# INTERNATIONAL STANDARD

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## 10164-10

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# Information technology — Open Systems Interconnection — Systems Management: Usage metering function for accounting purposes

*Technologies de l'information — Interconnexion de systèmes ouverts (OSI) — Gestion-systèmes: Fonction de compteur d'usage à des fins de calcul*

# Contents

# Foreword

ISO (the International Organization for Standardization) and IEC (the International Electrotechnical Commission) form the specialized system for worldwide standardization. National bodies that are members of ISO or IEC participate in the development of International Standards through technical committees established by the respective organization to deal with particular fields of technical activity. ISO and IEC technical committees collaborate in fields of mutual interest. Other international organizations, governmental and non-governmental, in liaison with ISO and IEC, also take part in the work.

In the field of information technology, ISO and IEC have established a joint technical committee, ISO/IEC JTC 1. Draft International Standards adopted by the joint technical committee are circulated to national bodies for voting. Publication as an International Standard requires approval by at least 75 % of the national bodies casting a vote.

International Standard ISO/IEC 10164-10 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, Subcommittee SC 21, *Open systems interconnection, data management and open distributed processing*, in collaboration with ITU-T. The identical text is published as ITU-T Recommendation X.742.

ISO/IEC 10164 consists of the following parts, under the general title *Information technology — Open Systems Interconnection — Systems Management*:

— *Part 1: Object management function*

— *Part 2: State management function*

— *Part 3: Attributes for representing relationships*

— *Part 4: Alarm reporting function*

— *Part 5: Event report management function*

— *Part 6: Log control function*

— *Part 7: Security alarm reporting function*

— *Part 8: Security audit trail function*

— *Part 9: Objects and attributes for access control*

— *Part 10: Accounting metering function*

— *Part 11: Metric objects and attributes*

— *Part 12: Test management function*

— *Part 13: Summarization function*

— *Part 14: Confidence and diagnostic test categories*

— *Part 15: Scheduling function*

— *Part 16: Management knowledge management function*

— *Part 17: Change over function*

— *Part 18: Software management function*

Annex A forms an integral part of this part of ISO/IEC 10164. Annexes B to I are for information only.

## Introduction

This Recommendation | International Standard specifies a model and management information for the acquisition of information by a managing system of resource usage information. The information may be used as part of a charging and billing process; however, charging and billing is outside the scope of this Recommendation | International Standard. This specification is of generic application and needs to be extended by some application specific purpose. It is expected to be adopted for TMN use.

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**INTERNATIONAL STANDARD**

**ITU-T RECOMMENDATION**

# INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – SYSTEMS MANAGEMENT: USAGE METERING FUNCTION FOR ACCOUNTING PURPOSES

## 1    Scope

This Recommendation | International Standard defines a systems management function which may be used by an application process in a centralized or decentralized management environment to interact for the purpose of systems management as defined in CCITT Rec. X.700 | ISO/IEC 7498-4. This Recommendation | International Standard defines the usage metering function and consists of service and generic definitions. It is positioned in the application layer of ITU-T Rec. X.200 | ISO/IEC 7498-1 and is defined according to the model provided by ISO/IEC 9545. The role of systems management functions is described by CCITT Rec. X.701 | ISO/IEC 10040.

This Recommendation | International Standard:

– establishes user requirements for service definitions needed to support the usage metering function;

– establishes models that relate the service provided by this function to the user requirements;

– defines the service provided by the function;

– specifies the protocol that is necessary in order to provide this service;

– defines the relationships between the service and the operations and notifications for usage metering managed objects;

– defines the relationships with other Systems Management functions;

– specifies conformance requirements;

– defines generic managed object classes, packages, attributes, operations types and notification types, documented in accordance with guidelines for the definition of managed objects;

– specifies compliance requirements placed upon other standards which make use of these generic definitions.

