INTERNATIONAL TELECOMMUNICATION UNION

CCITT D.36

THE INTERNATIONAL
TELEGRAPH AND TELEPHONE
CONSULTATIVE COMMITTEE

GENERAL TARIFF PRINCIPLES

CHARGING AND ACCOUNTING IN INTERNATIONAL TELECOMMUNICATIONS SERVICES

GENERAL ACCOUNTING PRINCIPLES APPLICABLE TO MESSAGE HANDLING SERVICES

Recommendation D.36

Geneva, 1991

FOREWORD

The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the International Telecommunication Union (ITU). CCITT 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 Plenary Assembly of CCITT which meets every four years, establishes the topics for study and approves Recommendations prepared by its Study Groups. The approval of Recommendations by the members of CCITT between Plenary Assemblies is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988).

Recommendation D.36 was prepared by Study Group III and was approved under the Resolution No. 2 procedure on the 22 of March 1991.

CCITT NOTE

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

© ITU 1991

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 the ITU.

Recommendation D.36

GENERAL ACCOUNTING PRINCIPLES APPLICABLE TO MESSAGE HANDLING SERVICES

1 Scope

This Recommendation is intended to provide the general accounting principles applicable to Message Handling Services (as described in the F.400- and X.400-Series of Recommendations) between interconnected administration management domains (ADMDs). While the information detailed in this Recommendation provides guidelines for the parties concerned, the specific details of each particular accounting arrangement between ADMDs is the subject of bilateral agreements between those ADMDs and may vary from this Recommendation.

2 Introduction

2.1 This Recommendation is intended for use by ADMDs which provide message handling services. It should also be of use to organizations creating software for the accounting and settlement of such services. It strives to strike a balance between simplicity and accuracy in accounting. An additional objective is to aid the provision of cost effective and reliable services between interconnected ADMDs.

2.2 The following sections lay out the overall model of ADMD interconnection, accounting principles useful for these interconnections, and formulae for various service interactions from the service provider's point-of-view. Annexes are provided for abbreviations (Annex A), a glossary (Annex B), and proposed account statements (Annex C).

2.3 This Recommendation should be applied in conjunction with other relevant CCITT Recommendations.

3 Service aspects

3.1 Message handling services provided via ADMDs comprise the offerings of the public service providers and are based on Recommendations laid down in the F.400- and X.400-Series of Recommendations. The versions of 1984 are the primary reference, but appropriate attention has been given to 1988 with the understanding that versions of 1988 will be implemented in the future. The F.400-Series of Recommendations are to be taken into account as far as applicable.

3.2 Regional profile standards may be used for reference and may be applicable as far as their specifications are compatible with this Recommendation.

4 General model for accounting

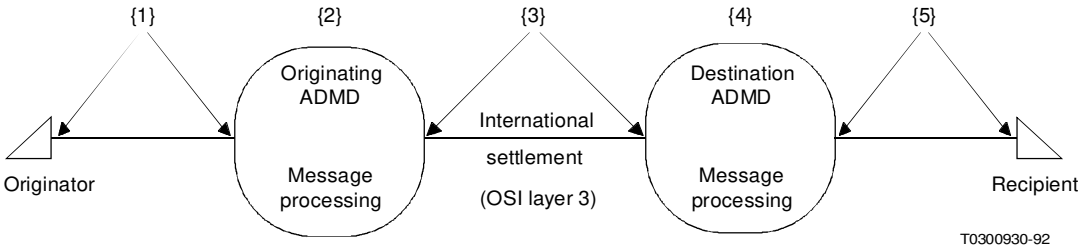
4.1 *General definition*

In order to establish a reference basis to permit a clear definition of principles for accounting, this section sets out a general model in which the cost elements to be taken into consideration are identified. These cost elements encompass the network features corresponding to OSI layer 3 and features of implementation relating up to and including OSI layer 7.

4.2 *Presentation of the model*

This model depicts the various interactions and processing involved in message handling.

Each interaction and process is associated with a cost element. These cost elements are identified in Figure 1/D.36 and their associated accounting principles in § 5.



{1} Service access costs.

{2} Processing costs at the originating ADMD.

{3} Network costs between ADMDs.

{4} Processing costs at the destination ADMD.

