concepts developed in ISO 7498 and makes use of the following terms found in it. These terms are replicated here as a convenience to the reader.

3.1.1

application layer

seventh and highest layer in the Reference Model for Open Systems Interconnection (OSI), which serves as the window between correspondent application-processes which are using the OSI to exchange meaningful information

3.1.2

application-entity

aspects of an application-process pertinent to OSI

3.1.3

application-process

element within a real open system which performs the information processing for a particular application

3.1.4

application-protocol-data-unit

unit of data specified in an application-protocol and consisting of application-protocol-information and possibly application-user-data

3.1.5

application-service-element

that part of an application-entity which provides an OSI environment capability, using underlying services when appropriate

3.1.6

(N)-service

capability of the (N)-layer and the layers beneath it, which is provided to (N+1)-entities at the boundary between the (N)-layer and the (N+1)-layer

Note 1 to entry: An application-service does not provide a capability to higher layer entities, but rather to application-processes.

3.1.7

presentation-service

capability of the Presentation Layer and the layers beneath it, which is provided to application-entities at the boundary between the Presentation and the Application Layer

3.1.8

transfer syntax

concrete syntax used in the transfer of data between open systems

3.2 Abstract Syntax Notation One definitions

NOTE This part of ISO 10161 makes use of the following terms defined in ISO/IEC 8824.

3.2.1

data type

type

named set of values

3.2.2

simple type

type defined by directly specifying the set of its values

3.2.3

structured type

type defined by reference to one or more other types

3.2.4

component type

one of the types referenced when defining a structured type

3.2.5

value

distinguished member of a set of values

3.3 Presentation Service definitions

NOTE This part of ISO 10161 makes use of the following term defined in ISO 8822.

3.3.1

abstract syntax

those aspects of the rules used in the formal specification of data which are independent of the encoding technique to represent the data

3.4 Application Layer Structure Definitions

NOTE This part of ISO 10161 makes use of the following terms defined in ISO/IEC 9545.

3.4.1

application-association

cooperative relationship between two application-entity-invocations for the purpose of communication of information and coordination of their joint operation

Note 1 to entry: This relationship is formed by the exchange of application-protocol-control-information using the Presentation Service.

3.4.2

application-context

set of rules shared in common by two application-entity-invocations governing their behaviour in order to enable their cooperative operation

Note 1 to entry: An application-context is a shared conceptual schema for the universe of discourse for communication.

3.4.3

application-context-definition

description of an application-context

3.4.4

application-entity-invocation

specific utilization of part or all of the capabilities of a given application-entity in support of the communications requirements of an application-process-invocation

3.4.5

application-process-invocation

specific utilization of part or all of the capabilities of a given application-process in support of a specific occasion of information processing

3.5 Service convention definitions

3.5.1

indication primitive

representation of an interaction in which a service-provider either:

- a) indicates that it has, on its own initiative, invoked some procedure; or
- b) indicates that a procedure has been invoked by the service-user at the peer service-access-point.

3.5.2

non-confirmed service

distinct part of the total (N)-service which does not result in an explicit confirmation from the service-provider to the initiating service-user

3.5.3

provider-initiated service

distinct part of the total (N)-service which is initiated by the service-provider rather than the service-user

3.5.4

request primitive

representation of an interaction in which a service-user invokes some procedure

3.5.5

service primitive

abstract, implementation-independent representation of an interaction between service-user and the service-provider

3.5.6

service-provider

abstract of the totality of those entities which provide a service to peer service-users

3.5.7

service-user

entity in a single open system that makes use of a service

3.6 ILL definitions

NOTE For the purpose of this part of ISO 10161, the following definitions apply to the ASN.1 value reference names and values which are associated with simple data types, as specified in [Clause 9](#).

3.6.1

account-number

number of an account to which a credit or debit is made

Note 1 to entry: A requester typically has been assigned a separate account for each responder.

3.6.2

additional-no-letters

additional-numbers-letters

number or code identifying an item

3.6.3

already-forwarded

responder indication that an ILL request has already been forwarded

3.6.4

already-tried-list

list of institutions which have been approached but were unable to supply requested item

3.6.5

answer

code representing a yes or no response

3.6.6

at bindery

title is owned but the requested item is at the bindery

3.6.7

author

name of the person or corporate body responsible for the intellectual or artistic content of an item, including composers, creators or originators of an item

3.6.8

author-of-article

author of an item which is a component part of another item

3.6.9

badly-structured-APDU

structure of a received APDU that does not conform to the standard notation and encoding defined in ISO 8824 and ISO 8825, or to the EDIFACT encoding defined in ISO 9735 and [Annex B](#) of this part of ISO 10161

EXAMPLE A received APDU does not match its stated length.

3.6.10

being-processed-for-supply

item is being retrieved, copied, and/or packaged for delivery

3.6.11

call-number

notation assigned to an item indicating its physical location in the owner institution

3.6.12

can-send-CHECKED-IN

indication by the responder that it is capable of supplying the CHECKED-IN APDU

3.6.13

can-send-RECEIVED

indication by the requester that it is capable of supplying the RECEIVED APDU

3.6.14

can-send-RETURNED

indication by the requester that it is capable of supplying the RETURNED APDU

3.6.15

can-send-SHIPPED

indication by the responder that it is capable of supplying the SHIPPED APDU

3.6.16

cannot-send-onward

indication that intermediary is unable to send on a request due to communication problems

3.6.17

chargeable-units

number of units supplied for which there is a charge

3.6.18

charges

responder's charges for the provision of the requested service

3.6.19

city

phrase used to identify a city, town, or village

3.6.20

client-identifier

number or code used to identify the client uniquely

3.6.21

client-name

name of the person or institution for which the item has been requested

3.6.22

client-signature-required

responder's stipulation that the client must sign the signature sheet enclosed with the item

3.6.23

client-status

professional level or position of the client

3.6.24

conditions

code used to indicate the conditions under which an item may be borrowed

3.6.25

copyright-compliance

requester notation indicating the applicable copyright regulations or laws to which the requester is adhering

3.6.26

correlation-information

information that is used to correlate an error report with the service request to which the report relates

3.6.27

cost

amount asked, taken or billed by the responder for the service supplied

3.6.28

cost-estimate

estimate of the cost to provide the service requested

3.6.29

cost-exceeds-limit

responder indication that the minimum cost to supply the request is greater than the amount authorized

3.6.30

country

phrase used to identify a country

3.6.31

currency-code

code identifying the currency of an amount, according to ISO 4217

3.6.32

current-state

code identifying the state of the ILL-transaction

3.6.33

date-checked-in

date on which a loaned item is received back by the responder

3.6.34

date-due

date by which the loaned item should be returned to the responder

Note 1 to entry: This reflects the latest date-due.

