

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Telecontrol equipment and systems –
Part 6-503: Telecontrol protocols compatible with ISO standards and ITU-T
recommendations – TASE.2 Services and protocol**

**Matériels et systèmes de téléconduite –
Partie 6-503: Protocoles de téléconduite compatibles avec les normes ISO
et les recommandations de l'UIT-T – Services et protocole TASE.2**



THIS PUBLICATION IS COPYRIGHT PROTECTED

Copyright © 2014 IEC, Geneva, Switzerland

All rights reserved. Unless otherwise specified, 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 either IEC or IEC's member National Committee in the country of the requester. If you have any questions about IEC copyright or have an enquiry about obtaining additional rights to this publication, please contact the address below or your local IEC member National Committee for further information.

Droits de reproduction réservés. Sauf indication contraire, aucune partie de cette publication ne peut être reproduite ni utilisée sous quelque forme que ce soit et par aucun procédé, électronique ou mécanique, y compris la photocopie et les microfilms, sans l'accord écrit de l'IEC ou du Comité national de l'IEC du pays du demandeur. Si vous avez des questions sur le copyright de l'IEC ou si vous désirez obtenir des droits supplémentaires sur cette publication, utilisez les coordonnées ci-après ou contactez le Comité national de l'IEC de votre pays de résidence.

IEC Central Office
3, rue de Varembe
CH-1211 Geneva 20
Switzerland

Tel.: +41 22 919 02 11
Fax: +41 22 919 03 00
info@iec.ch
www.iec.ch

About the IEC

The International Electrotechnical Commission (IEC) is the leading global organization that prepares and publishes International Standards for all electrical, electronic and related technologies.

About IEC publications

The technical content of IEC publications is kept under constant review by the IEC. Please make sure that you have the latest edition, a corrigenda or an amendment might have been published.

IEC Catalogue - webstore.iec.ch/catalogue

The stand-alone application for consulting the entire bibliographical information on IEC International Standards, Technical Specifications, Technical Reports and other documents. Available for PC, Mac OS, Android Tablets and iPad.

IEC publications search - www.iec.ch/searchpub

The advanced search enables to find IEC publications by a variety of criteria (reference number, text, technical committee,...). It also gives information on projects, replaced and withdrawn publications.

IEC Just Published - webstore.iec.ch/justpublished

Stay up to date on all new IEC publications. Just Published details all new publications released. Available online and also once a month by email.

Electropedia - www.electropedia.org

The world's leading online dictionary of electronic and electrical terms containing more than 30 000 terms and definitions in English and French, with equivalent terms in 14 additional languages. Also known as the International Electrotechnical Vocabulary (IEV) online.

IEC Glossary - std.iec.ch/glossary

More than 55 000 electrotechnical terminology entries in English and French extracted from the Terms and Definitions clause of IEC publications issued since 2002. Some entries have been collected from earlier publications of IEC TC 37, 77, 86 and CISPR.

IEC Customer Service Centre - webstore.iec.ch/csc

If you wish to give us your feedback on this publication or need further assistance, please contact the Customer Service Centre: csc@iec.ch.

A propos de l'IEC

La Commission Electrotechnique Internationale (IEC) est la première organisation mondiale qui élabore et publie des Normes internationales pour tout ce qui a trait à l'électricité, à l'électronique et aux technologies apparentées.

A propos des publications IEC

Le contenu technique des publications IEC est constamment revu. Veuillez vous assurer que vous possédez l'édition la plus récente, un corrigendum ou amendement peut avoir été publié.

Catalogue IEC - webstore.iec.ch/catalogue

Application autonome pour consulter tous les renseignements bibliographiques sur les Normes internationales, Spécifications techniques, Rapports techniques et autres documents de l'IEC. Disponible pour PC, Mac OS, tablettes Android et iPad.

Recherche de publications IEC - www.iec.ch/searchpub

La recherche avancée permet de trouver des publications IEC en utilisant différents critères (numéro de référence, texte, comité d'études,...). Elle donne aussi des informations sur les projets et les publications remplacées ou retirées.

IEC Just Published - webstore.iec.ch/justpublished

Restez informé sur les nouvelles publications IEC. Just Published détaille les nouvelles publications parues. Disponible en ligne et aussi une fois par mois par email.