{5} Delivery costs which may involve delivery to UAs, delivery to other telecommunication and physical delivery services, transfer to PRMDs and transfer to other ADMDs.

FIGURE 1/D.36

Cost elements model

5 Principles for accounting

5.1 *Assumptions*

Accounting principles to be applied internationally are based on the following assumptions:

5.1.1 They shall apply for all appropriate situations that face public service providers operating ADMDs.

5.1.2 Bilateral agreements are assumed for the component rates (see glossary in Annex B) used for the traffic relation concerned.

5.1.3 The principles shall allow for flexibility regarding the range of agreements.

5.2 *General principles*

5.2.1 Due to the adverse impact on the accounting, the originating ADMD will not knowingly allow traffic to be passed to the destination ADMD where such traffic is outside the bilateral agreement.

5.2.2 Similarly, the destination ADMD may bar traffic from a specific originating ADMD where such traffic is not covered by a bilateral agreement.

5.2.3 All messages transferred to the destination ADMD should normally be subject to accounting, even if a message cannot be delivered to the intended recipient.

5.2.4 Delivery service offerings across an ADMD to ADMD interconnection may be different in each direction and have their own component rate.

5.2.5 Component rates due to an ADMD for equivalent services across an ADMD to ADMD interconnection are not required to be symmetrical.

5.2.6 In general, accounting procedures should be such that the originating ADMD can easily comprehend the total outpayment for each message before transmission.

5.2.7 Unless otherwise agreed, component rates are expressed in SDRs (Special Drawing Rights).

5.2.8 For accounting arrangements covered by this Recommendation service messages may, by bilateral agreement, be excluded from the accounting statements.

5.2.9 In general, the originating ADMD is responsible for collecting the data and presenting the statement of accounts. The receiving ADMD may wish to produce the same information for reconciliation purposes. (A suggested format for an account statement can be found in Annex D.)

5.2.10 Two methods of accounting for message delivery are recognized, one based on estimated accounting information and one based on exact accounting information, for each message delivered via access units and distribution lists. The method used is subject to bilateral agreement.

5.3 *Accounting for specific cost elements*

Accounting for specific cost elements as illustrated in the model (see Figure 1/D.36), is assumed as follows:

5.3.1 Service access costs (service cost element {1}) are a national matter and are not included in the accounting.

5.3.2 Processing costs at the originating ADMD (service cost element {2]} are a national matter and are not included in the accounting.

5.3.3 Network costs between ADMDs (service cost element {3}) are to be addressed by normal accounting arrangements covering the networks involved.

5.3.4 Processing costs at the destination ADMD (service cost element {4}) should be subject to accounting.

5.3.5 Delivery costs (service cost element {5}) may be subject to accounting.

5.4 *Service specific principles*

5.4.1 *Optional user facilities*

5.4.1.1 Optional user facilities invoked by the originator or originating ADMD that imply the use of resources at the destination ADMD may be subject to accounting.

5.4.1.2 Optional user facilities selected by the intended recipient are, for accounting purposes, the responsibility of the recipient ADMD.

5.4.1.3 *Notifications*

The inclusion of delivery notifications in inter-ADMD accounting is subject to bilateral agreement.

Receipt and non-receipt notifications are included in the accounting as messages. For commercial reasons, costs of receipt and non-receipt notifications should be borne ideally by the originating ADMD. However, in the current absence of appropriate technical means to distinguish such notifications from messages, the accounting should be the same as for messages.

5.4.1.4 *Probe*

A probe is included in the accounting as a message.

5.4.1.5 *Conversion*

The cost of explicit or implicit conversion is included in a component rate.

Conditions for other types of conversion are subject to bilateral agreement.

5.4.1.6 *Return of contents*

Because of the impact on accounting, the support of the return of contents optional user facility between ADMDs is not advised.

5.4.1.7 *Originator requested alternate recipient*

Depending on the originating/recipient O/R address of primary and alternate recipients, the originating domain may be unable to determine the delivery cost. Thus, the destination domain decides whether delivery to the specified alternate recipient is effected. The use of this facility is subject to bilateral agreement.

5.4.1.8 *Distribution lists (DLs)*

For expediency in offering DLs it is suggested that the owner of the DL is responsible for all charges resulting from expansion of that list. It is assumed that the owner controls the use of a DL by the DLs submit permission.

