



INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

Q.860

(06/2000)

SERIES Q: SWITCHING AND SIGNALLING

Digital subscriber Signalling System No. 1 – General

**Integrated services digital network (ISDN)
and broadband integrated services digital
network (B-ISDN) generic addressing and
transport (GAT) protocol**

ITU-T Recommendation Q.860

(Formerly CCITT Recommendation)

AVA Documents
Document Sharing Hub

ITU-T Q-SERIES RECOMMENDATIONS
SWITCHING AND SIGNALLING

SIGNALLING IN THE INTERNATIONAL MANUAL SERVICE	Q.1–Q.3
INTERNATIONAL AUTOMATIC AND SEMI-AUTOMATIC WORKING	Q.4–Q.59
FUNCTIONS AND INFORMATION FLOWS FOR SERVICES IN THE ISDN	Q.60–Q.99
CLAUSES APPLICABLE TO ITU-T STANDARD SYSTEMS	Q.100–Q.119
SPECIFICATIONS OF SIGNALLING SYSTEMS No. 4 AND No. 5	Q.120–Q.249
SPECIFICATIONS OF SIGNALLING SYSTEM No. 6	Q.250–Q.309
SPECIFICATIONS OF SIGNALLING SYSTEM R1	Q.310–Q.399
SPECIFICATIONS OF SIGNALLING SYSTEM R2	Q.400–Q.499
DIGITAL EXCHANGES	Q.500–Q.599
INTERWORKING OF SIGNALLING SYSTEMS	Q.600–Q.699
SPECIFICATIONS OF SIGNALLING SYSTEM No. 7	Q.700–Q.799
Q3 INTERFACE	Q.800–Q.849
DIGITAL SUBSCRIBER SIGNALLING SYSTEM No. 1	Q.850–Q.999
General	Q.850–Q.919
Data link layer	Q.920–Q.929
Network layer	Q.930–Q.939
User-network management	Q.940–Q.949
Stage 3 description for supplementary services using DSS1	Q.950–Q.999
PUBLIC LAND MOBILE NETWORK	Q.1000–Q.1099
INTERWORKING WITH SATELLITE MOBILE SYSTEMS	Q.1100–Q.1199
INTELLIGENT NETWORK	Q.1200–Q.1699
SIGNALLING REQUIREMENTS AND PROTOCOLS FOR IMT-2000	Q.1700–Q.1799
BROADBAND ISDN	Q.2000–Q.2999

For further details, please refer to the list of ITU-T Recommendations.

Integrated services digital network (ISDN) and broadband integrated services digital network (B-ISDN) generic addressing and transport (GAT) protocol

Summary

This Recommendation provides the protocol for Generic Addressing and Transport (GAT). GAT is a protocol for exchanging Application Protocol Data Units (APDUs) between service provision points that may be located within the same network, between networks, or between a terminal and a network.

The protocol is applicable to the signalling network, and may be used in conjunction with the Digital Subscriber Signalling System No. 1 (DSS1) protocol, Digital Subscriber Signalling System No. 2 (DSS2) protocol, Signalling System No. 7 (SS No. 7), and is applicable at interfaces where those protocols are applicable.

Source

ITU-T Recommendation Q.860 was prepared by ITU-T Study Group 11 (1997-2000) and approved under the WTSC Resolution 1 procedure on 15 June 2000.

FOREWORD

The International Telecommunication Union (ITU) is the United Nations specialized agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of ITU. 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 turn, produce Recommendations on these topics.

The approval of ITU-T Recommendations is covered by the procedure laid down in WTSC Resolution 1.

In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

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

INTELLECTUAL PROPERTY RIGHTS

ITU draws attention to the possibility that the practice or implementation of this Recommendation may involve the use of a claimed Intellectual Property Right. ITU takes no position concerning the evidence, validity or applicability of claimed Intellectual Property Rights, whether asserted by ITU members or others outside of the Recommendation development process.

As of the date of approval of this Recommendation, ITU had not received notice of intellectual property, protected by patents, which may be required to implement this Recommendation. However, implementors are cautioned that this may not represent the latest information and are therefore strongly urged to consult the TSB patent database.

© ITU 2001

All rights reserved. No part of this publication may be reproduced or utilized in any form or by any means, electronic or mechanical, including photocopying and microfilm, without permission in writing from ITU.