Electropedia - www.electropedia.org

Le premier dictionnaire en ligne de termes électroniques et électriques. Il contient plus de 30 000 termes et définitions en anglais et en français, ainsi que les termes équivalents dans 14 langues additionnelles. Egalement appelé Vocabulaire Electrotechnique International (IEV) en ligne.

Glossaire IEC - std.iec.ch/glossary

Plus de 55 000 entrées terminologiques électrotechniques, en anglais et en français, extraites des articles Termes et Définitions des publications IEC parues depuis 2002. Plus certaines entrées antérieures extraites des publications des CE 37, 77, 86 et CISPR de l'IEC.

Service Clients - webstore.iec.ch/csc

Si vous désirez nous donner des commentaires sur cette publication ou si vous avez des questions contactez-nous: csc@iec.ch.

INTERNATIONAL STANDARD

NORME INTERNATIONALE



**Telecontrol equipment and systems –
Part 6-503: Telecontrol protocols compatible with ISO standards and ITU-T
recommendations – TASE.2 Services and protocol**

**Matériels et systèmes de téléconduite –
Partie 6-503: Protocoles de téléconduite compatibles avec les normes ISO
et les recommandations de l'UIT-T – Services et protocole TASE.2**

INTERNATIONAL
ELECTROTECHNICAL
COMMISSION

COMMISSION
ELECTROTECHNIQUE
INTERNATIONALE

PRICE CODE
CODE PRIX

XG

ICS 33.200

ISBN 978-2-8322-1647-7

**Warning! Make sure that you obtained this publication from an authorized distributor.
Attention! Veuillez vous assurer que vous avez obtenu cette publication via un distributeur agréé.**

CONTENTS

FOREWORD.....	8
INTRODUCTION.....	10
1 Scope.....	11
1.1 General.....	11
1.2 Control centre.....	11
1.3 Architecture.....	11
1.4 Network Model.....	12
1.5 Relation between TASE.2 and MMS.....	13
2 Normative references.....	13
3 Terms and definitions.....	14
4 Abbreviations.....	16
5 TASE.2 Model.....	17
5.1 General.....	17
5.2 Informal TASE.2 Model Description.....	17
5.2.1 General.....	17
5.2.2 Associations.....	18
5.2.3 Bilateral agreements, bilateral tables and access control.....	19
5.2.4 Data Value objects and services.....	20
5.2.5 Data Set objects and services.....	21
5.2.6 Account Objects and Services.....	21
5.2.7 Information Message object and services.....	21
5.2.8 Transfer Set objects and services.....	21
5.2.9 Common Data Transfer mechanisms.....	24
5.2.10 Special Transfer objects and services.....	25
5.2.11 Device objects and services.....	26
5.2.12 Program objects and services.....	27
5.2.13 Event Enrollment objects and services.....	27
5.2.14 Event Condition objects and services.....	27
5.3 Formal TASE.2 model description.....	27
5.3.1 General.....	27
5.3.2 General access control requirements.....	29
5.3.3 Association management.....	30
5.3.4 Bilateral Tables.....	32
5.3.5 List of Access Control Specification.....	33
5.3.6 Data values.....	34
5.3.7 Data Sets.....	35
5.3.8 Accounts.....	37
5.3.9 Information Messages.....	37
5.3.10 Transfer Sets.....	38
5.3.11 Special Transfer objects.....	43
5.3.12 Devices.....	44
5.3.13 Programs.....	46
5.3.14 Event Enrollments.....	46
5.3.15 Event Conditions.....	46
6 Mapping of TASE.2 Object Models onto MMS Object Models.....	46
6.1 General.....	46