There may be commercial reasons to implement services that fall outside of the previous paragraph. At this time, such arrangements are subject to bilateral agreement.

Implementations that require the return of accounting information to the originating ADMD are for further consideration.

5.4.1.9 *Other optional user facilities*

Accounting for other optional user facilities is not presently part of these guidelines, but may be subject to bilateral agreement.

5.4.2 *Delivery to a user agent (UA) belonging to an ADMD*

UAs belonging to an ADMD include both co-located UAs and stand-alone UAs. The suggested unit for measuring message size for accounting is the octet, without rounding. Delivery to a stand-alone UA addressed by an X.121 address is treated as a delivery via an access unit.

5.4.3 *Transfer to a private management domain (PRMD)*

A recipient address is considered as belonging to a PRMD only if the address contains the PRMD-name standard attribute. The suggested unit for measuring message size for accounting is the octet, without rounding.

5.4.4 *Telex delivery*

The suggested unit for measuring message size for accounting is the octet, without rounding. Other units may be used by bilateral agreement.

5.4.5 *Fax delivery*

The suggested unit for measuring message size for accounting is the octet, without rounding. Other units may be used by bilateral agreement.

5.4.6 *Physical delivery*

The suggested unit for measuring message size for accounting is the octet, without rounding. Other units may be used by bilateral agreement.

5.4.7 *Teletex delivery*

For further consideration.

5.4.8 *Transit*

Transit is defined as the transfer of a message from the originating ADMD to the destination ADMD via one or more intermediate ADMDs.

Such transits shall be by prior agreement with all the ADMDs concerned. The total outpayments applicable shall be based on the formulae shown in § 6 and shall be determined on a bilateral basis between consecutive ADMDs along the transit chain.

5.4.9 *Non-delivery notifications*

Non-delivery notifications are not included in the inter-ADMD accounting.

6 Accounting formulae for services

6.0 *General*

This section contains the recommended accounting formulae for service. When these formulae are applied, the total outpayment for services will be the sum of the formulae in §§ 6.1 and 6.2.

6.1 *Delivery to UAs and transfer to PRMDs*

The formula for single or multiple address messages delivered to UAs belonging to an ADMD and/or transferred to PRMDs is as follows:

$$S = a \times R + b \times P1e \times D + c \times P1e \times D'$$

where

S is the per message outpayment,

a is the total number of O/R addresses (UAs belonging to the ADMD and O/R addresses belonging to PRMDs),

b is the number of addressed UAs which belong to an ADMD,

c is the number of addressed PRMDs,

$P1e$ is the size of the P1 message envelope and content in octets,

R is the processing component rate per address,

D is the delivery component rate per octet to a UA,

D' is the transfer component rate per octet to a PRMD.

An ADMD may choose to account for a message addressed to multiple UAs belonging to one ADMD as a single address message.

For this formula, address refers to a recipient with the responsibility flag on (see X.400-Series Recommendations).

6.2 *Deliveries made via access units*

6.2.1 *General*

Message handling (MH) systems have the ability of delivering message traffic to non-MH systems via access units. Such deliveries include:

– delivery to remote user agents identified by an X.121 address;

– delivery to telex, via a telex access unit;

– delivery to G3 facsimile, via a fax access unit;

– delivery to a physical delivery system (PDS) via a physical delivery access unit.

Other access unit deliveries are held for further consideration.

6.2.2 *Accounting methods*

6.2.2.1 *Estimated accounting method*

For the estimated accounting method the following formula will apply:

$$S = a \times R + \sum_{i} [x(i) \times P1e \times D(i) + x(i) \times E(i)]$$

where

S is the per message accounting,

a is the total number of O/R addresses,

R is the processing component rate per address,

$\sum_{i}$ is a delivery service type,

$x(i)$ is the number of messages delivered by delivery service type i,

$P1e$ is the size of the $P1$ message envelope and content in octets,

$D(i)$ is the component rate per octet for delivery by delivery service type i,

$E(i)$ is a per message component rate for delivery service type i, independent of length for delivery via a PDS, telex or fax access unit. By bilateral agreement, $E(i)$ may be set to 0 for any specified delivery type.