This Recommendation | International Standard neither defines nor specifies:

– the interactions which are the consequence of the use of usage metering facilities;

– connection establishment or authorization requirements for the use of these facilities;

– which usage metering attributes, management operations and notifications are to be incorporated when defining accounting for the use of specific OSI resources or other resources;

– any procedures for the subsequent use of usage data, whether gathered from a usage metering data object or a log; in particular, procedures for using this data for filing, auditing, correlation or for combining usage data are excluded;

– the process by which usage data, gathered from a managed object, are used to form usage metering records in a log;

– the usage gathering process within the accountable resource;

– the charging process and the billing process.

## 2 Normative references

The following Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation I International Standard. At the time of publication, the editions indicated were valid. All Recommendations and Standards are subject to revision, and parties to agreements based on this Recommendation I International Standard are encouraged to investigate the possibility of applying the most recent edition of the Recommendations and Standards listed below. Members of IEC and ISO maintain registers of currently valid International Standards. The Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

### 2.1 Identical Recommendations I International Standards

– ITU-T Recommendation X.210 (1993) I ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services.*

– CCITT Recommendation X.701 (1992) I ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems management overview.*

– CCITT Recommendation X.720 (1992) I ISO/IEC 10165-1:1993, *Information technology – Open Systems Interconnection – Structure of management information: Management information model.*

– CCITT Recommendation X.721 (1992) I ISO/IEC 10165-2:1992, *Information technology – Open Systems Interconnection – Structure of management information: Definition of management information.*

– CCITT Recommendation X.722 (1992) I ISO/IEC 10165-4:1992, *Information technology – Open Systems Interconnection – Structure of management information: Guidelines for the definition of managed objects.*

– ITU-T Recommendation X.724 (1993) I ISO/IEC 10165-6:1994, *Information technology – Open Systems Interconnection – Structure of management information: Requirements and guidelines for implementation conformance statement proformas associated with OSI management.*

– CCITT Recommendation X.730 (1992) I ISO/IEC 10164-1:1993, *Information technology – Open Systems Interconnection – Systems management: Object management function.*

– CCITT Recommendation X.731 (1992) I ISO/IEC 10164-2:1993, *Information technology – Open Systems Interconnection – Systems management: State management function.*

– CCITT Recommendation X.734 (1992) I ISO/IEC 10164-5:1993, *Information technology – Open Systems Interconnection – Systems management: Event report management function.*

– CCITT Recommendation X.735 (1992) I ISO/IEC 10164-6:1993, *Information technology – Open Systems Interconnection – Systems management: Log control function.*

– ITU-T Recommendation X.738 (1993) I ISO/IEC 10164-13:1995, *Information technology – Open Systems Interconnection – Systems management: Summarization function.*

– ITU-T Recommendation X.739 (1993) I ISO/IEC 10164-11:1994, *Information technology – Open Systems Interconnection – Systems management: Metric objects and attributes.*

### 2.2 Paired Recommendations I International Standards equivalent in technical content

– CCITT Recommendation X.200 (1989), *Reference Model of Open Systems Interconnection for CCITT Applications.*

ISO 7498:1984, *Information processing systems – Open Systems Interconnection – Basic Reference Model.*

– CCITT Recommendation X.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1).*

ISO/IEC 8824:1990, *Information technology – Open Systems Interconnection – Specification of Abstract Syntax Notation One (ASN.1).*

– CCITT Recommendation X.209 (1990), *Specification of basic encoding rules for Abstract Syntax Notation One (ASN.1).*

ISO/IEC 8825:1990, *Information technology – Open Systems Interconnection – Specification of Basic Encoding Rules for Abstract Syntax Notation One (ASN.1).*

—   CCITT Recommendation X.700 (1992), *Management framework for Open Systems Interconnection (OSI) for CCITT Applications.*

ISO/IEC 7498-4:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 4: Management framework.*

—   CCITT Recommendation X.710 (1991), *Common management information service definition for CCITT applications.*

ISO/IEC 9595:1991, *Information technology – Open Systems Interconnection – Common management information service definition.*

—   CCITT Recommendation X.711 (1991), *Common management information protocol specification for CCITT applications.*

ISO/IEC 9596-1:1991, *Information technology – Open Systems Interconnection – Common management information protocol – Part 1: Specification.*

# 3   Definitions

For the purposes of this Recommendation | International Standard the following definitions apply.