3.6.35

date-for-reply

date by which a reply should be returned to the responder

3.6.36

date-of-last-transition

date on which the last state transition occurred

3.6.37

date-of-most-recent-service

date when the most recent service event occurred at the system providing the status report

Note 1 to entry: This is either a service invoked by the system providing the status report or a service reflected in a received APDU.

3.6.38

date-of-service

date on which a service concerning an ILL-transaction is invoked

3.6.39

date-received

date when the item is received by the requester

3.6.40

date-requested

date the ILL request was initiated by the requester

3.6.41

date-returned

date when the item was returned to the responder

3.6.42

date-shipped

date when the item was shipped to the requester

3.6.43

delivery-service

delivery service or method used in transporting a requested item

Note 1 to entry: Either physical or electronic delivery can be used.

3.6.44

desired-due-date

proposed due date for the renewed loan

3.6.45

duplicate-transaction-id

transaction-id value of an ILL-REQUEST APDU that is an illegal duplicate, i.e. the value is identical to one for an existing ILL-REQUEST received from the same requester

3.6.46

edition

all the copies of an item produced from one master copy or substantially the same type image, having the same contents, and, in the case of non-book materials, issued by a particular publishing agency or group of such agencies

3.6.47

electronic delivery

delivery of an electronic representation of a document via a telecommunications-based data transfer mechanism

Note 1 to entry: Delivery via transfer of a tangible magnetic or optical medium is excluded.

3.6.48

estimated-date-available

date when an item placed on hold is expected to become available

3.6.49

expiry date

date on which an ILL-transaction expires automatically

3.6.50

expiry flag

indication of whether an expiry date has been set for an ILL-transaction, and if so, whether that date is the "need-before-date", or some other date

3.6.51

extended-postal-delivery-address:

additional information in the postal address necessary to identify the exact point of delivery, e.g. room and floor number in a large building

3.6.52

final-responder

institution which supplies a requested item

Note 1 to entry: This term is used when it is necessary to distinguish between the responder of an ILL-transaction and the responder of an ILL-sub-transaction.

3.6.53

forward flag

indication whether a received ILL-REQUEST has been forwarded from an intermediary

3.6.54

forward note

note added to the ILL-REQUEST by the responder when it is forwarded to a new responder

3.6.55

general-problem

code indicating a general problem with a received APDU detected by the ILL service-provider that is not related to either the transaction-id or permissible state transitions

3.6.56

ILL-APDU-type

code identifying the type of APDU received

3.6.57

ILL-service-type

code for the type of ILL service requested

Note 1 to entry: These can be listed in a preferred order.

3.6.58

ILL-transaction

single complete instance of the whole ILL cycle, including all of the actions, service primitives and messages involved from the initial ILL-Request until the cycle is concluded, as with the return of the requested material

3.6.59

in-process

item has been received but is not yet ready for use

3.6.60

in-use/on-loan

item is owned but is currently being used by a client or is on loan to another institution

3.6.61

initial-requester

person or institution which initiates an ILL-transaction

Note 1 to entry: This term is used when it is necessary to distinguish between the requester of an ILL-transaction and the requester of an ILL sub-transaction.

3.6.62

initial-requester-address

information identifying the telecommunications service and address by which the initial-requester can be reached

3.6.63

initiator-of-most-recent service

identification information of the requester or responder who initiated the most recent service

3.6.64

instruction-symbol

number(s), letter(s) or a code serving to identify unambiguously and in an abbreviated format a library, institution or corporation that is participating in an ILL-transaction, e.g. institution's national union catalogue symbol

3.6.65

insured-for

notation of the amount of insurance purchased against loss or damage of items

3.6.66

intermediary-id

identification information of an ILL-transaction intermediary

3.6.67

intermediary-problem

code indicating that the intermediary has a problem in processing the request

3.6.68

invalid-transaction-id

transaction-id value of an ILL-REQUEST that is invalid, e.g. the value violates the assignment rules of this part of ISO 10161, or an unknown person-or-institution symbol or person-or-institution-name is encountered

3.6.69

ISBN

International Standard Book Number assigned to a monograph as prescribed by ISO 3297

3.6.70

ISSN

International Standard Serial Number assigned to a serial title as prescribed by ISO 2108:1978

3.6.71

item-type

code identifying the bibliographic form in which the item has been produced

3.6.72

lacking

the title is owned but not the component part or pages requested

3.6.73

lacks-copyright-compliance

compliance with applicable copyright regulations or laws must be indicated before copying can be done

3.6.74

level-of-service

code that indicates the level of search detail required or the duration of time within which a response is required

Note 1 to entry: Note that this code reflects regional or national conventions.

3.6.75

library-use-only

responder indication that the item may not be removed from the requesting institution

3.6.76

location-address

information identifying the telecommunication service and address or the postal address by which the institution that owns the item can be reached

3.6.77

location-id

symbol or name of the institution that owns the requested item

3.6.78

location-note

additional information that supplements or corrects the bibliographic data provided in the ILL-REQUEST or that clarifies the location provided

3.6.79

locations-not-found

no potential responder has been identified

3.6.80

lost

item declared missing and/or withdrawn from the collection

3.6.81

mandatory-messaging-not-supported

the responder does not provide the SHIPPED and/or CHECKED-IN message(s)

3.6.82

maximum-cost

maximum amount that will be paid to obtain an ILL service

3.6.83

medium-characteristics

technical specifications of the physical form in which the requested item is to be supplied

3.6.84

medium-type

code identifying the medium in which the item has been produced

3.6.85

mistyped-APDU

the structure of the APDU does not conform to the structure defined in this part of ISO 10161

EXAMPLE It contains a data type not defined for that version of the protocol.