Different component rates $D(i)$ and $E(i)$ will be applied by type of service. These will be designed to ensure a full recovery of all costs associated with all deliveries over each accounting period.

The derivations of $D(i)$ and $E(i)$ by type of service will be determined by the recipient ADMD.

For this formula, address refers to a recipient with the responsibility flag on (see X.400-Series Recommendations).

6.2.2.2 *Exact accounting method*

Exact accounting will be based on per message accounting information. The methodology for achieving this is for further consideration.

6.3 *Time as an element in accounting*

6.3.1 ADMDs may wish to offer service types which are defined by time-of-day and day-of-the-week.

6.3.2 In the case of time-dependent services, the time which is used for accounting purposes is the time the message left the message transfer agent (MTA) of the originating ADMD.

6.3.3 Time dependent services and component rates are negotiated on a bilateral basis.

7 Settlements

Settlements of the balances of accounts will take place based on the provisions of Article 6 of the International Telecommunication Regulations (Melbourne, 1988).

ANNEX A

(to Recommendation D.36)

Abbreviations

ADMD	Administration management domain
DL	Distribution list
MH	Message handling
MTA	Message transfer agent
O/R	Originator/recipient
OSI	Open systems interconnection
P1	MTS transfer protocol
P2	IPM transfer protocol
P3	MTS access protocol
PDS	Physical delivery system
PRMD	Private management domain
SDR	Special drawing rights
TLX	Telex
UA	User agent

ANNEX B

(to Recommendation D.36)

Glossary

All explanations given are assumed to be in the context of the message handling systems and services, unless otherwise noted. These are in addition to Recommendation F.400, Annexes A and B.

B.1 destination ADMD

In the context of international accounting the destination ADMD is the last ADMD involved in the accounting.

B.2 octet

A string of 8 bits without regard to the content of those bits.

B.3 originating ADMD

In the context of international accounting, the originating ADMD is the first ADMD involved in the accounting.

B.4 OSI layers

The seven layers of interconnection as described by CCITT/ISO standards concerning OSI.

B.5 component rates

The rates for processing, delivery and transfer of messages, identified by service cost elements {4} and {5} in Figure 1/D.36.

B.6 total outpayment

The sum of the component rates multiplied by their associated variables, based on the formulae in §§ 6.1 and 6.2.

ANNEX C

(to Recommendation D.36)

Account statement

A suggested format for monthly inter-ADMD account statements, with examples, is shown in Table C-1/D.36. The method of exchange of information, such as that described in Recommendation D.190 is for bilateral agreement.

TABLE C-1/D.36

ADMD A in account with ADMD B for message handling traffic for the month of . . .

Originating ADMD	Via	Destination ADMD	Component	Number of units	Component rate	Currency	Outpayment
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ABC/US	Direct	XYZ/UK	Process	3,000	R	SDR	(5) × (6)
ABC/US		XYZ/UK	PDS/BAS	2,000	D(i)	SDR	(5) × (6)
ABC/US		XYZ/UK	PDS/SUR	2,000	E(i)	SDR	(5) × (6)
ABC/US		XYZ/UK	UA		D	SDR	(5) × (6)
				Total outpayment:		SDR	(sum of column)

Key	Component
	(This list is given for illustration and is not complete)
(1) Originating A ADMD (2) Transit B ADMD (3) Destination ADMD	Process – Processing (a) UA – Co-located user agent deliveries ($b \times P1e$)
(4) Component	TLX/BAS – Telex (basic) [$x(i) \times P1e$]
(5) Unit count per component rate	TLX/SUR – Telex (surcharge) $x(i)$ FAX/BAS – FAX delivery (basic) [$x(i) \times P1e$]
(6) Component rate (7) Currency (SDRs) (8) Outpayment	FAX/SUR – FAX (surcharge) $x(i)$ PHY/BAS – Physical delivery (basic) [$x(i) \times P1e$] PHY/SUR – Physical delivery (surcharge) $x(i)$ 01 – Optional service element PRMD – PRMD transfer ($C \times P1e$)

Note 1 – For normal traffic (2) and (3) will be the same. For transit traffic (3) will be the destination ADMD.

Note 2 – Each accountable factor is given a separate component rate description, such as delivery type, delivery surcharge, processing, etc.