## 3.1   Basic reference model definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.200 | ISO/IEC 7498.

a)   open system;

b)   systems management.

## 3.2   Management framework definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.700 | ISO/IEC 7498-4:

—   managed object

## 3.3   Systems management overview definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.701 | ISO/IEC 10040

a)   management operation;

b)   notification;

c)   systems management functional unit.

## 3.4   Common management information definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.710 | ISO/IEC 9595

—   attribute

## 3.5   Management information model definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.720 | ISO/IEC 10165-1:

a)   action;

b)   package;

c)   subclass.

## 3.6 Log control function definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.735 | ISO/IEC 10164-6:

a) log;

b) log record.

## 3.7 Definitions specific to this standard

**3.7.1** **service subscriber**: Is the legal entity, which has subscribed to a certain service type. It is not necessarily a different party from the service user. (The calling and called parties of a service transaction are service users).

**3.7.2** **service transaction record**: Combines usage metering records, which pertain to a particular service transaction, into a single record. In addition it contains charging information.

> NOTE – The term service transaction is used in its usual English meaning to denote things like a telephone call or the sending of an electronic mail message.

**3.7.3** **usage metering**: The abstraction of activities that monitor the utilization of resources, for the purpose of accounting and controlling the recording of usage data.

**3.7.4** **usage metering control**: Usage metering functionality dedicated to controlling the activities of gathering and reporting data concerning the utilization of resources.

**3.7.5** **usage metering data**: Data which represents usage from which usage metering records may be derived.

**3.7.6** **accountable object**: A managed object representing a resource or another entity for which usage data are to be maintained, requiring its usage to be attributed to a user.

**3.7.7** **usage metering record**: A data item containing usage information relating to a specific period of resource utilization by a specific user.

**3.7.8** **unit of usage (unit)**: The unit of measure used to qualify the usage.

**3.7.9** **usage**: A value expressed in terms of a unit of usage, quantifying the utilization of a resource from which information may be derived for the purpose of accounting.

**3.7.10** **user**: An identifiable entity whose use of resources must be accounted.

## 4 Abbreviations

| | |
|---|---|
| CMIP | Common Management Information Protocol |
| CMIS | Common Management Information Service |
| MAPDU | Management Application Protocol Data Unit |
| OSI | Open Systems Interconnection |
| PDU | Protocol Data Unit |
| SDU | Service Data Unit |
| SMASE | Systems Management Application Service Element |
| umf-mo | joint-iso-ccitt ms(9) function(2) part10(10) managedObjectClass(3) |
| umf-pkg | joint-iso-ccitt ms(9) function(2) part10(10) package(4) |
| umf-par | joint-iso-ccitt ms(9) function(2) part10(10) parameter(5) |
| umf-nb | joint-iso-ccitt ms(9) function(2) part10(10) nameBinding(6) |
| umf-att | joint-iso-ccitt ms(9) function(2) part10(10) attribute(7) |
| umf-act | joint-iso-ccitt ms(9) function(2) part10(10) action(9) |
| umf-not | joint-iso-ccitt ms(9) function(2) part10(10) notification(10) |

## 5        Conventions

This Recommendation | International Standard follows the descriptive conventions defined in ITU-T Rec. X.210 | ISO/IEC 10731.

The following notation is used in this document's service parameter tables:

M      The parameter is mandatory.

U      The use of this parameter is a service-user option.

–      The parameter is not present in the interaction described by the primitive concerned.

C      The parameter is conditional. The condition(s) are defined by the text which describes the parameter.

P      Subject to the constraints imposed on the parameter by CCITT Rec. X.710 | ISO/IEC 9595.