3.6.86

monetary-value

value of an amount

3.6.87

most-recent-service

code identifying the last service event occurring at the system providing the status report

Note 1 to entry: This is either a service invoked by the system providing the status report or a service reflected in a received APDU. A status report sent in response to a status query will not indicate STATUS-QUERY as the most-recent-service because this would not be informative.

3.6.88

most-recent-service-note

the contents of the note parameter from the most recent service primitive

3.6.89

name-of-institution

word, phrase or abbreviation which identifies a library, institution or corporation

3.6.90

name-of-person

a word or combination of words and/or initials by which an individual is regularly known or designated and which identifies the person participating in the ILL-transaction

3.6.91

national-bibliography-no

information identifying the national bibliography and the corresponding record number for the desired item, e.g. Library of Congress Card Number (LCCN)

3.6.92

need-before-date

date by which the item or a reply is needed

3.6.93

no-of-units-per-medium

number of physical pieces shipped per supplied medium

3.6.94

no-reproduction

item may not be photocopied or mechanically reproduced in whole or in part

3.6.95

non-circulating

item is held but is not available for loan

3.6.96

not-available

due to some technical problem the service-user is temporarily unable to process the service request

3.6.97

not-found-as-cited

item identification information is believed by the responder to be either incomplete or incorrect

3.6.98

not-on-shelf

item is owned by the institution but is not charged out and is not on shelf

3.6.99

not-owned

title is not owned by the responder

3.6.100

note

additional information which is not covered by any other data elements

3.6.101

notification note

note added to the FORWARD-NOTIFICATION by the responder

3.6.102

on-hold

item has been requested by another institution or person and will be supplied to that institution or person as soon as it becomes available

3.6.103

on-order

item has been ordered but has not been received by the responder

3.6.104

on-reserve

item is owned but set aside for restricted use

3.6.105

pagination

numbering of the pages of an item or a component part of an item

3.6.106

payment-provided

requester statement that payment of responder charges has been authorized, is being sent, or will be enclosed with the returned material

3.6.107

permission-to-chain

indication granting permission to the responder to initiate a chained sub-transaction with another responder

3.6.108

permission-to-change-send-to-list

indication granting permission to the responder to alter the contents of the send-to-list. The nature of the permitted changes depends on the value of the type "preference"

3.6.109

permission-to-partition

indication granting permission to the responder to initiate a partitioned sub-transaction with another responder

3.6.110

permission-to-forward

indication granting permission to the responder to forward the request to another responder

3.6.111

person-symbol

number(s), letter(s) or code serving to identify unambiguously and in an abbreviated format a person who is participating in an ILL-transaction

3.6.112

physical-medium

code identifying the medium in which the item has been produced

Note 1 to entry: The same as medium-type.

3.6.113

place-of-publication

geographical location of the publisher, or failing this, of the printer, distributor or manufacturer

3.6.114

place-on-hold

request that a hold be placed on the item which is to be supplied as soon as it becomes available

3.6.115

policy-problem

responder indication that there is no policy in place to permit the completion of the request

3.6.116

poor-condition

item is owned but its physical condition prohibits lending or reproduction

3.6.117

post-office-box

box number assigned by the post office

3.6.118

postal-code

code which identifies a given area within a city or other geographical area

3.6.119

preference

indication of whether the institutions listed in the send-to-list are to be approached in the order of the list or in any order

3.6.120

prepayment-required

responder indication that prepayment is required prior to the processing of the ILL-transaction

3.6.121

protocol-version-not-supported

an APDU has been received with a protocol-version-number component identifying an unsupported version of the protocol

3.6.122

protocol-version-num

number identifying the protocol version in use

3.6.123

publication-date

date of issue of a work as designated by the publisher of the work

3.6.124

publication-date-of-components

publication date assigned by the publisher to identify the unique bibliographic components of a work

3.6.125

publisher

person(s) or organization(s) responsible for the publication of an item

3.6.126

reason-locs-provided

code used to indicate the reason why locations are provided in response to an ILL request

3.6.127

reason-no-report

code used to indicate the reason why no report can be provided in response to a STATUS-QUERY

3.6.128

reason-not-available

code used to indicate the reason for item unavailability

3.6.129

reason-unfilled

code used to indicate the reason for not filling an ILL request

3.6.130

reciprocal agreement

requester indication of a prior agreement regarding what may be supplied and under what conditions

3.6.131

region

phrase used to identify a province, state, region or locale

3.6.132

renewable

indication of whether the supplied item is renewable or not

3.6.133

report-source

code indicating whether the initiating source of the error report is the service-user or the service-provider

3.6.134

report-type

indication of whether a report is available and if so, whether it is a status report, error report or both

3.6.135

requested-id

identification information of the ILL-transaction requester

3.6.136

requester-note

note provided by the ILL-transaction requester

3.6.137

requester-optional-messages

indication of whether the requester is capable of supplying the RECEIVED and RETURNED optional messages and whether the SHIPPED and/or CHECKED-IN optional messages are required or desired from the responder

3.6.138

requester-CHECKED-IN

indication by the requester as to whether or not it requires or desires to receive the CHECKED-IN APDU

3.6.139

requester-SHIPPED

indication by the requester as to whether or not it requires or desires the SHIPPED APDU

3.6.140

resource-limitation

the service-user is unable to perform the requested service due to resource limitations

3.6.141

responder-address

information identifying the telecommunications service and address by which the responder can be reached

3.6.142

responder-id

identification information of the ILL-transaction responder

3.6.143

responder-note

note provided by the ILL-transaction responder

3.6.144

responder-optional-messages

indication of whether the responder is capable of sending the SHIPPED and/or CHECKED optional messages (for diagnostic purposes) and whether the RECEIVED and/or RETURNED messages are required or desired from the requester

3.6.145

responder-RECEIVED

indication by the responder as to whether or not it requires or desires to receive the RECEIVED APDU

3.6.146

responder-RETURNED

indication by the responder as to whether or not it requires or desires to receive the RETURNED APDU

3.6.147

responder-specific-result

reason provided in response to an ILL request which is specific to the responder, i.e. not specified in this standard

3.6.148

responder-specific-service

service provided by a responder which is specific to the responder, i.e. not specified in this standard

3.6.149

retry-date

date after which a request may be retried

3.6.150

retry-flag

requester indication that the ILL-transaction is or is not a retry of a previous one

3.6.151

return-insurance-required

amount of insurance against loss or damage required by the responder for the return of a loaned item

3.6.152

returned-via

requester's method of shipment used to return the item

3.6.153

security-problem

indication that the recipient has encountered a security problem that prevents it from processing the service request

Note 1 to entry: The possible reasons are outside the scope of this part of ISO 10161.