Note 3 – The outpayment is derived by multiplying the relevant outpayment component rate by the number of units (i.e. columns 5×6).

Note 4 – Where per message surcharges apply, messages are counted and accounted for as separate components.

ANNEX D

(to Recommendation D.36)

Example account

(based on the example calculations)

TABLE D-1/D.36

USA (A) in account with UK (B) for message handling traffic for the month of October 1989

Originating ADMD	Via	Destination ADMD	Component	Number of units	Component rate	Currency	Outpayment
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
USA(A)	Direct	UK(B)	Process	49	R	SDR	(5) × (6)
USA(A)	Direct	UK(B)	UA	121000	D	SDR	(5) × (6)
USA(A)	Direct	UK(B)	PRMD	12000	D′	SDR	(5) × (6)
USA(A)	Direct	UK(B)	TLX/BAS	12000	D(télex)	SDR	(5) × (6)
USA(A)	Direct	UK(B)	TLX/SUR	2	E(télex)	SDR	(5) × (6)
USA(A)	Direct	UK(B)	PDS/BAS	36000	D(PDS)	SDR	(5) × (6)
USA(A)	Direct	UK(B)	PDS/SUR	6	E(PDS)	SDR	(5) × (6)
JAP(A)	USA(A)	UK(B)	Process	20	R	SDR	(5) × (6)
JAP(A)	USA(A)	UK(B)	UA	20000	D	SDR	(5) × (6)
JAP(A)	USA(A)	UK(B)	PRMD	2000	D′	SDR	(5) × (6)
USA(A)	UK(B)	FRA(C)	Process	1	R	SDR	(5) × (6)
USA(A)	UK(B)	FRA(C)	FAX/BAS	5000	D(FAX)	SDR	(5) × (6)
USA(A)	UK(B)	FRA(C)	FAX/SUR	1	E(FAX)	SDR	(5) × (6)
				Total outpayment		SDR	(sum of column)

Example calculations

D.1 *Direct terminal route: USA (A) to UK (B)*

The termination of 1 message of 1000 octets, to 1 co-located UA (i.e. 1 address), sent in October 1989.

Formula to be used: $S = (a \times R) + (b \times P1e \times D) + (c \times P1e \times D')$

The calculation: $S(1) = (1 \times R) + (1 \times 1000 \times D)$.

D.2 *Indirect terminal route: Japan (A) to UK (B) via USA (A)*

The termination of 1 message of 2000 octets, to 10 co-located UAs (i.e. 10 UA addresses) and to 1 PRMD with 10 addresses, sent in October 1989.

Formula to be used: $S = (a \times R) + (b \times P1e \times D) + (c \times P1e \times D')$

The calculation: $S(2) = (20 \times R) + (10 \times 2000 \times D) + (1 \times 2000 \times D')$.

D.3 *Transit route: USA (A) to France (C) via UK (B)*

The termination of 1 message of 5000 octets, to 1 non-MH system (FAX) via an access unit (i.e. to 1 address), sent in October, 1989.

Formula to be used: $S = (a \times R) + \sum_i \{[x(i) \times P1e \times D(i)] + [x(i) \times E(i)]\}$

The calculation: $S(3) = (1 \times R) + [1 \times 5000 \times D(\text{FAX})] + [1 \times E(\text{FAX})]$.

D.4 *Direct terminal route: USA (A) to UK (B)*

The termination of 1 message of 6000 octets, to 20 co-located UAs, 2 PRMDs with 10 addresses each, 2 telexes via a telex access unit, and 6 messages delivered to a PDS via a physical delivery access unit, sent in October 1989.

Formula to be used: $S = (a \times R) + (b \times P1e \times D) + (c \times P1e \times D') + \sum_i \{[x(i) \times P1e \times D(i)] + [x(i) \times E(i)]\}$

The calculation: $S(4) = (48 \times R) + (20 \times 6000 \times D) + (2 \times 6000 \times D') +$

$\{[2(\text{telex}) \times 6000 \times D(\text{telex})] + [2(\text{telex}) \times E(\text{telex})]\} +$

$\{[6(\text{PDS}) \times 6000 \times D(\text{PDS})] + [6(\text{PDS}) \times E(\text{PDS})]\}$.