## 6        Requirements for usage metering

The usage metering function should fulfil the requirements by which resource utilization is determined so that the data that are gathered may be used for the processes of accounting management and the generation of bills. These requirements are:

a)    There is a requirement for the measurement and collection of data in order to provide information on the usage of OSI services and other services by the users of these services.

b)    Suppliers of OSI and other services need standardized ways of obtaining and representing usage information to advise subscribers of their usage and to facilitate exchange of usage information with other suppliers. A usage metering record should contain all usage data necessary to account for resource utilization relating to a specific instance of utilization by a specific user. More than one usage metering record may be needed in order to support any bill raised. This could include such details as time of usage, type of service offered by the resource and type of tariff.

c)    The usage metering function must enable those responsible for managing accounting to collect, and to control the collection of, data concerning the use of resources.

d)    There are many ways in which the collected data may subsequently be processed by the *charging process*. Hence, the usage metering function must be of sufficient generality to allow any reasonable form of data processing. (For example, it must permit data to be collected so that the supplier or subscriber can determine the extent of the usage of a particular resource; data may be collected so that a service provider can charge for resource utilization.)

e)    The information available through the usage metering function, must enable managers to discover information about the resources whose usage is determined by the usage metering function. Managers must be able to determine the status of metering operation and managing systems need to be informed of metering activity. Thus, the usage metering function must allow sufficient control over the collection of data so that the relevant information can be made available when required, either during the period of resource usage or at any time thereafter. A managing system should (in principle) have the capability to access individual usage metering records instantaneously. For example, this feature is required for real time cost calculation.

f)    In order to store collected usage data, usage metering records are required to provide a historical record of resource usage as determined by the usage data.

g)    The usage metering records should be self contained, i.e. the way in which a usage metering record is to be interpreted, should not depend on the system where the usage metering record was created.

h)    Several resources may be available in a managed system to provide a service. The function should make it possible to relate usage metering records to the resources that are actually used for providing the requested service. Such a resource can be either internal or external to the domain of a service provider. For instance, a specific department within the domain can own the resource providing the service. Also an external service provider can own the resource. (In general an external service provider will receive revenues from a service subscriber through the billing process of the "original" service provider.).

i)    The function should make it possible to relate usage metering records to (one or more) service-users and their roles in the transaction (i.e. calling and called parties). (Recording more than one called-party role can be necessary.) A service-user identification may be necessary for determining the geographical area where the service transaction is taking place in order to determine related charging. It also is necessary that usage metering records contain the information required to facilitate the production of itemized bills.

NOTE 1 – The detailed mechanism to support all of this requirement is not specified in this Recommendation | International Standard, but left open for specializers to specify.

j)   A usage metering record should contain sufficient timestamp information, which is precise enough, in order to be able to relate it to for example, time-related tariffs.

k)   All usage metering records should have a *standardized format*. It should be possible to specialize the usage metering records so that they can be used for specific purposes. Examples are:

1)   A usage metering record may need a parameter which relates to the geographical area where the service is provided. Normally, the service-user identification is sufficient. However, for mobile services, the service-user identification may provide insufficient information.

2)   The function should provide a mechanism for 'volume-based' accounting. It must be possible to modify the volume-unit. (A duration can be seen as a special case of a volume unit.)

l)   The function should support a number of conditions for reporting of a usage metering record. These conditions will cause the creation of a usage metering record. Examples are:

1)   invocation or termination of a service-transaction;

2)   reaching a volume threshold;

3)   at regular intervals during a practical service transaction.

m)   A usage metering record should identify the actual condition which caused the record to be created.

n)   The function should be able to produce usage metering records which contain sufficient information to correlate usage metering records to each other. In this manner any charging process is able to interrelate and combine the different usage metering records which belong to the same service-transaction, and which possibly emerge from different systems.