3.6.154

series-title-number

name given to a number of separate publications related to one another by the fact that each bears a collective title applying to the group or subgroup as a whole as well as its own title, and its number within that group

3.6.155

send-to-list

list of potential responders for forwarded, chained or partitioned ILL-transactions

3.6.156

shipped-conditions

conditions under which an item may be used

3.6.157

shipped-service-type

code for the type of ILL service provided

3.6.158

shipped-via

lender's method of shipment used to send the item

3.6.159

special-collections-supervision-required

indication by the responder that the item must be used within the special collections department or archives of the requester

3.6.160

sponsoring-body

corporate body or organization that issued the item or that is associated with its authorship

3.6.161

street-and-number

number and/or phrase used to identify the location of a building within a city or a rural area

3.6.162

supplemental-item-description

additional item description information that may be represented in a machine-readable format, e.g. MARC record

3.6.163

supplier-id

identification information of the supplier of the requested item when the supplier is different from the responder

3.6.164

supply-medium-type

code identifying the medium in which the item is required

Note 1 to entry: This can be listed in preferred order.

3.6.165

system-no

number providing system-specific identification of a bibliographic record for a requested item

3.6.166

telecom-service-address

unique number or code assigned to an electronic mailbox or service or to a participant in a communications network

3.6.167

telecom-service-identifier

unique name or code of the telecommunication service used for the ILL-transaction

3.6.168

time-of-service

time at which a service is invoked

3.6.169

title

name of an item consisting of a word or group of words intended to identify it

3.6.170

title-of-article

title of an item which is a component part of another item

3.6.171

transaction-group-qualifier

alphanumeric string uniquely identifying a set of related ILL-transactions, e.g. a series of referrals or an ILL request and its subsequent retry

Note 1 to entry: This qualifier is unique within the scope of the original ILL-transaction requester's system. In combination with the requester's id, this provides a universally unique identifier for the ILL-transaction group.

3.6.172

transaction-id-problem

code indicating a problem with the transaction-id in a received APDU

3.6.173

transaction-qualifier

alphanumeric string identifying all services and messages associated with a single ILL-transaction

Note 1 to entry: This is a unique string assigned by the initial requester of the ILL-transaction and applied by the ILL partners to all subsequent services and messages associated with the ILL-transaction. In combination with the requester's id and the transaction-group-qualifier this provides a universally unique identification for the ILL-transaction.

3.6.174

transaction-type

code that identifies the type of ILL-transaction

3.6.175

transportation-mode

physical or non-electronic means of transporting the requested item when represented or stored on a tangible medium

3.6.176

unable-to-perform

code indicating the reason why the service-user is unable to perform the requested service

3.6.177

unknown-transaction-id

there is no ILL-transaction corresponding to the transaction-id value of a received APDU

3.6.178

unrecognized-APDU

type of the received APDU is not one of the APDUs defined in this part of ISO 10161

3.6.179

verification-reference-source

authoritative source of bibliographic information used to identify or locate an item or any source used to identify or locate an item

3.6.180

volume-issue

identifier of a physical unit of a serial or multi-volume monograph, or a number, letter or word identifying a unit of an item which is, or the volumes of which are, published in parts

3.6.181

volume/issue-not-yet-available

title is owned but the requested component part has not yet been received

3.6.182

will-pay-fee

requester notation indicating that the requester agrees to pay the applicable fee

3.6.183

will-supply-results

code for identifying additional information associated with the "will-supply" result in the response to an ILL request

4 Abbreviations

ACSE	association control service element
APDU	application-protocol-data-unit
ASE	application-service-element
ASN.1	abstract syntax notation one
ASO	application service object
EDIFACT	Electronic Data Interchange For Administration, Commerce and Transport
ILL	interlibrary loan
ILLPM	ILL Protocol machine
MHS	Message Handling System
MOTIS	Message Oriented Text Interchange System
MTS	Message Transfer System
OSI	open systems interconnection

5 Overview of the Protocol

5.1 Service provision

The protocol specified in this part of ISO 10161 provides the services defined in ISO 10160. These services are listed in [Table 1](#).

Table 1 — ILL Services

SERVICE	TYPE
ILL-REQUEST	non-confirmed
FORWARD	non-confirmed
FORWARD-NOTIFICATION	provider-initiated
SHIPPED	non-confirmed
ILL-ANSWER	non-confirmed
CONDITIONAL-REPLY	non-confirmed
CANCEL	non-confirmed
CANCEL-REPLY	non-confirmed
RECEIVED	non-confirmed
RECALL	non-confirmed
RETURNED	non-confirmed
CHECKED-IN	non-confirmed
OVERDUE	non-confirmed
RENEW	non-confirmed
RENEW-ANSWER	non-confirmed
LOST	non-confirmed
DAMAGED	non-confirmed

Table 1 (continued)

SERVICE	TYPE
MESSAGE	non-confirmed
STATUS-QUERY	non-confirmed
STATUS-OR-ERROR-REPORT	non-confirmed
EXPIRY	provider-initiated

5.2 Supporting services assumed

The ILL Protocol is specified to potentially operate in both store-and-forward and connection-oriented modes. The specification of mappings to specific supporting services are to be provided in application-context-definitions and functional profiles. [Annex F](#) describes some possible mappings to supporting services.

5.3 Model

In the abstract, the operation of the ILL Protocol is modelled by the interaction of ILL Protocol machines (ILLPM). The ILLPMs communicate by exchanging ILL APDUs through the use of the abstract services “send APDU” and “receive APDU” at their lower boundary. At their upper boundary, the ILLPMs provide the services defined in ISO 10160.

An ILLPM is driven by the receipt of input events from its ILL service-user, supporting service provider or from an internal timer. The input events from the ILL service-user are request primitives and from the ILL supporting service they are received APDUs. The input event from the internal timer is timer expiry.

