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CCITT

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X.734

DATA COMMUNICATION NETWORKS

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – SYSTEMS MANAGEMENT: EVENT REPORT MANAGEMENT FUNCTION

Recommendation X.734

Foreword

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The CCITT (the International Telegraph and Telephone Consultative Committee) is a permanent organ of the ITU. Some 166 member countries, 68 telecom operating entities, 163 scientific and industrial organizations and 39 international organizations participate in CCITT which is the body which sets world telecommunications standards (Recommendations).

The approval of Recommendations by the members of CCITT is covered by the procedure laid down in CCITT Resolution No. 2 (Melbourne, 1988). In addition, the Plenary Assembly of CCITT, which meets every four years, approves Recommendations submitted to it and establishes the study programme for the following period.

In some areas of information technology which fall within CCITT's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of CCITT Recommendation X.734 was approved on 10th of September 1992. The identical text is also published as ISO/IEC International Standard 10164-5.

CCITT NOTE

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

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INFORMATION NOTE

The following table gives a list of X.700 Series Recommendations which were developed in collaboration with the ISO/IEC and are identical to the corresponding International Standard. Cross-references to the corresponding ISO/IEC International Standard number and the short title of the Recommendation | International Standard are provided.

CCITT Recommendation ISO/IEC International Standard	Short Title
X.700 | 7498-4 (Note)	Management Framework
X.701 | 10040	System Management Overview
X.710 | 9595 (Note)	Common Management Information Service Definition
X.711 | 9596-1 (Note)	Common Management Information Protocol Specification
X.712 | 9596-2	CMIP PICS
X.720 | 10165-1	Management Information Model
X.721 | 10165-2	Definition of Management Information
X.722 | 10165-4	Guidelines for the Definition of Managed Objects
X.730 | 10164-1	Object Management Function
X.731 | 10164-2	State Management Function
X.732 | 10164-3	Attributes for Representing Relationships
X.733 | 10164-4	Alarm Reporting Function
X.734 | 10164-5	Event Management Function
X.735 | 10164-6	Log Control Function
X.736 | 10164-7	Security Alarm Reporting Function
X.740 | 10164-8	Security Audit Trail Function
NOTE — This Recommendation and International Standard are not identical, but are technically aligned.	

INTERNATIONAL STANDARD

CCITT RECOMMENDATION

INFORMATION TECHNOLOGY — OPEN SYSTEMS INTERCONNECTION — SYSTEMS MANAGEMENT: EVENT REPORT MANAGEMENT FUNCTION

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 by CCITT Rec. X.700 | ISO/IEC 7498-4. This Recommendation | International Standard defines the Event report management function and consists of services and two functional units. This function is positioned in the application layer of CCITT Rec. X.200 | ISO 7498 and is defined according to the model provided by ISO/IEC 9545. The role of systems management functions is described in CCITT Rec. X.701 | ISO/IEC 10040.

This Recommendation | International Standard

- establishes user requirements for the event report management function;
- establishes models that relate the services provided by the function to user requirements;
- defines the services provided by the function;
- specifies the protocol that is necessary in order to provide the services;
- defines the relationship between the services and SMI operations and notifications;
- defines relationships with other systems management functions;
- specifies conformance requirements.

This Recommendation | International Standard does not

- define the nature of any implementation intended to provide the event report management function;
- specify the manner in which management is accomplished by the user of the event report management function;
- define the nature of any interactions which result in the use of the event report management function;
- specify the services necessary for the establishment, normal and abnormal release of a management association;
- specify the authorization requirements for the use of the event report management function or for any associated activity;
- define the managed objects related to the management of particular protocol machines.

2 Normative references

The following CCITT Recommendations and International Standards contain provisions which, through reference in this text, constitute provisions of this Recommendation | 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 | 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 CCITT Secretariat maintains a list of the currently valid CCITT Recommendations.

2.1 Identical Recommendations | International Standards

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

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

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

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

2.2 Paired Recommendations | International Standards equivalent in technical content

— CCITT Recommendation X.200 (1988), *Reference Model of Open Systems Interconnection for CCITT Applications.*

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

— CCITT Recommendation X.210 (1988), *Open Systems Interconnection Layer Service Definition Conventions.*

ISO/TR 8509:1987, *Information processing systems — Open Systems Interconnection — Service conventions.*

— CCITT Recommendation X.700 (1988), *Management Framework Definition 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.208 (1988), *Specification of Abstract Syntax Notation One (ASN.1). X.208, ITU, Geneva 1989.*

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

— CCITT Recommendation X.209 (1988), *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.710 (1992), *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.290 (1992), *OSI Conformance Testing Methodology and Framework for protocol Recommendations for CCITT applications — General Concepts.*

ISO/IEC 9646-1:1991, *Information technology — Open Systems Interconnection — Conformance testing methodology and framework — Part 1: General concepts.*

2.3 Additional references

— ISO/IEC 9545:1989, *Information technology — Open Systems Interconnection — Application Layer structure.*

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 7498.

a) open system;

b) systems management.

3.2 Service convention definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.210 | ISO/TR 8509.

primitive

3.3 Management framework definitions

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

a) Management information;

b) Managed object;

c) systems-management-application-entity.