CONTENTS

	Page
1 Scope	1
2 References	1
3 Definitions	2
4 Abbreviations	4
5 Description	5
5.1 Overview	5
5.1.1 Introduction	5
5.1.2 Provision of addresses	6
5.2 Protocol architecture	9
5.3 Transport mechanisms	9
5.4 Services provided by individual protocol entities	10
5.4.1 Services provided by ROSE	10
5.4.2 Services provided by GAT-control	10
5.4.3 Services provided by the transport mechanisms	10
6 Operational requirements	11
6.1 Provision and withdrawal	11
6.2 Requirements on the originating network side	11
6.3 Requirements on the destination network side	11
7 Primitive definitions and state definitions	11
7.1 Primitive definitions	11
7.2 State definitions	11
8 Coding requirements	12
8.1 Message functional definitions and content	12
8.2 General message format and information element coding	12
9 Signalling procedures	14
9.1 Sending GAT-Control	14
9.1.1 Introduction	14
9.1.2 Sending a service user APDU as the initial APDU of a transaction	14
9.1.3 Responding to a service user APDU that has been received	17
9.2 Receiving GAT-Control	17
9.2.1 Introduction	17
9.2.2 Receiving GAT-Control located at a terminal	17
9.2.3 Receiving GAT-Control located at a transit exchange, incoming local exchange, incoming gateway PINX, incoming gateway exchange, outgoing local exchange or outgoing gateway exchange	18

	Page
9.3 Transit GAT-Control	19
9.4 End GAT-Control	19
9.5 Interpretation	19
9.5.1 Inclusion of an InterpretationAPDU parameter at a Source entity	19
9.5.2 Handling of APDUs at a Destination entity	20
10 Interactions with other networks	20
10.1 Interworking with private ISDNs	20
10.2 Interworking with non-ISDNs	20
10.3 Interworking with frame-relay.....	20
10.4 Interworking with PSPDNs	21
10.5 Interworking with H.323 environments	21
11 Parameter values.....	21
Annex A – Redirection function.....	21
Appendix I – Examples of GAT protocol architectures	22
I.1 Introduction	22
I.2 Examples for use in narrow-band ISDN.....	23
I.3 Examples for use in broadband ISDN	24
I.4 Key to figures within this appendix.....	25
I.5 Bibliography for figures within this appendix.....	25
Appendix II – General information for the definition of GAT user applications.....	26
II.1 Introduction	26
II.2 ROSE	26
II.3 Service indicator	26
II.4 Addressing mechanisms	27
II.4.1 Transport mechanism addresses.....	27
II.4.2 GAT addresses	27
II.4.3 Application addresses.....	27
II.5 Other application data issues	27
Appendix III – Assignment of object identifiers	27

Integrated services digital network (ISDN) and broadband integrated services digital network (B-ISDN) generic addressing and transport (GAT) protocol

1 Scope

This Recommendation provides the protocol for Generic Addressing and Transport (GAT). GAT is a protocol for exchanging Application Protocol Data Units (APDUs) between service provision points that may be located within the same network, between networks, or between a terminal and a network. This Recommendation also provides a common framework for the use of ROSE or for the support of other application dependent content (e.g. in the IN environment) and interpretation capabilities in conjunction with the GAT protocol.

The protocol is applicable to the signalling network, and may be used in conjunction with the Digital Subscriber Signalling System No. 1 (DSS1) protocol, Digital Subscriber Signalling System No. 2 (DSS2) protocol, Signalling System No. 7 (SS No. 7), and is applicable at interfaces where those protocols are applicable.

The details of addressing and routing at the level of the transport mechanism are outside the scope of this specification.

2 References

The following ITU-T 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.

- [1] ITU-T I.411 (1993), *ISDN user-network interfaces – Reference configurations*.
- [2] ITU-T Q.932 (1998), *Digital subscriber signalling system No. 1 – Generic procedures for the control of ISDN supplementary services*.
- [3] ITU-T X.219 (1988), *Remote operations: Model, notation and service definition*.
- [4] ITU-T X.880 (1994), *Information technology – Remote Operations: Concepts, model and notation*.
- [5] ITU-T X.229 (1988), *Remote Operations: Protocol specification*.
- [6] ITU-T X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1)*.
- [7] ITU-T X.209 (1988), *Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1)*.
- [8] ITU-T X.680 (1994), *Information technology – Abstract Syntax Notation One (ASN.1): Specification of basic notation*.
- [9] ITU-T X.690 (1994), *Information technology – ASN.1 encoding rules; Specification of Basic Encoding Rules (BER), Canonical Encoding Rules (CER) and Distinguished Encoding Rules (DER)*.
- [10] ITU-T I.413 (1993), *B-ISDN user-network interface*.
- [11] ITU-T I.112 (1993), *Vocabulary of terms for ISDNs*.