An ILLPM responds to input events by issuing output events to its supporting service and to its ILL service-user. The output events to the supporting service are the sending of ILL APDUs. The output events to its ILL service-user are ILL indication primitives.

The receipt of an input event, the generation of dependent actions, and the resultant output event are considered to be an indivisible action.

Logically there is a separate invocation of a set of ILLPMs for each ILL-transaction. Those invocations maintain the state information for a given ILL-transaction. The lifetime of an ILLPM invocation is as long as is required to complete the associated ILL transaction. This state information must be preserved across all instances of use of supporting services, for example, it must be maintained separate from any state information associated with underlying application-associations. Many ILL-transactions, and hence many ILLPMs, may be in existence simultaneously.

The ILL Protocol machine expects that its APDUs will be transferred reliably without loss, alteration or addition of any information. It is tolerant to repeated APDUs. The protocol allows for user-initiated repetition of service requests to recover from lost, out-of-sequence or malformed APDUs. The mechanisms whereby such problems are detected and users are notified are outside the scope of this specification.

6 ILL APDUs

An ILL APDU is a unit of information which passes between two peer ILL ASEs involved in an ILL-transaction. This clause lists the APDUs used in the ILL application and describes the use and meaning of these APDUs

ILL-REQUEST	used by the requester to request the loan, the location, or a photocopy of an item or a cost estimate for a service from a library.
FORWARD-NOTIFICATION	used by the service provider to inform the requester that its request has been forwarded, and to whom.

ILL-REQUEST	used by the requester to request the loan, the location, or a photocopy of an item or a cost estimate for a service from a library.
SHIPPED	used by the responder to indicate that an item has been shipped.
ILL-ANSWER	used by the responder to send a response to the requester (possible responses are: CONDITIONAL, RETRY, UNFILLED, LOCATIONS-PROVIDED, WILL-SUPPLY, HOLD PLACED and ESTIMATE).
CONDITIONAL-REPLY	used by the requester to reply to an ILL-ANSWER with a status of CONDITIONAL. Possible answers are YES (we will meet the conditions) and NO (we do not agree to meet the conditions).
CANCEL	used by the requester to initiate cancellation of an ILL-transaction.
CANCEL-REPLY	used by the responder to respond to a CANCEL request.
RECEIVED	used by the requester to indicate that an item has been received.
RECALL	used by the responder to request the immediate return of an item.
RETURNED	used by the requester to indicate that a borrowed item has been returned.
CHECKED-IN	used by the responder to acknowledge the return of a borrowed item.
OVERDUE	used by the responder to notify the requester that an item is overdue.
RENEW	used by the requester to request the renewal of a borrowed item.
RENEW-ANSWER	used by the responder to respond to a RENEW request.
LOST	used by either the requester or the responder to notify the other that an item has been lost.
DAMAGED	used by either the requester or the responder to notify the other that an item has been damaged.
MESSAGE	used by either the requester or the responder to communicate with the other without affecting the state of the ILL-transaction.
STATUS-QUERY	used by either the requester or the responder to request the status of the ILL-transaction at the remote site.
STATUS-OR-ERROR-REPORT	used by either the requester or the responder to report the current state of a ILL-transaction, and any other relevant information available, or to report an error condition.
EXPIRED	used by the responder system to notify the requester of ILL-transaction expiry. The sending of this APDU is initiated by the ILL service-provider and not by the service-user.

7 Transaction information

An ILL system must maintain the following information for each ILL-transaction:

- transaction identification;
- protocol state;
- protocol variables;
- expiry timer;

- request information;
- history information.

7.1 Transaction identification

An ILL APDU or service primitive is associated with an ILL-transaction by means of a transaction-id.

The transaction-id satisfies the following requirements:

- a) uniqueness in the case of chaining and partitioning;
- b) allows sub-transactions to be related to the parent ILL-transaction;
- c) allows multiple ILL-transactions to be related together into a logical grouping, e.g. when a requester refers an ILL request to many responders in turn; or a retry is to be related to the original ILL request.

It consists of the following components:

initial-requester-id (optional)	identifies the ILL-transaction initiator;
transaction-group-qualifier (mandatory)	distinguishes a group of ILL-transactions from all other active ILL-transaction groups associated with the initial-requester;
transaction-qualifier (mandatory)	distinguishes an ILL-transaction from all other ILL-transactions within an ILL-transaction group;
sub-transaction-qualifier (optional)	distinguishes a sub-transaction from all other sub-transactions initiated by the intermediary.

[Table 2](#) summarizes the use of the components of transaction-id for a simple transaction. [Table 3](#) relates to a chained or partitioned transaction.

Table 2 — Components of Transaction-Id

Simple transaction			
Initial-requester-id	Transaction-group qualifier	Transaction qualifier	Sub-transaction qualifier
optional set by requester	mandatory set by requester	mandatory set by requester	not used

Table 3 — Chained or Partitioned Transaction

Chained or partitioned transaction			
Initial-requester-id	Transaction-group qualifier	Transaction qualifier	Sub-transaction qualifier
mandatory set by intermediary	mandatory set by requester	mandatory set by requester	mandatory set by intermediary

The initial-requester-id identifies the initiator of the ILL-transaction. It may take on any of the possible representations identified in [7.5.1](#) for system-id, but if the person-or-institution-symbol representation is used, then the ILL-transaction is constrained to occur only within a domain where that symbol is unambiguous, e.g. within a country. When this component is assigned a value by the intermediary, the value is the same as “requester-id” type in the original ILL-REQUEST.

NOTE The internal components of initial-requester-id may need to be further defined within an application profile definition.

For a simple two-party ILL-transaction, the initial-requester-id component need not be included as part of the transaction-id because this information is available already in the requester-id type of the ILL-REQUEST APDU. However, if the initial-requester-id is present in an ILL-REQUEST APDU, then it must be present with the same value in all other messages associated with that ILL-transaction. Also, the sub-transaction-qualifier is not needed.

The transaction-group-qualifier is a mandatory component of the transaction-id. It is unique within the scope of the initial-requester. The initial-requester is responsible for assigning values to this qualifier to satisfy this rule. A transaction-group-qualifier can be reused only when there are no ILL-transactions active within that group and there is little probability that new related transactions will be initiated. The transaction-group-qualifier can be used to relate multiple ILL-transactions, e.g. in the case of referrals or in the case of retries where it is desired to distinguish the retries from the original ILL-transaction.