3.4 Systems management overview definitions

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

a) agent role;

b) dependent conformance;

c) general conformance;

d) management support object;

e) manager role;

f) notification;

g) systems management functional unit;

h) systems management operation.

3.5 Common management information service definitions

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

a) attribute;

b) common management information services;

c) common management Information service element.

3.6 OSI conformance testing definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.290 | ISO/IEC 9646-1.

system conformance statement

3.7 Additional definitions

The following terms are defined in this Recommendation | International Standard.

3.7.1 discriminator: A management support object that allows a system to select management operations and event reports relating to other managed objects.

3.7.2 discriminator input object: A conceptual object whose attributes are parameters of either an operation or a notification.

Discriminator input objects are defined for the purpose of discrimination and instances of discriminator input objects exist only for the duration of discrimination. Discriminator input object attributes can be used for discrimination, if and only if they have an object identifier. Attributes that have no matching rules defined for them can only be checked for presence.

3.7.3 event forwarding discriminator: A discriminator that acts on potential event reports.

3.7.4 event report management function: A function, including the definition of a management support object class, that allows a manager to control the transmission of event reports from managed objects independent of the definition of the managed objects.

3.7.5 potential event report: A type of discriminator input object that is defined for the purpose of event forwarding discrimination.

A potential event report consists of all the information required to be forwarded in the event report. The information is derived from the information contained in the notification and information derived from local processing of the notification, if any.

4 Abbreviations

ASN.1	Abstract Syntax Notation One
CMIS	Common management information service
CMISE	Common management information service element
EFD	Event forwarding discriminator
ERF	Event reporting function
Id	Identifier
MAPDU	Management application protocol data unit
PDU	Protocol data unit
SMAE	Systems management application entity
SMFU	Systems management functional unit
SMI	Structure of management information

5 Conventions

This Recommendation | International Standard defines services for the event report management function following the descriptive conventions defined in CCITT Rec. X.210 | ISO/TR 8509.

6 Requirements

The requirements to be satisfied are

a) the definition of a flexible event report control service which will allow systems to select which event reports are to be sent to particular managing systems;

b) the specification of the destinations (e.g. the identities of managing systems) to which event reports are to be sent;

c) the specification of a mechanism to control the forwarding of event reports, for example, by suspending and resuming their forwarding;

d) the ability for an external managing system to modify the conditions used in the reporting of events;

e) the ability to designate a backup location to which event reports can be sent if the primary location is not available.

7 Model for the event report management function

7.1 General

The functional requirements noted above, relating to the behaviour of systems, can be reduced to a basic requirement on the behaviour of a system. This is the ability to specify conditions to be satisfied by a potential event report emitted by a particular managed object in order to be sent to specified destinations.

7.2 Event report management model

The event report management model describes the conceptual components that provide for remote event reporting and local processing of potential event reports. The model also describes the control messages, event reporting messages and retrieval messages.

The conceptual event pre-processing function receives local notifications and forms the potential event reports. Conceptually, these potential event reports are distributed to all event forwarding discriminators that are contained within the local open system. A potential event report is perceived as a discriminator input object for the purposes of discrimination by the event forwarding discriminators only and is not visible from outside the local system.

The event forwarding discriminator is used to determine which event reports are to be forwarded to a particular destination during specified time periods. It may also be used to specify the mode (confirmed or non-confirmed) for forwarding events. Each event forwarding discriminator may contain a scheduling capability determining the intervals during which event reports will be selected for forwarding. Each event forwarding discriminator contains a discriminator construct which specifies the characteristics a potential event report must satisfy in order to be forwarded. Event reports that have been selected are forwarded to the destination as soon as possible.

The event forwarding discriminator is itself a managed object and can therefore emit notifications. These notifications are processed as potential event reports by all event forwarding discriminators including the one that generated the notification.

Figure 1 is a schematic representation of the components involved in generating, processing and reporting events.