6.2	Object modelling notation.....	46
6.3	The virtual control centre (VCC).....	47
6.3.1	General	47
6.3.2	TASE.2 Domain mapping.....	47
6.3.3	TASE.2 Control Centre mapping	48
6.3.4	OSI Application Processes, Application Entities and Addressing.....	48
6.4	Association object model mapping	48
6.5	Bilateral Table object model mapping.....	49
6.6	Data Value object model mapping	50
6.7	Data Set object model mapping	51
6.8	Information Message object model mapping.....	52
6.9	Transfer Set object model mapping.....	53
6.9.1	General	53
6.9.2	Data Set Transfer Set object model mapping	53
6.9.3	Information Message Transfer Set object model mapping	55
6.10	Next Transfer Set object model mapping.....	56
6.11	Transfer Set Name object model mapping.....	56
6.12	Conditions object model mapping.....	56
6.13	Event Code object model mapping	57
6.14	Transfer Set Time Stamp object model mapping	57
6.15	Device object model mapping	57
7	Mapping of TASE.2 operations and actions onto MMS services	58
7.1	General.....	58
7.2	Use of MMS services	59
7.2.1	General	59
7.2.2	Association Management Mapping to MMS.....	59
7.2.3	Data Value operations mapping to MMS	62
7.2.4	Data Set operations mapping to MMS.....	66
7.2.5	Transfer Set operations and actions mapping to MMS	73
7.2.6	Device operations and actions mapping to MMS	81
7.2.7	Summary of TASE.2 operations	86
8	Standardized Application-specific objects	88
8.1	General.....	88
8.2	Named Type objects	88
8.2.1	General	88
8.2.2	Visible-String-32 Type	88
8.2.3	MMS ObjectName.....	88
8.2.4	Time Stamp Types.....	89
8.2.5	TimeStampExtended Type	89
8.2.6	Time Interval Types	90
8.2.7	TransferSet Types	90
8.2.8	Conditions Types.....	92
8.2.9	SupportedFeatures Type	93
8.2.10	TASE.2Version Type	93
8.3	Named Variable Objects	94
8.3.1	General	94
8.3.2	"Supported_Features".....	94
8.3.3	"Bilateral_Table_ID"	94
8.3.4	"TASE.2_Version".....	94

8.3.5	Data Value objects	94
8.3.6	Transfer Set objects	95
8.3.7	"Next_DSTransfer_Set"	95
8.3.8	"Transfer_Set_Name"	95
8.3.9	"IM_Transfer_Set"	95
8.3.10	"DSConditions_Detected"	95
8.3.11	"Transfer_Set_Time_Stamp"	96
8.3.12	"Transfer_Report_ACK"	96
8.3.13	"Transfer_Report_NACK"	96
8.4	Named Variable List objects	96
8.5	Information Message objects	96
9	Use cases for semantic integration with IEC 61970	97
9.1	General	97
9.2	Use Case 1: Determining what Measurement/MeasurementValues are available	97
9.2.1	General	97
9.2.2	Use Case 1a: Determining information associated to equipment	97
9.2.3	Use Case 1b: Determining Measurement information for non-equipment related measurements	98
9.3	Use Case 2: Exchange of Bilateral Table information	98
10	Bilateral Table semantic model	98
10.1	General	98
10.2	IEC 61970-452 Classes	100
10.2.1	Command	100
10.2.2	Control	100
10.2.3	IdentifiedObject	100
10.2.4	DiscreteCommand	101
10.2.5	MeasurementValue	101
10.2.6	Setpoint	101
10.3	ICCP Specific Classes	102
10.3.1	ICCPAccessPoint	102
10.3.2	ICCPCommandPoint	102
10.3.3	ICCPControlPoint	103
10.3.4	ICCP IndicationPoint	103
10.3.5	ICCPInformationMessage	104
10.3.6	ICCPPoint	104
10.3.7	ICCPSetPoint	104
10.3.8	ISOAPAddress	105
10.3.9	ISOUpperLayer	105
10.3.10	TASE2BilateralTable	105
10.3.11	TCP_AccessPoint	106
10.3.12	Enumerations	106
11	Conformance	107
	Annex A (normative) TASE.2 Operations and actions summary	108
	Annex B (informative) Quality of Service (QOS), Routing and Priority	110
B.1	General	110
B.2	Background	110
B.3	TASE.2 Requirements	111
B.3.1	General	111