3 Definitions

This Recommendation defines the following terms:

3.1 anynode: a value for the sourceEntity and destinationEntity of the GAT network facility extension, such that (two cases exist):

- when specified without an address, the requested service functionality is to be provided at the next service provision point along the path of the transport mechanism that supports the service within the same or any subsequent service provider. For this value, an end node acts to provide end GAT-Control functionality; or
- when specified with an associated address, the requested service functionality is to be provided at the next service provision point along the path of the transport mechanism within the same, or any subsequent, service provider that has the given address. Where the first service provision point that has the given address does not wish to provide the service, it can alter the address to that of another service provision point either within the same service provider or within a different service provider. For this value, an end node that is not addressed discards the information.

3.2 Broadband Integrated Services Digital Network (B-ISDN): an ISDN that supports rates greater than primary rate.

3.3 coincident S and T reference point: see ITU-T I.411 [1]. Unless otherwise stated, this should also be understood to include the coincident S_B and T_B reference point, as defined in ITU-T I.413 [10].

3.4 end GAT-Control: this entity is located at the entity providing the destination service provision point. It provides information to the application concerning the source of the service user APDUs (ApuPortion parameter), taken from the GAT-PDU, and passes the service user APDU to the application.

3.5 end node: the node that is at either the end point of the transport mechanism, or at the local exchange, whichever comes first along the path of the transport mechanism.

3.6 endNode: a value for the sourceEntity and destinationEntity of the GAT network facility extension, such that the requested service functionality is to be provided at the last service provision point along the path of the transport mechanism before a terminal is reached. This may be within the current service provider or in any subsequent service provider. For this value, an end node acts to provide end GAT-Control functionality.

3.7 endTerminal: a value for the sourceEntity and destinationEntity of the GAT network facility extension, such that the requested service functionality is to be provided at the terminal along the path of the transport mechanism. This terminal can be attached to the current service provider or to any subsequent service provider.

3.8 GAT control: the protocol entity supporting the GAT protocol. It provides services to the GAT users, both directly and through ROSE, and uses the services of various underlying protocols (e.g. DSS1, ISUP) in order to provide the transport of those GAT user protocol data units.

3.9 GAT user: a protocol entity that uses the services of the GAT protocol to transfer the GAT user protocol data units between the peer GAT user entities.

3.10 general signalling: a signalling procedure for the exchange of GAT user protocol data units between application entities that need not be adjacent.

3.11 incoming gateway exchange: a public network exchange for which an incoming transport mechanism (bearer-related or bearer-independent) is received from a private network exchange in a private network, or from a public network exchange in another public network.

3.12 incoming gateway PINX: a private network exchange for which an incoming transport mechanism (bearer-related or bearer-independent) is received from a public network exchange in a public network.

3.13 incoming local exchange: a public network exchange for which an incoming transport mechanism (bearer-related or bearer-independent) is received from a terminal.

3.14 Integrated Services Digital Network (ISDN): see ITU-T I.112 [9], definition 308.

3.15 local signalling: a signalling procedure restricted to the exchange of application protocol data units between adjacent application entities.

3.16 no value at all: (i.e. a value for both the sourceEntity and destinationEntity of the GAT network facility extension assumed when the GAT network facility extension is absent) the requested service functionality is to be provided along the path of the transport mechanism at the immediate next entity (terminal or node) that provides GAT at a GAT-Control entity.

3.17 outgoing gateway exchange: a public network exchange for which an outgoing transport mechanism (bearer-related or bearer-independent) is generated to a private network exchange in a private network, or to a public network exchange in another public network.

3.18 outgoing gateway PINX: a private network exchange for which an outgoing transport mechanism (bearer-related or bearer-independent) is generated to a public network exchange in a public network.

3.19 outgoing local exchange: a public network exchange for which an outgoing transport mechanism (bearer-related or bearer-independent) is generated to a terminal.

3.20 owner domain: an owner domain is a domain under the control of a single operator, and can range from a single terminal, to a public network, and to other forms of service provider.

3.21 receiving GAT-Control: an entity that could be a point of service provision, which can be one of end GAT-Control, or transit GAT-Control.

3.22 redirection function: this entity is located at an exchange where the network owner domain providing the destination service provision point has been reached (i.e. an entity identified by the service address contained within the destination entity address). It operates in conjunction with transit GAT-Control. The function of this entity is to identify where in the network the service is to be provided, if it is not to be provided at this particular location. As a result, it modifies the GAT protocol data identifying the destination entity.

3.23 sending GAT-Control: this entity is located at the entity providing the source service provision point. It provides information from the application concerning the destination of the service user APDU, and passes the service user APDU (ApduPortion parameter) to the peer receiving GAT-Control entity.

3.24 service address: an address that identifies the service provision point. This can be any valid address within the available numbering plan and is assigned by the service provider.