The transaction-qualifier uniquely identifies an ILL-transaction within a transaction group. It is a mandatory component of a transaction-id.

For a sub-transaction, all components are needed. The initial-requester-id together with the transaction-group-qualifier and the transaction-qualifier ensure that the ILL-transaction is unique within the domain of uniqueness of the initial-requester-id. The sub-transaction-qualifier together with the requester-id information conveyed in a sub-transaction ILL-REQUEST APDU ensure sub-transaction uniqueness.

In the case of chained ILL-transactions, there may be a sequence of sub-transactions linked in a chain. In such cases, each sub-transaction is considered to be a sub-transaction of the original ILL-transaction, so each intermediary which initiates a new sub-transaction replaces the current sub-transaction-qualifier with a new one which is unique within the scope of the intermediary. All sub-transactions of a particular ILL-transaction can be distinguished on the basis of the combination of the transaction-id and the requester-id.

7.2 Protocol states

The ILL Protocol states are identical to the ILL-transaction states defined in the ILL Service Definition.

7.2.1 Requester states

The requester state is the state of processing of an ILL-transaction at the requester. It may be one of the following:

IDLE	The ILL-transaction has not started.
PENDING	A request has been made and the item is expected from the responder; or a message has been received indicating that the item will be supplied or has been placed on hold; or that the request has been forwarded to another institution.
NOT-SUPPLIED	The ILL-transaction has reached a stage where the request cannot be filled by the responder.
CONDITIONAL	The ILL-transaction has reached a stage where the request can only be filled if the requester agrees to meet specified conditions.
CANCEL-PENDING	The requester has initiated cancellation of the ILL-transaction but no response has been received from the responder.
CANCELLED	The ILL-transaction has been cancelled by the responder.
SHIPPED	The item has been shipped to the requester.
RECEIVED	The item has been received from the responder.

RENEW/ PENDING	A request has been made for the renewal of the item.
RENEW/ OVERDUE	A request has been made for the renewal of an item which is overdue.
OVERDUE	The requester has been notified that the item is overdue.
NOT-RECEIVED/ OVERDUE	The responder has sent an overdue notification for an item that has not yet been received.
RECALL	The item has been recalled by the responder.
RETURNED	The item has been shipped back to the responder.
LOST	The item has been lost.

7.2.2 Responder states

The responder state is the state of processing of an ILL-transaction at the responder. It may be one of the following:

IDLE	The responder has not received a request.
IN-PROCESS	A request has been received and is being processed by the responder; the item has not been shipped.
FORWARD	The request has been forwarded to another institution.
NOT-SUPPLIED	The responder has responded to a request with an ILL-ANSWER of RETRY, UNFILLED, LOCATIONS-PROVIDED or ESTIMATE; or the ILL-transaction has expired.
CONDITIONAL	The request can only be filled if the requester agrees to meet specified conditions.
CANCEL-PENDING	The requester has initiated cancellation of the ILL-transaction but no response has been provided by the responder.
CANCELLED	The ILL-transaction has been cancelled by the responder.
SHIPPED	The item has been shipped to the requester.
RENEW/ PENDING	A request has been made for the renewal of the item.
RENEW/ OVERDUE	A request has been made for the renewal of an item which is overdue.
OVERDUE	The responder has informed the requester that the item is overdue.
RECALL	The item has been recalled by the responder.
CHECKED-IN	The item has been received back from the requester.
LOST	The item has been lost.

7.2.3 Terminal states

For the requester, responder and intermediary, there are certain states, known as terminal states which, when reached, will not result in any further transitions for a given ILL-transaction. The only exception is a transition to another terminal state.

An ILL-transaction would normally be maintained in a terminal state for a certain length of time before the ILL-transaction information is made inaccessible to the peer or is deleted. This length of time is a local management decision, or subject to agreement by implementors. Note, however, that the requirement to respond to a Status-Query request, and the requirement to relay messages suggests that this length of time may have to be sufficient to allow the information to be accessible for the maximum loan period plus renewal periods and delivery time. For non-returnable items, the length of time may have to be sufficient to allow the requester to determine that an expected item will not be received and to invoke the Status-Query or Lost services.

The possible terminal states for the requester are

- NOT-SUPPLIED
- CANCELLED
- RECEIVED (if a non-returnable item is received)
- RETURNED
- LOST

The possible terminal states for the responder are

- NOT-SUPPLIED
- CANCELLED
- FORWARD
- SHIPPED (if a non-returnable item is shipped)
- CHECKED-IN
- LOST

The terminal state for a particular ILL-transaction will depend on its circumstances. For example, when a photocopy is provided, SHIPPED is the terminal state for the responder, while RECEIVED is the terminal state for the requester.

The possible terminal states for the intermediary are

- NOT SUPPLIED
- FORWARD
- CANCELLED
- SHIPPED

7.2.4 Intermediary states

An intermediary involved in a chained or partitioned ILL-transaction plays both the role of responder (in its interactions with the requester) and requester (in its interactions with the responder). It maintains separate state information for each of these sets of interactions.

For unsuccessful sub-transactions, the terminal states for the intermediary requester are NOT-SUPPLIED and CANCELLED; for the intermediary responder, they are NOT-SUPPLIED, CANCELLED, and FORWARD.

For a successful ILL-transaction, the terminal state for an intermediary in both the roles of requester and responder is the SHIPPED state.

7.3 Protocol variables

The following protocol variables affect ILL Protocol behaviour. These variables are maintained by the ILLPM and are set according to parameters of service primitives or received APDUs. An intermediary maintains the appropriate protocol variables separately for its requester and responder roles.