B.3.2	Transport layer	111
B.4	Network layer.....	112
Annex C (informative)	TASE.2 Operations and actions summary	113
Annex D (informative)	TASE.2 (2002) Additional Model Elements	114
D.1	General.....	114
D.2	Informal TASE.2 Model Description.....	114
D.2.1	General	114
D.2.2	Bilateral Agreements, Bilateral Tables and access control	114
D.2.3	Account objects and services.....	114
D.2.4	Program objects and services	115
D.2.5	Event Enrollment objects and services.....	115
D.2.6	Event Condition objects and services	115
D.3	Formal TASE.2 Model description	116
D.3.1	General	116
D.3.2	Accounts	116
D.3.3	Accounts models	116
D.3.4	Transfer Sets.....	116
D.3.5	Transfer Account Transfer Set object model	119
D.3.6	Information Message Transfer Set object model	121
D.3.7	Special Transfer Sets	121
D.3.8	Programs.....	122
D.3.9	Event Enrollments	123
D.3.10	Event Conditions	124
Annex E (informative)	Mapping of TASE.2 (2002) object models onto MMS object models.....	125
E.1	General.....	125
E.2	Bilateral Table object model mapping.....	125
E.3	Time Series Transfer Set object model mapping	125
E.3.1	General	125
E.3.2	TSTransmissionPars Object Model Mapping.....	126
E.4	Account Object Model Mapping.....	127
E.5	Transfer Set Object Model Mapping	127
E.5.1	Transfer Account Transfer Set Object Model Mapping	127
E.5.2	TATransmissionPars Object Model Mapping	127
E.6	Program Object Model Mapping	127
E.7	Event Enrollment Object Model Mapping	128
E.8	Conditions Object Model Mapping	129
E.8.1	General	129
E.8.2	Event Condition Object Model Mapping	129
Annex F (informative)	Mapping of TASE.2 (2002) Operations and Actions onto MMS Services.....	131
F.1	General.....	131
F.2	Use of MMS Services.....	131
F.2.1	Association Management Mapping.....	131
F.2.2	Transfer Set Operation and Action Mapping.....	131
F.2.3	Condition Monitoring Mapping	132
F.2.4	Get Next TSTransfer Set Value Operation Mapping	136
F.2.5	Account Operations and Actions Mapping.....	137
F.2.6	Query Mapping	137

F.2.7	Program Operations Mapping to MMS	138
F.2.8	Event Enrollment Operations Mapping to MMS	142
F.2.9	Event Condition Actions Mapping onto MMS – Event Notification Action Mapping	144
F.2.10	Summary of TASE.2 Operations	144
Annex G (informative)	TASE.2 (2002) Standardized Application-specific Objects	146
G.1	General.....	146
G.2	Named Type Objects	146
G.2.1	General	146
G.2.2	TransferSet Types	146
G.2.3	SupportedFeatures Type	147
G.2.4	Conditions Types.....	147
G.3	Named Variable Objects	148
G.3.1	General	148
G.3.2	"Next_TSTransfer_Set".....	148
G.3.3	"TSConditions_Detected".....	148
G.3.4	"TA_Transfer_Set".....	148
G.3.5	"TAConditions_Detected".....	149
G.3.6	"Event_Code_Detected"	149
G.3.7	Information Message Objects	149
G.4	Event Condition Objects.....	149
Figure 1	– Protocol relationships.....	12
Figure 2	– TASE.2 network topologies	13
Figure 3	– Informal TASE.2 Model	18
Figure 4	– Transfer DataSet reporting mechanism	23
Figure 5	– General Transfer reporting mechanism	24
Figure 6	– Relationship between TASE.2 and real control centres	28
Figure 7	– TASE.2 server components.....	58
Figure 8	– TASE.2 Server association control elements	60
Figure 9	– Data Value operations.....	63
Figure 10	– Sequence of Get Data Value	64
Figure 11	– Data Set operations	67
Figure 12	– Sequence of Create Data Set operation	69
Figure 13	– Sequence of Delete Data Set	70
Figure 14	– Transfer Set services	74
Figure 15	– Device operations	81
Figure 16	– Sequence of Device Control.....	82
Figure 17	– Measurements and network models	97
Figure 18	– CIM and ICCP semantic harmonization	99
Figure B.1	– ToS Byte field definition RFC-2474 and RFC-3168.....	112
Figure F.1	– Sequence of Transfer Set operations and actions	135
Figure F.2	– Server Program Components	138
Figure F.3	– Sequence of Program Invocation operations	142

Table 1	– Scope of the object models in the VCC	29
---------	---	----

Table 2 – Summary of TASE.2 operations.....	87
Table A.1 – TASE.2 Operations versus MMS services	108
Table B.1 – Typical Priorities	111
Table C.1 – TASE.2 (2002) Additional Operations and Actions	113
Table F.1 – Summary of TASE.2 Operations from IEC 60870-6-503:2002.....	145
Table G.1 – TASE.2 Event Objects	150