NOTE – The following considerations can apply:

- For addressing from outside a service provider, an address that does not represent a geographical location is preferable, so that the service provision point can be changed to a different geographical location without resulting in a need to change the assigned number. This non-geographic address may identify either an individual service within the service provider, the entire service provider, or any appropriate grouping of functionality in between.
- For addressing within the network of a service provider, the same constraints do not apply, and therefore geographic addresses can be used. This is an issue for the service provider as to how routing within the service provider's domain is reconfigured.

3.25 service indicator: the service indicator provides information to identify an ASE.

3.26 service provision point: a node capable of providing service functionality, and where checking should therefore be performed to see if the specific requested service is provided.

3.27 service user APDU: an APDU that is carried on behalf of another application within the generic addressing and transport protocol. It is encoded as an AduPortion parameter within the GAT-PDU.

3.28 terminal address: an address assigned to the terminal by the network to which it is attached.

3.29 terminal: the equipment provided at the user side of the coincident S and T reference point.

3.30 transit exchange: a public network exchange for which an incoming transport mechanism (bearer-related or bearer-independent) is received from a public network exchange in the same public network, and for which an outgoing transport mechanism (bearer-related or bearer-independent) is generated to a public network exchange in the same public network.

3.31 transit GAT-Control: this entity is an exchange located within a network, and its function is to pass on service user APDUs (AduPortion parameter) unchanged.

3.32 transport mechanism: a mechanism, or one of a set of mechanisms, within the underlying protocol, for transporting transport parameters between GAT-Control entities.

3.33 transport parameter: a transport parameter is the element of information transported by the transport mechanism on behalf of the GAT protocol. The transport parameter carries the GAT-PDU and information identifying that the information relates to the GAT protocol, rather than some other application making use of the transport mechanism. Multiple transport parameters can occur within a transport PDU.

NOTE – Where the transport parameter is a Facility information element, the GAT protocol is identified by the protocol profile field. Where the transport parameter is an Application TransPort parameter, the GAT protocol is identified by the Application Context Identifier field.

4 Abbreviations

This Recommendation uses the following abbreviations:

APDU	Application Protocol Data Unit
APM	Application Protocol Mechanism
AS-ASE	Application Service Application Service Element
ASN.1	Abstract Syntax Notation one
B-ISDN	Broadband Integrated Services Digital Network
DSS1	Digital Subscriber Signalling System No. 1
DSS2	Digital Subscriber Signalling System No. 2
GAT	Generic Addressing and Transport
GAT-Control	Generic Addressing and Transport Control
GAT-PDU	Generic Addressing and Transport Protocol Data Unit
IN	Intelligent Network
ISDN	Integrated Services Digital Network
ISUP	ISDN User Part
N-ISDN	Narrow-band Integrated Services Digital Network
PDU	Protocol Data Unit

PINX	Private Integrated Services Network Exchange
PSPDN	Packet Switched Public Data Network
ROSE	Remote Operations Service Element
SCP	Service Control Point
SS No. 7	Signalling System No. 7
SSP	Service Signalling Point
TCAP	Transaction Capabilities Application Part

5 Description

5.1 Overview

5.1.1 Introduction

The Generic Addressing and Transport (GAT) protocol provides general signalling rather than local signalling in any of the underlying protocols.

The Generic Addressing and Transport (GAT) protocol within GAT-Control allows the exchange of information between applications located in terminals and/or networks which are not necessarily in entities adjacent to each other.

NOTE 1 – The GAT protocol allows the AS-ASEs to communicate from more remote locations, e.g. the following:

- from a terminal to an IN SSP within a transit exchange of the local public network;
- from a terminal to an IN SSP within a transit exchange of a non-local public network;
- from a mobile terminal to its visited mobility management centre in support of the mobility management protocols;
- from a mobile terminal to its home service centre in support of the provision of home services to the mobile user.

The GAT protocol operates over a number of different protocols, including DSS1, DSS2 and SS No. 7, where the protocol has been extended to cover the underlying capabilities.

The establishment of the transport mechanism establishes a signalling relation between adjacent GAT entities. Detailed procedures for the establishment of these signalling relations are constrained in the protocol specifications for the transport mechanisms.

The GAT protocol data units are exchanged along the path that is defined by the chain of signalling relations that is created when the transport mechanism is established. Therefore, only GAT entities along this path can be reached by means of the GAT protocol.

If the transport mechanism is released for any reason, APDUs that are in the process of being sent may never reach their destination. In such a case, the APDUs will be discarded.

NOTE 2 – It is the responsibility of the application above GAT-Control to cater for this eventuality.

Copyright International Telecommunication Union/ITU-T Q.860 (06/2000)