RETURN	used to indicate whether a shipped item is required to be returned to the responder. It takes on the values TRUE or FALSE.
FWD	used to indicate whether or not a request may be forwarded by the responder. It takes on the values TRUE or FALSE.
PART	used by an intermediary to indicate whether an ILL-transaction can be or has been partitioned. It takes on the values TRUE or FALSE.
CHAIN	used by an intermediary to indicate whether an ILL-transaction can be or has been chained. It takes on the values TRUE or FALSE.
SEQUENCE-TIME-STAMP	used to preserve the time stamp of the last received APDU. This variable is set to the value of the type “date-time-of-this-service” in the received APDU, and serves to detect out-of-sequence APDUs.
REPEAT-TIME-STAMP	used to preserve the time stamp of the last received APDU which caused a state change. This variable is set to the value of the type “date-time-of-this-service”, or if the received APDU is itself a repeated one, then this protocol variable is set to the value of the type “date-time-of-original-service”.
CURRENT-PARTNER-ID	used to preserve the identification of the current partner for the ILL-transaction for the purpose of APDU sequence validation. For the requester, it is set initially to the value of the parameter “responder identification” in an ILL-REQUEST service primitive. Thereafter it is updated to the value of “responder identification” in a received APDU when that value is not equal to the value of CURRENT-PARTNER-ID and is not one of the values of PREVIOUS-PARTNER-IDS. Similarly, for the responder, it is set initially to the value of the field “requester-id” in a received ILL-REQUEST and is updated to the value of the same field in subsequent APDUs.
PREVIOUS-PARTNER-IDS	used to preserve the identification of previous partners for the ILL-transaction. Whenever the value of CURRENT-PARTNER-ID is changed, the previous value is added to this protocol variable. Since the current partner identification may change more than once in the course of an ILL-transaction, e.g. as a result of multiple instances of forwarding, this protocol variable may consist of a sequence of values.

7.4 Expiry timer

The following timer must be maintained by the responder if it supports the EXPIRY service:

EXPIRY	specifies the date of ILL-transaction expiry.
--------	---

This information is provided by the requester in the ILL-REQUEST.

7.5 Request information

The entire contents of the original ILL-REQUEST must be preserved to support ILL-transaction forwarding, partitioning and chaining. An intermediary may however change the contents of an ILL-REQUEST when the request is forwarded or a sub-transaction is initiated. For example, it may correct bibliographic information provided, or it may change the permission-to-chain to FALSE in a sub-transaction when the value in the original ILL-REQUEST was TRUE.

An intermediary should always change the value of requester-id to its own when a sub-transaction is initiated. Note that the identity of the initial requester is preserved in the transaction-id.

7.5.1 System-id

The ILL-REQUEST information includes the identification of the requester and responder, both of which are of type system-id, which consists of one or more of the following components:

person-or-institution-symbol	Number(s), letter(s) or a code serving to identify unambiguously to the responder, in an abbreviated format a person or institution which is participating in an ILL request.
name-of-person-or-institution	a word, phrase or abbreviation which identifies a person, library, institution or corporation.

A person-or-institution-symbol may have internal structure, e.g. to indicate an institution's affiliation with a particular utility, consortium, etc., or to identify individual workstations (i.e. application processes) within an institution. Any such structure is outside the scope of this standard and is the responsibility of the appropriate authorities.

Since the scope of a person-or-institution-symbol is limited, ILL-transactions which use only this information as part of system-id are constrained to operate only within the domain of the symbol. ILL-transactions which involve persons or institutions outside that domain must include "name-of-person-or-institution" as part of the system-id.

The name-of-person-or-institution represents a free-form description of a person or institution title.

The requester and responder shall use a constant value for a system-id throughout an ILL-transaction. Thus, if only a person-or-institution-symbol is assigned initially by the requester, then only a symbol shall be used thereafter and the value of the symbol shall not change. If both a person-and-institution-symbol and a name-of-person-or-institution are assigned initially by the requester, both the symbol and the name shall be used thereafter and the value of the symbol and of the name shall not change.

7.6 History information

The following additional history information is provided as part of a STATUS-OR-ERROR-REPORT for an ongoing ILL-transaction and, therefore, must be maintained throughout the lifetime of an ILL-transaction:

- date-of-last-transition;
- most-recent-service;
- date-of-most-recent-service;
- initiator-of-most-recent-service;
- shipped-service-type;
- transaction-results;
- most-recent-service-note.

The "most-recent-service" indicates which ILL service primitive was last invoked or which APDU (indication) last received by this ILL service-user. Out of sequence service indications are to be considered as valid service indications for the purpose of the "most-recent-service" component of the history report. An exception is when a STATUS-OR-ERROR-REPORT is sent in response to a STATUS-QUERY, in which case the "most-recent-service" is the one prior to the STATUS-QUERY.

The "date-of-most-recent-service" indicates the date of the "most-recent-service".

The “initiator-of-most-recent-service” identifies the requester or responder who initiated the most recent service.

The “shipped-service-type” should reflect the most current information in the “shipped-service-type” parameter from the SHIPPED or RECEIVED service or from the SHIPPED or RECEIVED APDU, e.g. if a requester has received a SHIPPED APDU and then invokes a RECEIVED.request, then the value in the RECEIVED.request is used. This information may not be available for all ILL-transactions.

The “transaction-results” should reflect the value of the “transaction-results” parameter contained in the ILL-ANSWER. This information may not be available for all ILL transactions.

The “most-recent-service-note” provides the contents of the Note parameter from the most recent service primitive.

If status information is requested for a terminated ILL-transaction, no history information may be available.

8 Elements of procedure

8.1 Events and actions

This Clause describes the allowable events and actions for a single ILL-transaction. The requester, responder and intermediary must react to various events by taking specific actions. An event is defined to be the receipt of an APDU from another ILL ASE or the receipt of a service primitive from the local ILL service user. An action can take the form of the issuance of a service primitive to the local ILL service user, or the transmission of one or more APDUs to a remote ILL ASE.

The following subclauses identify which events and actions are allowable for the requester, responder and intermediary and which, by implication, are not.

8.1.1 Requester events

This Clause describes the allowable events for a requester.