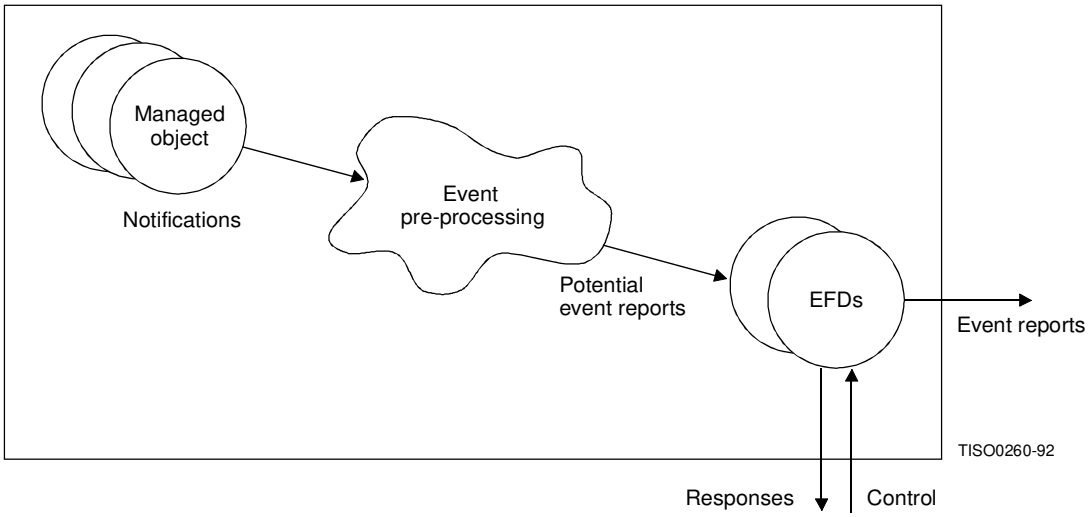

Figure 1 – Event report management model

7.2.1 Event reporting management function

Event reporting management allows an open system to establish and control the discrimination and the forwarding of event reports to other open systems. Event reports are generated as a result of the notification that an event has occurred, e.g. a threshold violation or a change in configuration status. The event forwarding management function provides the capability of identifying the destinations to which selected event reports are to be sent. Event reporting management provides the means by which discrimination and forwarding can be initiated, terminated, suspended, or resumed and through which the attributes of the event forwarding discriminator can be read and modified.

The event reporting management function provides the capability for setting up a long term event reporting relationship between two open systems. While the event forwarding discriminator is in the unlocked state, the reporting open system forwards event reports to the specified destination given that the operational state is enabled and any schedule is not “off-duty”.

Event reporting management comprises the following:

— initiation of event forwarding;

— termination of event forwarding;

— suspension of event forwarding;

— resumption of event forwarding;

— modification of event forwarding conditions;

— retrieval of event forwarding conditions.

8 Generic definitions

8.1 Managed objects

This Recommendation | International Standard provides generic definitions of managed objects, attributes and packages associated with the discriminator and the event forwarding discriminator.

8.1.1 The discriminator

The basic superclass is the **discriminator** object class. The discriminator may be specialized into subclasses to specify management support object classes that allow the control of various system management functions. The discriminator provides for specification of conditions that shall be satisfied prior to allowing the management operation or notification associated with the discriminator input object to proceed. Some of the conditions are common to all subclasses of the discriminator; others are unique to the specific discriminator subclass.

The conditions specified by the discriminator are

— identification of a scheduling packages that determine when discriminator processing will occur;

— the criteria for discrimination;

— the administrative and operational state of the discriminator;

— those specific to a particular discriminator object subclass.

8.1.1.1 Management of discriminators

The discriminator is a managed object that allows a managing system to exercise control over the management operations that may be accepted and the event reports that may be forwarded, by a managed system. Discriminators can, therefore, be created, deleted, read and modified. In addition, the activity of discriminators can be suspended and resumed by means of manipulating their administrative states.

When a discriminator is created, the discriminator shall generate an object creation notification. This notification shall be processed by the newly created discriminator.

Each discriminator has an operational state and an administrative state. The operational states defined for the discriminator are those defined in CCITT Rec. X.731 | ISO/IEC 10164-2. The administrative state attribute defined for the discriminator is a subset of those defined in CCITT Rec. X.731 | ISO/IEC 10164-2. A change in the operational state shall be reported using the state change notification. This notification shall be processed by the affected discriminator before it enters the disabled state or after it enters the enabled state, as appropriate.

The operational states defined for the discriminator are **enabled** and **disabled**. For the discriminator, the enabled state is the state in which the discriminator can process discriminator input objects (unless administratively prohibited from doing so or if any schedule is "off-duty"); in the disabled state the discriminator does not process any discriminator input objects.

The administrative states defined for the discriminator are **locked** and **unlocked**. State changes in the administrative state of the discriminator are the result of intervention by a managing system or local administrative activity. The precise semantics of these states are defined as part of the class definition of subclasses of discriminator.

The managing system may lock or unlock the discriminator. Whenever the administrative state of the discriminator changes, the discriminator shall generate a notification. When the state is changed from unlocked to locked and the discriminator is in the enabled state, the discriminator shall not change state until a state change notification indicating the state change has been processed by the discriminator. When the discriminator state is changed from locked to unlocked, the discriminator shall generate a notification indicating the state change immediately after having entered the unlocked state. The state change from unlocked to locked is assumed to occur instantaneously and without disrupting the processing of a current potential event report.

When the discriminator is deleted, the discriminator shall generate an object deletion notification and process that notification prior to deletion. If the discriminator is in the unlocked and enabled states it shall process the discriminator input object indicating the object deletion prior to its deletion.

In addition to manipulating the state of a discriminator, a manager can change the time during which a discriminator will be available and change the conditions under which tests on a discriminator input object can evaluate to TRUE. These changes are defined to occur in such a way so as not to impact a discriminator input object that is currently being processed. The availability status shall be present when a manager can change the time during which the discriminator is available. The availability status attribute value for the discriminator is a subset of those defined in CCITT Rec. X.731 | ISO/IEC 10164-1. If discrimination is available and the scheduling attributes are changed so that the current time is not within the "available" time range, the availability status becomes "off-duty". This notification shall be processed by the affected event forwarding discriminator before it enters the off-duty status. No state change notifications are generated for this attribute.