NOTE 2 – The detailed mechanism to support all of this requirement is not specified in this Recommendation | International Standard, but left open for specializers to specify.

o)   The function should be able to produce usage metering records which contain an identifier of the service-type. (This is not necessarily the end-to-end service, but can be a supporting service on a lower level.) This service-type identifier can be used by any charging process to determine the algorithm according to which the charging has to be computed.

p)   It must be possible that the completeness of a service transaction record can be determined. This requires additional features in the usage metering function and the usage metering records. However, not all implications to the function are known yet, and further study is required.

# 7   Model for usage metering and usage logs

## 7.1   Model for accounting

Accounting for resource utilization has three sub-processes. These sub-processes are:

–   The *usage metering process* – This process is responsible for the creation of usage metering records as a consequence of the occurrence of accountable events in systems. The usage metering process is also responsible for logging of the usage metering records. Several accountable events may result in a single usage metering record. In general use of a service which demands the use of several resources will give rise to several usage metering records.

–   The *charging process* – This process is responsible for collecting the usage metering records which pertain to a particular service transaction in order to combine them into *service transaction records*. In addition, pricing information (according to a tariff-system) is added to the service transaction records. The charging process is also responsible for logging the service transaction records.

–   The *billing process* – This process is responsible for collecting the service transaction records and selecting from these the ones which pertain to a particular service subscriber over a particular time-period and produce the bill from these.

Figure 1 illustrates these processes.

Of the above, this Recommendation | International Standard specifies the activities and management information required to support the usage metering process.

NOTE – The accounting process, which is used in this Recommendation | International Standard purely for descriptive purposes, is a hypothetical process that does not purport to be, or have the characteristics of, any actual accounting process such as the international accounting process.
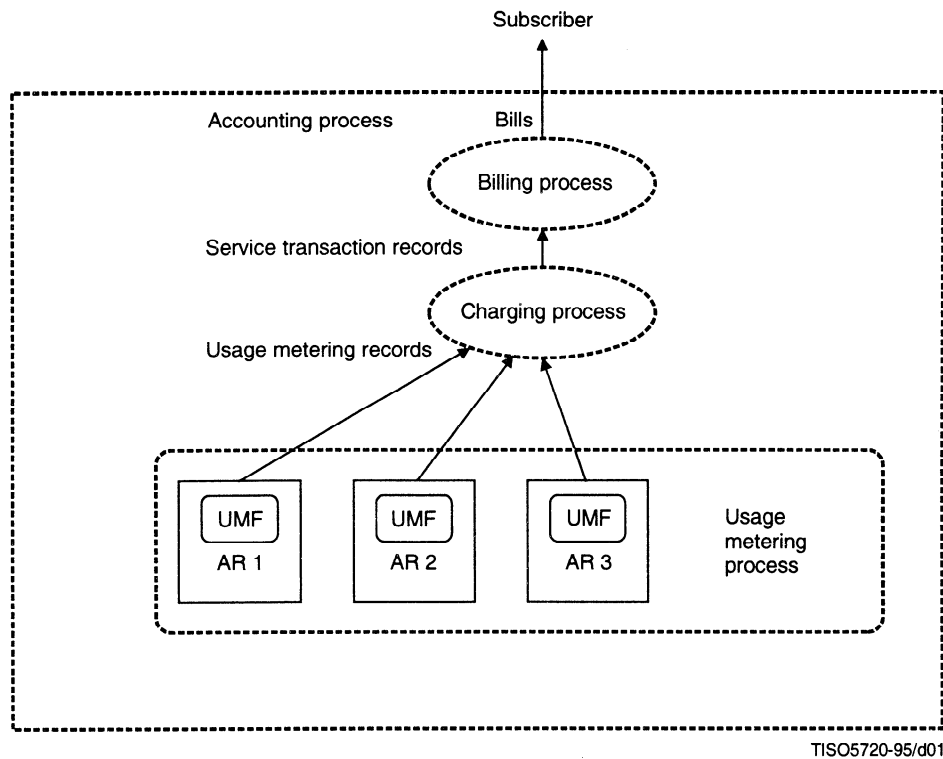
Figure 1 – Example of modelling the accounting process

## 7.2    Model for usage metering

*Usage metering* is an abstraction of management characteristics associated with provision of accounting for resource utilization. This is modelled as being associated with an accountable object which may either represent other aspects of that resource, or which may exist solely for the purpose of supporting accounting. There are two aspects to the usage metering:

  — control of the recording and reporting of data associated with accounting for usage;

  — the specifics of the recorded data.