This document is a preview generated by EVS

INTERNATIONAL ELECTROTECHNICAL COMMISSION

TELECONTROL EQUIPMENT AND SYSTEMS –

**Part 6-503: Telecontrol protocols compatible with
ISO standards and ITU-T recommendations –
TASE.2 Services and protocol**

FOREWORD

- 1) The International Electrotechnical Commission (IEC) is a worldwide organization for standardization comprising all national electrotechnical committees (IEC National Committees). The object of IEC is to promote international co-operation on all questions concerning standardization in the electrical and electronic fields. To this end and in addition to other activities, IEC publishes International Standards, Technical Specifications, Technical Reports, Publicly Available Specifications (PAS) and Guides (hereafter referred to as "IEC Publication(s)"). Their preparation is entrusted to technical committees; any IEC National Committee interested in the subject dealt with may participate in this preparatory work. International, governmental and non-governmental organizations liaising with the IEC also participate in this preparation. IEC collaborates closely with the International Organization for Standardization (ISO) in accordance with conditions determined by agreement between the two organizations.
- 2) The formal decisions or agreements of IEC on technical matters express, as nearly as possible, an international consensus of opinion on the relevant subjects since each technical committee has representation from all interested IEC National Committees.
- 3) IEC Publications have the form of recommendations for international use and are accepted by IEC National Committees in that sense. While all reasonable efforts are made to ensure that the technical content of IEC Publications is accurate, IEC cannot be held responsible for the way in which they are used or for any misinterpretation by any end user.
- 4) In order to promote international uniformity, IEC National Committees undertake to apply IEC Publications transparently to the maximum extent possible in their national and regional publications. Any divergence between any IEC Publication and the corresponding national or regional publication shall be clearly indicated in the latter.
- 5) IEC itself does not provide any attestation of conformity. Independent certification bodies provide conformity assessment services and, in some areas, access to IEC marks of conformity. IEC is not responsible for any services carried out by independent certification bodies.
- 6) All users should ensure that they have the latest edition of this publication.
- 7) No liability shall attach to IEC or its directors, employees, servants or agents including individual experts and members of its technical committees and IEC National Committees for any personal injury, property damage or other damage of any nature whatsoever, whether direct or indirect, or for costs (including legal fees) and expenses arising out of the publication, use of, or reliance upon, this IEC Publication or any other IEC Publications.
- 8) Attention is drawn to the Normative references cited in this publication. Use of the referenced publications is indispensable for the correct application of this publication.
- 9) Attention is drawn to the possibility that some of the elements of this IEC Publication may be the subject of patent rights. IEC shall not be held responsible for identifying any or all such patent rights.

International Standard IEC 60870-6-503 has been prepared by IEC technical committee 57: Power systems management and associated information exchange.

This third edition cancels and replaces the second edition published in 2002 and constitutes a technical revision.

This edition includes the following significant technical changes with respect to the previous edition:

- the following objects were made informative: Accounts, Programs, Event Enrollment, and Event Condition;
- services associated with the informative objects were made informative;
- the TASE.2 conformance blocks 6, 7, 8, and 9 have been made out-of-scope.

The text of this standard is based on the following documents:

FDIS	Report on voting
57/1453/FDIS	57/1477/RVD

Full information on the voting for the approval of this standard can be found in the report on voting indicated in the above table.

This publication has been drafted in accordance with the ISO/IEC Directives, Part 2.

A list of all the parts in the IEC 60870 series, published under the general title *Telecontrol equipment and systems*, can be found on the IEC website.

The committee has decided that the contents of this publication will remain unchanged until the stability date indicated on the IEC web site under "<http://webstore.iec.ch>" in the data related to the specific publication. At this date, the publication will be

- reconfirmed,
- withdrawn,
- replaced by a revised edition, or
- amended.

IMPORTANT – The 'colour inside' logo on the cover page of this publication indicates that it contains colours which are considered to be useful for the correct understanding of its contents. Users should therefore print this document using a colour printer.

INTRODUCTION

The Telecontrol Application Service Element (TASE.2) protocol (also known as Inter-Control Centre Communications Protocol, ICCP) allows for data exchange over Wide Area Networks (WANs) between a utility control centre and other control centres, other utilities, power pools, regional control centres, and Non-Utility Generators. Data exchange information consists of real-time and historical power system monitoring and control data, including measured values, scheduling data, energy accounting data, and operator messages. This data exchange occurs between one control centre's Supervisory Control And Data Acquisition/Energy Management System/Distribution Management System (SCADA/EMS/DMS) host and another centre's host, often through one or more intervening communications processors.