Changes to values of attributes other than administrative state, operational state and, if present, availability status, shall be reported using the attribute value change notification.

Open systems may be configured with a mechanism for forwarding events when no manageable event forwarding discriminator is available (see Annex B). This mechanism is outside the scope of this specification.

8.1.1.2 Normal operation of discriminators

A discriminator contains a discriminator construct that is a filtering mechanism which acts on attributes of discriminator input objects. A discriminator construct is a set of one or more assertions about the presence or values of attributes. If the discriminator construct involves more than one assertion, the assertions are grouped together using logical operators.

The discriminator construct can specify tests for equality and inequality conditions of attributes, test for the presence of attributes and the negation of any of these conditions. Multiple conditions may be combined by means of "AND" or "OR" operators. When an attribute for which an attribute value assertion is present in the discriminator construct, is absent in a discriminator input object to be tested, the result of the test on that attribute value assertion shall be evaluated as FALSE.

An empty discriminator construct will evaluate to TRUE for any set of discriminator input object attributes. For the discriminator, if the discriminator construct evaluates to TRUE, the discriminator is in the unlocked and enabled states, and the availability status, if present, is not "off-duty", then the discriminator input object passes the discriminator and will be processed further (the processing to be performed depends on the precise semantics of the discriminator subclass).

If the discriminator is in the locked or disabled states or has the "off-duty" availability status (if present), then discriminator input objects will not be processed by that discriminator. If the discriminator is created such that a manager can not change the time when it is available, then the discriminator is assumed to be always available.

8.1.1.3 Discriminator attributes

The following mandatory attributes are defined for the discriminator object class.

8.1.1.3.1 Discriminator Id

This attribute is used to uniquely identify the instance of a discriminator.

8.1.1.3.2 Discriminator construct

This attribute specifies tests on the information that is to be processed by the discriminator.

8.1.1.3.3 Administrative state

This attribute represents the administrative state of the discriminator. The following administrative states are defined:

a) **unlocked** — processing of the information by the discriminator is permitted by a managing system;

b) **locked** — processing of the information by the discriminator is prohibited by a managing system.

8.1.1.3.4 Operational state

This attribute represents the operational capability of the discriminator to perform its function. The following operational states are defined:

a) **enabled** — the discriminator is operational;

b) **disabled** — the discriminator is inoperable.

8.1.1.4 Discriminator notifications

The following mandatory notifications are defined for the discriminator object class:

a) state change;

b) attribute value change;

c) object creation;

d) object deletion.

8.1.1.5 Scheduling packages

To accommodate various levels of complexity in scheduling event reporting activity periods, conditional packages that are related to scheduling are defined for the event forwarding discriminator.

Scheduling packages provide discriminators with the ability to automatically switch between their reporting-on and reporting-off conditions. If no scheduling package is present in a discriminator, it is always in reporting-on condition.

8.1.1.5.1 Availability status package

This conditional package shall be present if any of the other scheduling related packages are instantiated. This package contains the following attribute:

Availability status

This attribute reflects the availability status of the managed object. When the resource has been made unavailable in accordance with a predetermined time schedule its value will be “off-duty”. The attribute is read-only. The value on creation is determined by the scheduling parameters specified and the status of the resource. The required value set for this attribute in this package is “off-duty”.

No state change notifications are generated for this attribute.

8.1.1.5.2 Duration package

The duration package provides the ability to automatically control the time that a managed object starts and stops functioning through the use of the start time and stop time attributes.

a) Start time

This attribute defines the date and time at which an unlocked and enabled managed object starts functioning. If the value of the Start time attribute is not specified in the create request, its value defaults to the time of creation of the managed object and thus causing it to function immediately.

A change in the Start time attribute results in an attribute value change notification.

b) Stop time

This attribute defines the date and time at which a managed object stops functioning. If the value of the Stop time attribute is not specified in the create request, its value defaults to "continuous operation". Continuous operation is represented by a null value for the Stop time.

A change in the Stop time attribute results in an attribute value change notification.

8.1.1.5.3 Daily scheduling package

The daily scheduling conditional package provides the capability of scheduling operability of the discriminator with a periodicity of 24 h.

The scheduling attribute and its associated default, are defined below:

Intervals of day

This attribute defines the list of time intervals (interval-start and interval-end times of day) for which the discriminators will exhibit the "on duty" condition. During excluded intervals the discriminator exhibits the "off-duty" condition. If not specified in the create request, the value of this component defaults to a single interval encompassing the entire 24 h period of a day.

8.1.1.5.4 Weekly scheduling package

The weekly scheduling conditional package provides the capability of scheduling operability of the discriminator with a periodicity of one week.