The events relating to service primitive requests from the ILL service user are the following:

- ILL-REQUEST.request
- CONDITIONAL-REPLY.request:
 answer = YES
- CONDITIONAL-REPLY.request:
 answer = NO
- CANCEL.request
- RECEIVED.request
- RETURNED.request
- RENEW.request
- LOST.request
- DAMAGED.request
- MESSAGE.request
- STATUS-QUERY.request

— STATUS-OR-ERROR-REPORT.request

The events relating to ILL APDUs received from the remote ILL ASE are the following:

— FORWARD-NOTIFICATION

— SHIPPED

— ILL-ANSWER:

Request-result = CONDITIONAL

— ILL-ANSWER: Request-result = RETRY

— ILL-ANSWER: Request-result = UNFILLED

— ILL-ANSWER:

Request-result = LOCATIONS-PROVIDED

— ILL-ANSWER:

Request-result = WILL-SUPPLY

— ILL-ANSWER:

Request-result = HOLD-PLACED

— ILL-ANSWER:

Request-result = ESTIMATE

— CANCEL-REPLY

— RECALL

— CHECKED-IN

— OVERDUE

— RENEW-ANSWER: answer = YES

— RENEW-ANSWER: answer = NO

— LOST

— DAMAGED

— MESSAGE

— STATUS-QUERY

— STATUS-OR-ERROR-REPORT

— EXPIRED

8.1.2 Requester actions

The following service primitives can be issued to the ILL service user:

— FORWARD-NOTIFICATION.indication

— SHIPPED.indication

- ILL-ANSWER.indication:
Request-result = CONDITIONAL
- ILL-ANSWER.indication: Request-result = RETRY
- ILL-ANSWER.indication: Request-result = UNFILLED
- ILL-ANSWER.indication:
Request-result = LOCATIONS-PROVIDED
- ILL-ANSWER.indication:
Request-result = WILL-SUPPLY
- ILL-ANSWER.indication:
Request-result = HOLD-PLACED
- ILL-ANSWER.indication:
Request-result = ESTIMATE
- CANCEL-REPLY.indication
- RECALL.indication
- CHECKED-IN.indication
- OVERDUE.indication
- RENEW-ANSWER.indication:
answer = YES
- RENEW-ANSWER.indication: answer = NO
- LOST.indication
- DAMAGED.indication
- MESSAGE.indication
- STATUS-QUERY.indication
- STATUS-OR-ERROR-REPORT.indication
- EXPIRED.indication

The following ILL APDUs can be sent to the remote ILL ASE:

- ILL-REQUEST
- CONDITIONAL-REPLY:
answer = YES
- CONDITIONAL-REPLY:
answer = NO
- CANCEL
- RECEIVED - This action is optional

- RETURNED - This action is optional
- RENEW
- LOST
- DAMAGED
- MESSAGE
- STATUS-QUERY
- STATUS-OR-ERROR-REPORT

8.1.3 Responder events

This clause describes the allowable events for a responder.

The events relating to service primitive requests from the ILL service-user are the following:

- FORWARD.request
- SHIPPED.request
- ILL-ANSWER.request: Request-result = CONDITIONAL
- ILL-ANSWER.request: Request-result = RETRY
- ILL-ANSWER.request: Request-result = UNFILLED
- ILL-ANSWER.request: Request-result = LOCATIONS-PROVIDED
- ILL-ANSWER.request: Request-result = WILL-SUPPLY
- ILL-ANSWER.request: Request-result = HOLD-PLACED
- ILL-ANSWER.request: Request-result = ESTIMATE
- CANCEL-REPLY.request
- RECALL.request
- CHECKED-IN.request
- OVERDUE.request
- RENEW-ANSWER.request: answer = YES
- RENEW-ANSWER.request: answer = NO
- LOST.request
- DAMAGED.request
- MESSAGE.request
- STATUS-QUERY.request
- STATUS-OR-ERROR-REPORT.request

The events relating to ILL APDUs received from the remote ILL ASE are the following:

- ILL-REQUEST
- CONDITIONAL-REPLY: answer = YES

- CONDITIONAL-REPLY: answer = NO
- CANCEL
- RECEIVED
- RETURNED
- RENEW
- LOST
- DAMAGED
- MESSAGE
- STATUS-QUERY
- STATUS-OR-ERROR-REPORT

The following local events can occur within the ILL service provider:

- EXPIRY TIMEOUT

8.1.4 Responder actions

The following ILL service primitives can be issued to the ILL service user:

- ILL-REQUEST.indication
- CONDITIONAL-REPLY.indication: answer = YES
- CONDITIONAL-REPLY.indication: answer = NO
- CANCEL.indication
- RECEIVED.indication
- RETURNED.indication
- RENEW.indication
- LOST.indication
- DAMAGED.indication
- MESSAGE.indication
- STATUS-QUERY.indication
- STATUS-OR-ERROR-REPORT.indication
- EXPIRED.indication

The following ILL APDUs can be sent to the remote ILL ASE:

- ILL-REQUEST
- SHIPPED -This action is optional.
- FORWARD-NOTIFICATION
- ILL-ANSWER: Request-result = CONDITIONAL
- ILL-ANSWER: Request-result = RETRY

- ILL-ANSWER: Request-result = UNFILLED
- ILL-ANSWER: Request-result = LOCATIONS-PROVIDED
- ILL-ANSWER: Request-result = WILL-SUPPLY
- ILL-ANSWER: Request-result = HOLD-PLACED
- ILL-ANSWER: Request-result = ESTIMATE
- CANCEL-REPLY
- RECALL
- CHECKED-IN - This action is optional.
- OVERDUE
- RENEW-ANSWER: answer = YES
- RENEW-ANSWER: answer = NO
- LOST
- DAMAGED
- MESSAGE
- STATUS-QUERY
- STATUS-OR-ERROR-REPORT
- EXPIRED

8.1.5 Intermediary events and actions

This Clause describes the allowable events for an intermediary. An intermediary participating in a chained or partitioned ILL-transaction plays both the roles of requester and responder.

In the role of requester, the intermediary events and actions are the same as for a requester, although the states may differ.

In the role of responder, the intermediary events and actions are the same as for a responder, although the states may differ. The one difference is that the SHIPPED APDU is mandatory.

8.2 Procedural rules for all parties

8.2.1 Sending and receiving APDUs

With the exception of the FORWARD service, each request service primitive results in the preparation and transmission of the APDU of the corresponding name.

In the case of the FORWARD.request, two APDUs are prepared: an ILL-REQUEST APDU is sent to the new responder, while a FORWARD-NOTIFICATION APDU is sent to the requester.

The receipt of a valid APDU results in a corresponding indication service primitive.

APDUs are prepared and sent only upon the explicit request of the ILL service user, with the exception of the EXPIRED APDU which is sent by the responder's system in the case of timer expiry.