This part of IEC 60870 defines a mechanism for exchanging time-critical data between control centres. In addition, it provides support for device control, general messaging and control of programs at a remote control centre. It defines a standardized method of using the ISO 9506 Manufacturing Message Specification (MMS) services to implement the exchange of data. The definition of TASE.2 consists of three documents. This part of IEC 60870 defines the TASE.2 application modelling and service definitions. IEC 60870-6-702 defines the application profile for use with TASE.2. IEC 60870-6-802 defines a set of standardized object definitions to be supported.

The TASE.2 describes real control centres with respect to their external visible data and behaviour using an object oriented approach. The objects are abstract in nature and may be used in a wide variety of applications. The use of TASE.2 goes far beyond the application in the control centre to control centre communications. This standard must be understood as a tool box for any application domain with comparable requirements. i.e. the TASE.2 may be applied in areas like substation automation, power plants, factory automation, chemical plants, or others which have comparable requirements. It provides a generic solution for advanced Information and Communication Technology.

The TASE.2 version number for this standard is 2001-08. See 8.3.4 for more details.

TELECONTROL EQUIPMENT AND SYSTEMS –

Part 6-503: Telecontrol protocols compatible with ISO standards and ITU-T recommendations – TASE.2 Services and protocol

1 Scope

1.1 General

This part of IEC 60870 specifies a method of exchanging time-critical control centre data through wide-area and local-area networks using a full ISO compliant protocol stack. It contains provisions for supporting both centralized and distributed architectures. This standard includes the exchange of real-time data indications, control operations, time-series data, scheduling and accounting information, remote program control and event notification.

Though the primary objective of TASE.2 is to provide control centre (telecontrol) data exchange, its use is not restricted to control centre data exchange. It may be applied in any other domain having comparable requirements. Examples of such domains are power plants, factory automation, process control automation, and others.

This standard does not specify individual implementations or products, nor does it constrain the implementation of entities and interfaces within a computer system. This standard specifies the externally visible functionality of implementations together with conformance requirements for such functionalities.

1.2 Control centre

The model of a control centre includes four primary classes of host processors: SCADA/EMS, Demand Side Management (DSM)/ Load Management, Distributed Applications, and Display Processors. The SCADA/EMS host is the primary processor, utilizing analogue and digital monitoring data collected at power plants, Non-Utility Generators, and transmission and distribution substations via Data Acquisition Units (DAUs) and Remote Terminal Units (RTUs). The control centre typically contains redundant SCADA/EMS/DMS hosts in a "hot standby" configuration. The DSM/Load Management host(s) are used by either an operator or EMS application to initiate load management activities. The Distributed Application host(s) perform miscellaneous analysis, scheduling, or forecasting functions. Display Processors allow for local operator and dispatcher display and control. Typically, the control centre will contain one or more Local Area Networks (LANs) to connect these various hosts. The control centre will also access several WANs, often through intermediate communications processors. These WAN connections may include the company-wide area network for communications with the corporate host and a distinct real-time SCADA network. Each control centre will also have one or more TASE.2 instances to handle data exchange with remote control centres.

Other classes of host processors like archive systems, engineering stations, or quality control systems (e.g., for data recording according to ISO 9000) may also be included. The application of the TASE.2 control centre model is in principle unlimited. This model provides a common and abstract definition applicable for any real systems which have comparable requirements.

1.3 Architecture

The TASE.2 protocol relies on the use of MMS services (hence the underlying MMS protocol) to implement the control centre data exchange. Figure 1 shows the relationship of TASE.2, the MMS provider, and the rest of the protocol stack. In most cases, the values of objects being transferred are translated from/to the local machine representation automatically by the

local MMS provider. Some TASE.2 objects require a common syntax (representation) and meaning (interpretation) by both communicating TASE.2 systems. This common representation and interpretation constitutes a form of protocol. The control centre applications are not part of this standard. It is assumed that these applications request TASE.2 operations and supply control centre data and functions to the TASE.2 implementation as needed. The specific interface between TASE.2 and the control centre applications is a local issue and not part of this standard.