The scheduling attribute and its associated default, are defined below:

Week mask

This structured attribute defines a set of mask components, each specifying a set of time intervals on a 24 h time-of-day clock, pertaining to selected days of the week. The weekMask attribute defaults to a scheduling criteria of "always on" at discriminator creation. The components of each mask are defined below:

a) Days of week

This component defines the days of the week on which the discriminator's scheduling mechanism will allow the discriminator to have intervals during which processing of a discriminator may occur. This component, if not present in a create, will default to all seven days of the week.

b) Intervals of day

This component defines the list of time intervals (interval-start and interval-end times of day) for which the discriminator will exhibit the "on duty" condition, if the current day is one of the days that is selected within the corresponding daysOfWeek. During excluded intervals the discriminator exhibits the "off-duty" condition. If not specified in the create request, the value of this component defaults to a single interval encompassing the entire 24 h period of a day.

8.1.1.5.5 External scheduler scheduling package

The external scheduler scheduling conditional package provides the capability of scheduling event reporting based on a schedule defined in an external scheduler managed object. The discriminators' "on duty" and "off duty" conditions will be changed in accordance with the scheduling characteristics specified by a scheduler managed object.

The scheduling attribute is defined below:

Scheduler name

This attribute specifies the name of the schedular managed object that is related to the discriminators. This relationship implies that the discriminator's "on duty" and "off-duty" conditions will be scheduled by the external scheduler. This attribute is a read-only attribute.

8.1.2 Event forwarding discriminator

The **event forwarding discriminator** allows specification of conditions to be satisfied by potential event reports related to managed objects before the event report is forwarded to a particular destination(s). The event forwarding discriminator is a subclass of the discriminator object class.

8.1.2.1 Event forwarding discriminator attributes

In addition to the attributes inherited from the discriminator, the event forwarding discriminator has the following attribute:

Destination

The destination attribute identifies the destination(s) to which the discriminator forwards event reports. The destination may be a single application entity title or multiple application entity titles.

8.1.2.2 Backup destination package

This package has two attributes which specify the backup destinations and the active destination. This package is present when it is required to provide a backup for the destination.

8.1.2.2.1 Backup destination list

The backup destination list attribute is an ordered list of application entity titles. The application entities identified in the backup destination list are AE Titles designated to be used as event destination if the destination specified by the destination attribute fails. Detection of AE failures and switch-back policy is a local matter. The application entity that appears earlier in the list has priority over those following it in the list.

This attribute is not used when the destination attribute has multiple application entity titles.

8.1.2.2.2 Active destination

The active destination attribute is specified as a single application entity title. The active destination attribute identifies the Application Entity to which events are currently forwarded by the discriminator. This attribute is read-only and its value is assigned as a result of system operation using the destination or backup destination list attributes.

8.1.2.3 Mode package

This package has one attribute and is present when it is required if the mode for reporting events is to be specified by the managing system:

Confirmed mode

This attribute has two values: confirmed and non-confirmed. Its value shall only be set at object creation time. If the attribute is not specified in the request, the mode to be used for sending event reports is a local matter. All potential event reports that are forwarded by the event forwarding discriminator with the mode set to confirmed, are sent as confirmed event reports; if the mode is set to non-confirmed, they are sent as non-confirmed reports.

8.1.2.4 Event forwarding discriminator behaviour

In addition to the behaviour inherited from the discriminator object class, the event forwarding discriminator exhibits the following behaviour.

Tests on the following attributes of a potential event report may be specified by the discriminator construct in the event forwarding discriminator:

- managed object class;
- managed object instance;
- event type;
- event type specific attributes, e.g. for fault related events such attributes as
  - severity;
  - backed Up Status;
  - probable Cause.

In order to perform these tests the abstract syntax used must be known to the discriminator.

If the discriminator construct for a potential event report evaluates to TRUE and the event forwarding discriminator is in the unlocked and enabled state and does not exhibit the “off-duty” availability status, then an event report is directed to the specified destination.

8.2 Imported generic definitions

The following generic definitions used in this Recommendation | International Standard are defined in CCITT Rec. X.731 | ISO/IEC 10164-2 and CCITT Rec. X.730 | ISO/IEC 10164-1.

- administrative state;
- operational state;
- availability status;
- state change notification;
- object creation notification;
- object deletion notification;
- attribute value change notification.

9 Service definitions

This Recommendation | International Standard does not define any services. The use of services defined in other functions is described below.

9.1 Introduction

The information needs and management control requirements between systems may change with time and changes in the management or communications environment. It is, therefore, necessary to provide a mechanism for administering OSI management services.

It is considered that systems should have the capability of modifying the operation of event forwarding discriminators in other systems. In particular, the operations required, that can be applied to each instance of an event forwarding discriminator, are

- creation of a discriminator;
- deletion of a discriminator;
- modification of discriminator attributes;
- suspension of the activity of the discriminator; and
- resumption of the discriminators activity.

These operations will thus provide a means for a system to initiate/terminate/suspend/resume event reporting for particular managed objects.

It is also considered necessary that systems be able to modify and read any of the attributes of a particular event forwarding discriminator. The operational state attribute, active destination attribute, confirmed mode attribute and availability status attribute are read only and cannot be changed by management.

9.2 Initiation of event report forwarding

The PT-CREATE service defined in CCITT Rec. X.730 | ISO/IEC 10164-1 is used to allow one open system to request that another open system create an event forwarding discriminator, thereby requesting that new or additional event forwarding controls be imposed. When an event forwarding discriminator is created, it generates an object creation notification indicating its administrative, operational states and if present, availability status and confirmed mode. Whether or not this notification will result in the transmission of an event report, depends on the administrative and operational states, availability status and discriminator construct of the discriminators processing the potential event report.