### 7.2.1    Usage metering control

Usage metering control allows a managing system to:

  a)    control the collection of usage data from an accountable object, start and stop the collection through management operations;

  b)    identify which usage data can be collected, and under what circumstances they are to be reported.

Usage metering control specifies the events which will cause usage metering information to be reported. They include periodic events marking the passage of time for which a resource is in use and specified stimuli relating to other aspects of resource use. Reporting may also occur as a result of usage metering control actions.

A managed object dedicated to the control of usage metering is termed a *usage metering control object* (for short: control object). The generic usage metering control object can be specialized to form usage metering control object classes for specific resources. Other managed objects, which also exhibit usage metering control properties can be defined using packages of usage metering control characteristics defined in this Recommendation I International Standard. These objects are formed by using and specializing the various template definitions provided by this Recommendation I International Standard.

### 7.2.2    Usage metering data

Usage metering data represent the accounted use of a resource. They contain information identifying the user, the service being provided, a measure of the quantity used together with other qualifying data.

Usage data relating to an accountable object can be obtained:

      a)   by the inclusion of usage metering data parameters in a usage metering defined notification;

      b)   by the use of the GET operation to get corresponding meter data attribute values.

A notification containing usage data is obtained on a predefined basis by identifying triggering events. Triggering events are represented as part of usage metering control.

A managed object dedicated to the provision of accounting management data is termed a *usage metering data object* (for short: data object). The generic data object can be specialized to form data object classes for specific resources. Other managed objects, which also exhibit usage metering properties can be defined using packages of usage metering characteristics. These objects are formed by using and specializing the various template definitions provided by this Recommendation | International Standard. Only the generic behaviour of these properties is defined in this Recommendation | International Standard. An object providing usage metering data shall be specified to include the identity of the user (see Table 2 in 8.2.3.1) and possibly other attributes relating to the instance of use that is being metered.

### 7.2.3    Relationships between accountable objects, usage metering control and usage metering data objects

Usage metering control may be modelled in terms of either a separate managed object or as part of a managed object representing control aspects of management which include accounting. The usage metering control object may be named relative to either an accountable object or some other managed object in order for it to control the collection of usage data from one or more accountable objects. This implies that one usage metering control object may support and reference several accountable objects. When the functionalities of a metering control object are included in the accountable object, the reference is a set of one element containing the pointer to itself.

Usage metering data may be modelled in terms of either a separate managed object or as part of a managed object representing the activities being accounted. If the accountable object exists solely for the purpose of accounting, then the accountable object shall include the usage metering data capability.

Control objects provide a reference to the data objects which they control. Each instance of a control object may exercise its control over several instances of data objects. An instance of a control object applies to all referenced instances of data objects. Each usage metering data object references the accountable object for which it maintains usage metering data. When the functionalities of the data object are included in the accountable object, the reference is a pointer to itself.

Each instance of a data object shall be controlled by one and only one control object, and shall measure usage for one and only one accountable object.

This Recommendation | International Standard recommends that the control object is contained within either:

      a)   the managed object which contains the accountable objects; or

      b)   the accountable object itself.

### 7.2.4    Operation of usage meters

Before usage metering data from an accountable object can be made available at least one instance of an object providing control functionality, a *usage metering control object*, must exist. This may be created implicitly or explicitly through the use of a create operation. Upon creation, the control object shall have values for:

      –   identifying the units of usage;

      –   the reporting triggers which specify occurrences of events, either within or related to the accountable object or the data object, which cause a data object to emit a usage metering data notification.