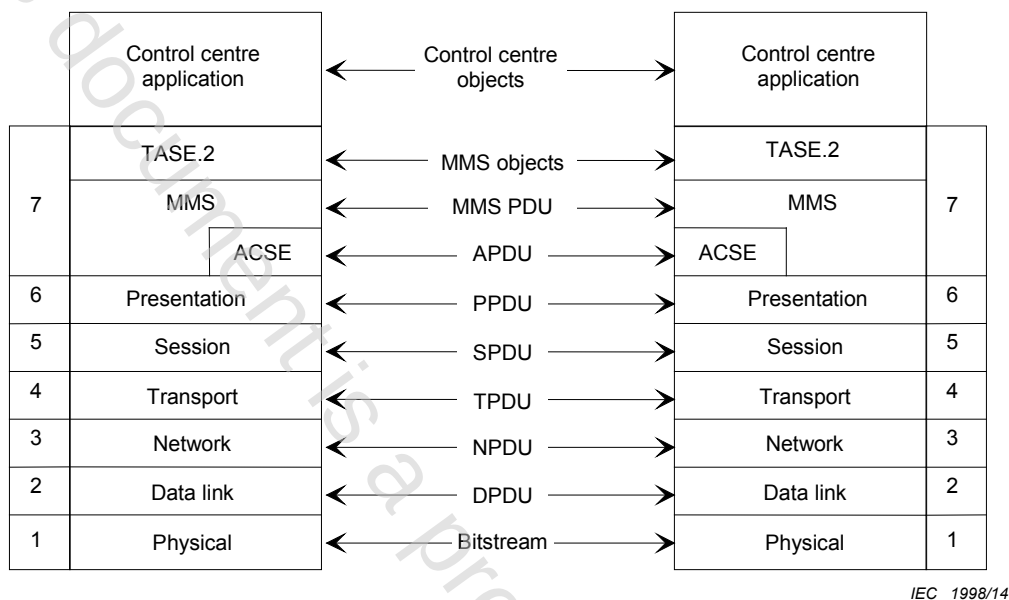


Figure 1 – Protocol relationships

The protocol architecture for TASE.2 requires the use of ISO protocols in layers 5 to 7 of the OSI reference model. The Transport Profiles (layers 1 to 4) can use virtually any standard or de-facto standard (e.g. TCP) connection-mode transport layer and connectionless-mode network layer (e.g., IP) services over any type of transmission media.

1.4 Network Model

The TASE.2 Data Exchange network can be either a private or public packet-switched or mesh network connecting communications processors which provide adequate routing functionality to allow for redundant paths and reliable service.

Figure 2 shows a typical network topology using a router-based Wide Area Network (WAN). The WAN provides routing and reliable service between control centres (which may include internal networks and routing capabilities).

The mesh network shown in Figure 2 demonstrates the concept of redundant paths for a mesh network. Each control centre maintains its own series of direct circuits, and also provides a mechanism for routing between those direct circuits. Control Centre C provides an alternate routing path for network traffic going from Control Centre A to B. This network configuration requires key control centres to provide significant routing capabilities.