The semantics of the discriminator attributes are defined in clause 8. The attributes and defaults for the create operation are specified below.

Discriminator construct: This attribute specifies the test conditions which will be used by the event forwarding discriminator in testing potential event reports. If no value is specified for this parameter in the incoming request, then an empty discriminator construct will be defined; i.e. a discriminator construct that evaluates to TRUE for all potential event reports. An example of the value notation for the discriminator construct is shown in annex B.

Discriminator Id: If the value is not supplied, the managing system shall assign a value and return it in the response.

Destination: This attribute identifies the destination to which event reports that have passed the test conditions will be sent. If no destination is specified in the request, then the discriminator is created with the destination defaulted to the AE Title of the invoker.

Administrative state: This attribute specifies the administrative state in which the discriminator is to be created. The discriminator administrative state is a subset of the administrative state defined in CCITT Rec. X.731 | ISO/IEC 10164-2. The discriminator may be created in an unlocked or a locked state. If no administrative state is specified, the unlocked state is assumed.

Operational state: This attribute specifies the operational state of the discriminator. The discriminator operational state are those defined for the operational state in CCITT Rec. X.731 | ISO/IEC 10164-2. The discriminator may be in the enabled or disabled state. The operational state shall not be specified as part of the create request, but shall be returned in the response and will reflect the actual state of the created event forwarding discriminator.

9.3 Termination of event report forwarding

The PT-DELETE service defined in CCITT Rec. X.730 | ISO/IEC 10164-1 is used to allow one open system to request that another open system delete one or more event forwarding discriminators, thereby requesting that some event forwarding controls be terminated. When an event forwarding discriminator is deleted, it generates an object deletion notification. Whether or not this notification will result in the transmission of an event report, depends on the administrative and operational states and discriminator construct of the event forwarding discriminators processing the potential event report. The discriminator shall not be deleted until it has either processed its deletion event report or been prohibited from doing so by being in a locked or disabled state.

9.4 Event forwarding discriminator modification, suspension and resumption

The PT-SET service defined in CCITT Rec. X.730 | ISO/IEC 10164-1 is used to allow one open system to request that another open system change the administrative state or other settable attribute of the event forwarding discriminator. When the administrative state is changed to locked, event forwarding will be suspended; when the administrative state is changed to unlocked and the operational state is enabled, event forwarding will be resumed. When the state of an event forwarding discriminator is changed, it generates a state change notification indicating its new and old values for the state. Whether or not this notification will result in the transmission of an event report, depends on the administrative and operational states and discriminator construct and, if present, on the availability status of the discriminators processing the potential event report. An event forwarding discriminator shall not enter the locked state until it has either processed the potential event report resulting from its state change or been prohibited from doing so by being in a disabled or off-duty state.

When the other non-state attributes of an event forwarding discriminator are changed, it shall generate an attribute change notification indicating the attributes that have changed. Whether or not this notification will result in the transmission of an event report, depends on the administrative and operational states and discriminator construct of the discriminators processing the potential event report. An event forwarding discriminator shall not change the value of its destination attribute until it has either processed the potential event report resulting from the destination change, or been prohibited from doing so by being in a locked, disabled or off-duty state.

9.5 Retrieval of event forwarding discriminator attributes

This Recommendation | International Standard uses the PT-GET service defined in CCITT Rec. X.730 | ISO/IEC 10164-1 for retrieving the attributes of the event forwarding discriminator.

10 Functional units

Two functional units are defined in this Recommendation | International Standard for the management of event forwarding discriminators:

a) event report management functional unit;

b) monitor event report management functional unit.

The monitor event report management functional unit requires the support of PT-GET service for instances of the event forwarding discriminator or any of its subclasses. The event report management functional unit requires the support of PT-GET, PT-SET, PT-CREATE and PT-DELETE, object creation reporting, object deletion reporting, attribute value change reporting and state change reporting services for instances of the event forwarding discriminator or any of its subclasses.

11 Protocol

11.1 Elements of procedure

This Recommendation | International Standard makes use of the elements of procedure defined for the services described in clause 9 of this Recommendation | International Standard. No additional elements of procedure are defined in this Recommendation | International Standard.

11.2 Abstract syntax

11.2.1 Objects

This Recommendation | International Standard references the following support objects whose ASN.1 value notation is specified in CCITT Rec. X.721 | ISO/IEC 10165-2:

a) eventForwardingDiscriminator;

b) discriminator.

11.2.2 Attributes

This Recommendation | International Standard references the following attributes, associated with the objects specified in 11.2.1, whose abstract syntax is defined in CCITT Rec. X.731 | ISO/IEC 10165-2:

a) activeDestination;

b) administrativeState;

c) availabilityStatus;

d) backUpDestinationList;

e) confirmedMode;

f) destination;

g) discriminatorConstruct;

h) discriminatorId;

i) intervalsOfDay;

j) operationalState;

k) schedulerName;

l) startTime;

m) stopTime;

n) weekMask.