Attributes for units of usage are not specified by this function, but must be provided in a specialization. Furthermore, if there is a need to manage the usage metering process, a specialization may incorporate attributes for triggering of recording of usage metering data, the *recording triggers*.

A notification of creation of a control object or a data object shall be provided by the Object Creation Reporting Service of the Object Management Function CCITT Rec. X.730 I ISO/IEC 10164-1. To capture complete usage metering information, a control object must remain in existence as long as there are data objects controlled by the control object. A notification of deletion of a control object or a data object shall be provided by the Object Deletion Reporting Service of the Object Management Function (see CCITT Rec. X.730 I ISO/IEC 10164-1).

Creation of a data object may be implicit or explicit. Explicit creation is achieved by use of a create operation. Implicit creation is the result of an event which is significant for accounting purposes. These events must be specified in detail when this Recommendation I International Standard is specialized for a certain technology.

While a data object is in existence and accounting for the use of a resource, update of its usage metering information is triggered only by internal events, i.e. the value of the metering data is read only. If there is a need to manage which events is used as recording triggers, these can be specified in specializations as a set of recording triggers listed in the corresponding control object.

When there is no further requirement to account for usage, the corresponding data object is deleted. Deletion can be implicit or explicit, through management intervention. Where data object deletion is one of the reporting triggers, the data object shall emit a notification containing usage data prior to its deletion. During the period in which the data object is generating the notification and pending deletion, it shall assert a *terminating* value for its procedural status.

Further control over usage metering objects is provided through the use of action operations. A request for action is directed to a control object and identifies the corresponding data objects whose activity is to be modified.

Data objects may be placed in a suspended condition by the use of a suspend action applied to the corresponding control object identifying the data objects to which the action applies. This has the effect of holding usage parameters constant at their current values. Usage metering may be resumed in a running condition by directing a resume action to the control object with a list of identified data objects to which the action applies. This action has no effect upon data objects which are already in the desired condition. The response to the action lists the data objects upon which the operation was successfully performed and those where it failed, that is the actions are performed using *best effort* synchronisation across the associated data objects.

Usage metering control functionality may be started by directing a start action to the control object. The effect of this action is to re-initialize the values of parameters accounting for usage which are under the control of that object and identified in an action parameter list. Usage metering control functionality is stopped by issuing a suspend action identifying all data objects. All related recording of usage ceases. All data objects are left in the suspended condition. It should be noted that a start action, which is received by a control object, referencing a data object will (re-)start its metering activity and as a result have its usage values reset. During the period in which the data object is suspended, its control status shall take a suspended value. Upon start or resumption of the data object, the suspended value is removed from its control status.

Notifications are emitted by control objects as a result of these actions to indicate the data objects to which the action applied and the associated control parameters.

A notification generated by a data object is the result of an internal event which matches one of the reporting situations listed in the reporting triggers attribute. This internal event may arise from activities within the system containing the accountable object or may be the result of an external management operation. Events can be periodic (that is at specified time intervals), determined by the successful completion of a start, suspend or resume action, by a change in the operational state of the control object or by the data object being deleted. Provision is made in this Recommendation I International Standard for including other reporting stimuli in the set of reporting triggers. The notification contains data together with an indication of the presence of problems in the usage metering data, if any.

Table 1 specifies the various state transitions for the usage data object as a result of the events. The triggers for the events causing the state transitions are a result of either explicit management requests directed at the control object (example start metering) or defined as part of the control object (example recording trigger).

The usage metering function relies upon the facilities of the Event Report Management function as defined in CCITT Rec. X.734 I ISO/IEC 10164-5 to configure one or more event forwarding discriminators in order to send usage metering data notifications (as M-EVENT REPORTs) to specific destinations. Event reports may also be logged in a log that contains *usage metering records*. The usage metering function relies upon the facilities of the Log Control function, CCITT Rec. X.735 I ISO/IEC 10164-6, for the further handling of usage metering records.