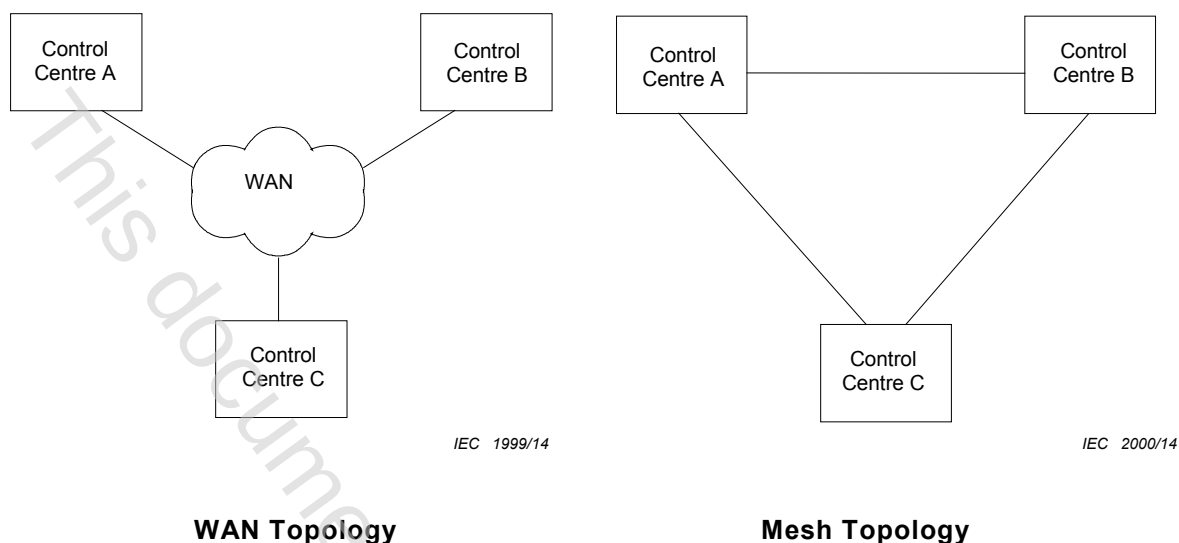


Figure 2 – TASE.2 network topologies

1.5 Relation between TASE.2 and MMS

The TASE.2 resides on top of MMS. It describes a standardized application of MMS using the MMS services and protocol. TASE.2 enhances the functionality of MMS by specifying structured data mapped to MMS objects and assigning specific semantics to it. As an example of pure MMS services, MMS allows reading data from a remote system. The data will be responded without any specific condition. If these data are read depending on very specific conditions (e.g., on change only) then TASE.2 provides appropriate services which are not provided by MMS.

Though the specific requirements agreed upon within the IEC IEC TC 57 have led to the definition of TASE.2 there are several other application domains (outside the control centres) with less, very limited or mixed requirements which might use the TASE.2 services. These other areas are outside the scope of this standard but the use of TASE.2 goes far beyond the specific scope of this standard.

TASE.2 provides an independent and scalable set of services to allow efficient implementations optimized for the respective requirements of a control centre. It does this by defining several conformance building blocks. MMS offers also a scalability of its services specifying MMS Conformance Building Blocks (CBBs). A simple TASE.2 implementation requires only a simple MMS implementation.

TASE.2 and MMS provide their services to their respective users. MMS provides its services to TASE.2 and TASE.2 provides its services to the control centre application. MMS is an independent standard that can provide its services also to users other than TASE.2 – it can serve directly to specific control centre applications and to any other application. This means that the use of MMS is not restricted to TASE.2.

For requirements outside the scope of this standard or for future requirements, for example journaling of data, downloading and uploading of mass data like programs, additional MMS models and services, i.e. Journaling and Domain Loading respective can be applied by a real system in addition to TASE.2. This is possible because the additional application of MMS objects and services is independent of the use of TASE.2 and the use of MMS by TASE.2.

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.

IEC 60870-6-702:2014, *Telecontrol equipment and systems – Part 6-702: Telecontrol protocols compatible with ISO standards and ITU-T recommendations – Functional profile for providing the TASE.2 application service in end systems*

IEC 60870-6-802:2014, *Telecontrol equipment and systems – Part 6-802: Telecontrol protocols compatible with ISO standards and ITU-T recommendations – TASE.2 Object models*

IEC 61970-452:2013, *Energy management system application program interface (EMS-API) – Part 452: CIM Static transmission network model profiles*

IEC 61970-552:2013, *Energy Management System Application Program Interface (EMS-API) – Part 552: CIM XML model exchange format*

IEC/TS 62351-4:2007, *Power systems management and associated information exchange – Data and communications security – Part 4: Profiles including MMS*

ISO 9506-1:2003, *Industrial automation systems – Manufacturing Message Specification – Part 1: Service definition*

ISO 9506-2:2003, *Industrial automation systems – Manufacturing Message Specification – Part 2: Protocol specification*

3 Terms and definitions

For the purposes of this part of IEC 60870, the following terms and definitions apply.

NOTE Much of the terminology used with this standard is derived directly from ISO 9506-1 and ISO 9506-2 (MMS). Refer to those standards for further definitions.

3.1

action

activity performed by the TASE.2 server under some defined circumstances

3.2

accounting information

set of information which describes an account for a utility

Note 1 to entry: See IEC 60870-6-802 for more details.

3.3

bilateral agreement

agreement between two control centres which includes the data elements to be accessed and the means to access them

3.4

bilateral table

computer representation of the bilateral agreement

Note 1 to entry: The representation used is a local matter.

3.5

client

communicating entity which makes use of the VCC for the lifetime of an association via one or more TASE.2 service requests