11.2.3 Notifications

This Recommendation | International Standard references the following events defined in CCITT Rec. X.730 | ISO/IEC 10164-1:

a) attribute value change notification;

b) object creation notification;

c) object deletion notification;

This Recommendation | International Standard references the following events defined in CCITT Rec. X.731 | ISO/IEC 10164-2:

d) state change notification.

11.3 Negotiation of functional units

This Recommendation | International Standard assigns the following object identifier value

{joint-iso-ccitt ms(9) function (2) part5(5) functionalUnitPackage(1)}

as a value of the ASN.1 type FunctionalUnitPackageId defined in CCITT Rec. X.701 | ISO/IEC 10040 to use for negotiating the following functional units:

0 event report management functional unit

1 monitor event report management functional unit

where the number identifies the bit positions in the BIT STRING assigned to the functional units, and the names referencing the functional units as defined in clause 10.

Within the Systems management application context, the mechanism for negotiating the functional units is described by CCITT Rec. X.701 | ISO/IEC 10040.

NOTE — The requirement to negotiate functional units is specified by the application context.

12 Relationship with other functions

The event report management function uses the services defined in CCITT Rec. X.731 | ISO/IEC 10164-2 for the notification of state changes and the services defined in CCITT Rec. X.730 | ISO/IEC 10164-1 for the creation and deletion of discriminators, the retrieval of discriminator attributes, and the notification of attribute changes and object creations and deletions.

The relationship with the log control function in CCITT Rec. X.735 | ISO/IEC 10164-6 is shown in Figure 2 below.

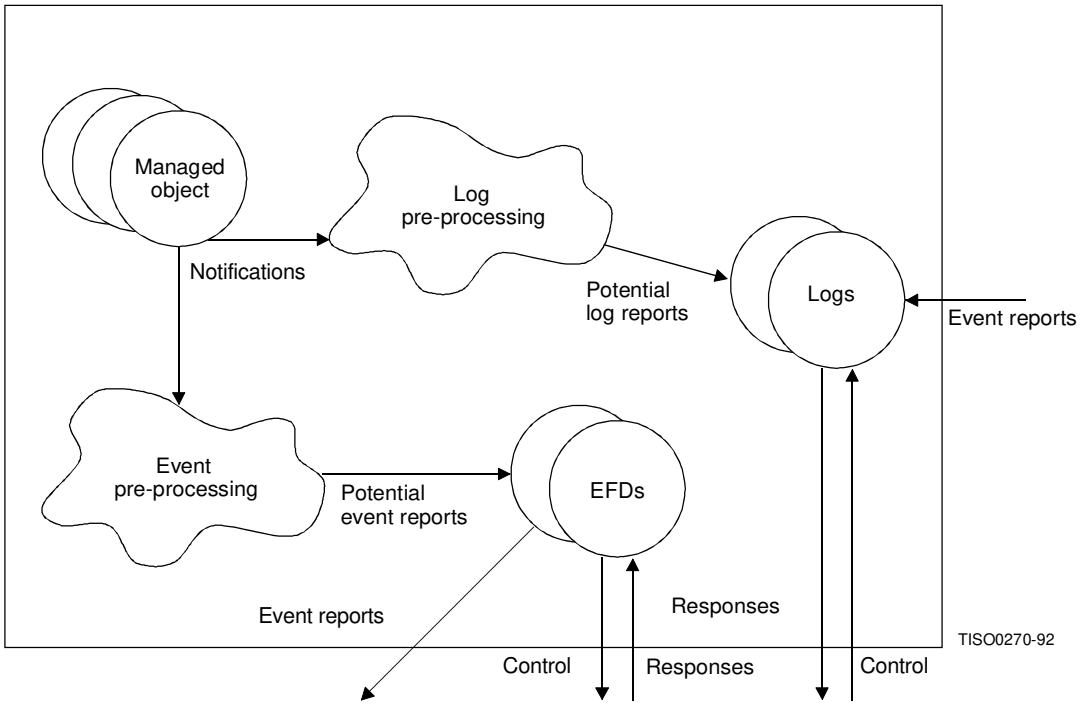

Figure 2 – Relationship between event report and log management models

13 Conformance

There are two conformance classes: general conformance class and dependent conformance class. A system claiming to implement the elements of procedure for system management services referenced by this Recommendation | International Standard shall comply with the requirements for either the general or the dependent conformance class as defined in the following clauses. The supplier of the implementation shall state the class to which the conformance is claimed.

13.1 General conformance class requirements

A system claiming general conformance shall support this function for all managed object classes that import the management information defined by this Recommendation | International Standard.

NOTE — This is applicable to any subclass of the management support object classes defined in this Recommendation | International Standard.

13.1.1 Static conformance

The system shall

a) support the role of manager or agent or both with respect to the event report management functional unit;

b) support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 | ISO/IEC 8825 and named {joint-iso-ccitt asn1(1) basicEncoding(1)}, for the purpose of generating and interpreting the MAPDUs, defined by the abstract data types referenced in 11.2.2 and 11.2.3 of this Recommendation | International Standard;

c) when acting in the agent role, support one or more instances of the event forwarding discriminator managed object class or any of its subclasses.

13.1.2 Dynamic conformance

The system shall, in the role(s) for which conformance is claimed, support the elements of procedure defined in

— CCITT Rec. X.730 | ISO/IEC 10164-1 for the PT-GET, PT-CREATE, PT-DELETE, PT-SET, Object creation reporting, Object deletion reporting and Attribute change reporting services;

— CCITT Rec. X.731 | ISO/IEC 10164-2 for the State change reporting service.

13.2 Dependent conformance class requirements

13.2.1 Static conformance

The system shall

a) supply a System Conformance Statement which identifies the standardized use of this Recommendation | International Standard;

b) support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 | ISO/IEC 8825 and named {joint-iso-ccitt asn1(1) basicEncoding(1)}, for the purpose of generating and interpreting the MAPDUs, defined by the abstract data types referenced in 11.2.3 of this Recommendation | International Standard, as required by a standardized use of this systems management function;

c) when acting in the agent role, support one or more instances of the event forwarding discriminator managed object class or any of its subclasses.

13.2.2 Dynamic conformance

The system shall support the elements of procedure referenced by this Recommendation | International Standard, as required by a standardized use of this system management function.

13.3 Conformance to support managed object definitions

The event forwarding discriminator objects supported by the open system shall comply with the behaviour specified in clause 8 and the syntax specified in CCITT Rec. X.721 | ISO/IEC 10165-2. For minimum conformance to the event report management function, an event forwarding discriminator containing the all-pass form of discriminator construct shall be supported.

Annex A
Example value notation for the discriminator construct

(This annex does not form an integral part of this Recommendation | International Standard)

This annex presents an example of the value notation for the discriminator construct.

The condition to be encoded is given below.

(objectClass **equal to** protocolEntity)
and (entityID **starts with** "123")
and ((severity **not Equal to** minor)
or (badPduCount **greater than or equal to** 20))

where **bold face** words are operators and plain type words are variables.

The following value notation of the value test-filter represents this condition.

```
test-filter CMISFilter ::=
        and {item equality {objectClass, Object-Class protocolEntity},
             item substrings {initialstring {entityID, PrintableString "123"}},
             or { not item equality {severity,Severity minor},
                  item lessOrEqual {badPduCount, INTEGER 20}}}
```

where

objectClass, entityID, severity and badPduCount are value references to AttributeId of type OBJECT IDENTIFIER, protocol entity is a value reference to ObjectClass of type OBJECT IDENTIFIER and minor is a value reference to Severity of type ENUMERATED.

Annex B
Event forwarding using local mechanism

(This annex does not form an integral part of this Recommendation | International Standard)

This annex presents a mechanism for forwarding events where no manageable event forwarding discriminator is available. This mechanism is a local issue. Figure B.1 illustrates this mechanism.

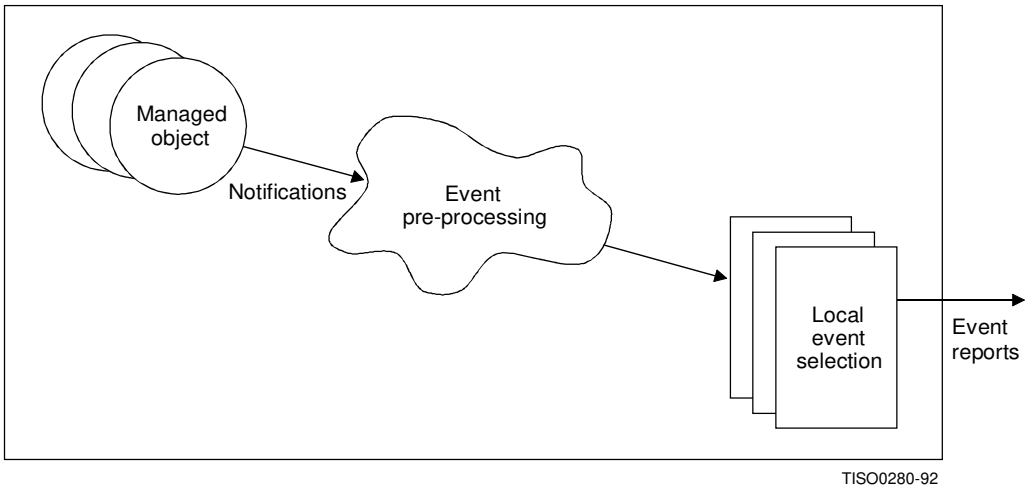

Figure B.1 – Local event selection mechanism

Annex C
Considerations for system implementation conformance statement

(This annex does not form an integral part of this Recommendation | International Standard)

The following is an example of the information the implementor may specify when defining conformance to this systems management function:

a) the behavioural options implemented for the event forwarding managed object class;

b) the range of all attribute values that can be supported by the event forwarding discriminator;

c) the number of each type of event forwarding discriminator that can be supported by the implementation.

Number	Discriminator type
	All-pass and destination configurable
	Object class and instance selection and destination configurable
	Event type selection and destination configurable
	Event type, object class and instance selection and destination configurable
	Arbitrary selection criteria