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Information technology — Open Systems Interconnection — Structure of management information: Definition of management information

Technologies de l'information — Interconnexion de systèmes ouverts — Structure des informations de gestion: Définition des informations de gestion

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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 10165-2 was prepared by Joint Technical Committee ISO/IEC JTC 1, *Information technology*, in collaboration with CCITT. The identical text is published as CCITT Recommendation X.721.

ISO/IEC 10165 consists of the following parts under the general title *Information technology – Open Systems Interconnection – Structure of management information*:

- Part 1: *Management information model*
- Part 2: *Definition of management information*
- Part 4: *Guidelines for the definition of managed objects*
- Part 5: *Generic management information*
- Part 6: *Requirements and guidelines for implementation conformance statement proformas associated with management information*

Annex A forms an integral part of this part of ISO/IEC 10165. Annexes B, C, D, E, F and G are for information only.

Introduction

ISO/IEC 10165 is a multipart standard developed according to ISO 7498 and ISO/IEC 7498-4. ISO/IEC 10165 is related to the following International Standards:

– ISO/IEC 9595:1990, *Information technology – Open Systems Interconnection – Common management information service definition;*

– ISO/IEC 9596:1990, *Information technology – Open Systems Interconnection – Common management information protocol;*

– ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems management overview;*

– ISO/IEC 10064:1992, *Information technology – Open Systems Interconnection – Systems Management.*

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INTERNATIONAL STANDARD

CCITT RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – STRUCTURE OF MANAGEMENT INFORMATION: DEFINITION OF MANAGEMENT INFORMATION

1 Scope

This Recommendation | International Standard

- defines the managed object classes, attribute types, name bindings, packages, specific attributes, action types, parameter types and notification types documented in accordance with CCITT Rec. X.722 | ISO/IEC 10165-4;
- specifies compliance requirements placed on other CCITT Recommendations | International Standards that make use of these definitions.

This Recommendation | International Standard is applicable to the development of OSI managed object class specifications and provides generic definitions that support OSI systems management functions. These definitions may also be used in other Recommendations | International Standards specifying object classes, attributes, notifications and action types.

2 Normative references

The following CCITT Recommendations | 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 editions of the Recommendations|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 CCITT Recommendations| International Standards

- CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1 : 1992, *Information technology - Open Systems Interconnection - Structure of management information: Management information model.*
- CCITT Recommendation X.722 (1992) | ISO/IEC 10165-4 : 1992, *Information technology - Open Systems Interconnection - Structure of management information: Guidelines for definition of managed objects.*
- CCITT Recommendation X.730 (1992) | ISO/IEC 10164-1 : 1992, *Information technology - Open Systems Interconnection - Systems Management: Object management function.*
- CCITT Recommendation X.731 (1992) | ISO/IEC 10164-2 : 1992, *Information technology - Open System Interconnection - Systems Management: State management function.*
- CCITT Recommendation X.732 (1992) | ISO/IEC 10164-3 : 1992, *Information technology - Open Systems Interconnection - Systems Management: Attributes for representing relationships.*
- CCITT Recommendation X.733 (1992) | ISO/IEC 10164-4 : 1992, *Information technology - Open Systems Interconnection - Systems Management: Alarm reporting function.*

- CCITT Recommendation X.734[1] | ISO/IEC 10164-5 : 1992, *Information technology - Open Systems Interconnection - Systems Management Event report management function.*
- CCITT Recommendation X.735[1] | ISO/IEC 10164-6 : 1992, *Information technology - Open Systems Interconnection - Systems Management: Log control function.*
- CCITT Recommendation X.736 (1992) | ISO/IEC 10164-7 : 1992, *Information technology - Open Systems Interconnection - Systems Management: Security alarm reporting function.*

2.2 Paired CCITT 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.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.501 (1988), *The Directory - Models.*

  ISO/IEC 9594-2 : 1990 *Information technology - Open Systems Interconnection - The Directory - Part 2: The Models.*
- 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 specification - Part 1: Specification.*

3 Definitions

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

3.1 Event report management function definitions

This Recommendation | International Standard makes use of the following terms defined in CCITT Rec. X.734 | ISO/IEC 10164-5:

a) discriminator;

b) event forwarding discriminator;

c) potential event report.

3.2 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) Attribute type;

b) Distinguished name;

c) Relative distinguished name.

---

[1] Presently at state of draft Recommendation.

4 Abbreviations

ASN.1	Abstract Syntax Notation One
CMIS	Common Management Information Service
CMIP	Common Management Information Protocol
EFD	Event Forwarding Discriminator
Id	Identifier
PDU	Protocol Data Unit
RDN	Relative Distinguished Name

5 Notation

Attribute types and specific attributes are defined in this Recommendation | International Standard using the templates, defined in CCITT Rec. X.722 | ISO/IEC 10165-4.

The behavioural aspects of the specific attributes described here shall be incorporated into the definition of the managed object class importing these specific attributes.

6 Definition of managed object classes

This Recommendation | International Standard defines Managed Object classes which are referenced by the System Management Functions of CCITT Recs. in X.730 - X.736 | ISO/IEC 10164 parts 1 to 7, or which are intended to be used as superclasses for the purpose of inheritance in the definition of Managed Object classes in other standards. The syntax of the attributes referenced in the templates are defined in clause 13.

6.1 Alarm record

The **alarmRecord** managed object class is used to define the information stored in the log as a result of receiving alarm notifications or alarm reports. The semantics of the managed object class, namely its attributes and behaviour are derived from the Alarm notification described in CCITT Rec. X.733 | ISO/IEC 10164-4.


```
alarmRecord         MANAGED OBJECT CLASS
 DERIVED FROM   eventLogRecord;
 CHARACTERIZED BY
-- The appropriate object identifier values for the eventType attribute, inherited from eventLogRecord
-- managed object class are communicationAlarm, qualityofServiceAlarm, processingErrorAlarm,
-- equipmentAlarm and environmentalAlarm --
           alarmRecordPackage      PACKAGE
           BEHAVIOUR
           alarmRecordBehaviour    BEHAVIOUR
           DEFINED AS "This managed object is used to represent logged information that resulted from alarm
           notifications or event reports";;
           ATTRIBUTES
           probableCause      GET,
           perceivedSeverity GET;;;
 CONDITIONAL PACKAGES
           specificProblemsPackage PACKAGE
           ATTRIBUTES
           specificProblems   GET;
           REGISTERED AS {smi2Package 1}; PRESENT IF "the Specific problems parameter is present in the alarm
           notification or event report corresponding to the instance of alarm record",

           backedUpStatusPackage  PACKAGE
           ATTRIBUTES
           backedUpStatus   GET;
           REGISTERED AS {smi2Package 2}; PRESENT IF "the backedUpStatus attribute has a value TRUE and the
           Backed up status parameter is present in the alarm notification or event report corresponding to the instance
           of alarm record",
```

```
        backUpObjectPackage     PACKAGE
        ATTRIBUTES
        backUpObject      GET;
        REGISTERED AS{smi2Package 3}; PRESENT IF "Backup object parameter is present in the alarm notification
        or event report corresponding to the instance of alarm record",

        trendIndicationPackage    PACKAGE
        ATTRIBUTES
        trendIndication     GET;
        REGISTERED AS{smi2Package 4}; PRESENT IF "the Trend indication parameter is present in the alarm
        notification or event report corresponding to the instance of alarm record",

        thresholdInfoPackage      PACKAGE
        ATTRIBUTES
        thresholdInfo       GET;
        REGISTERED AS{smi2Package 5}; PRESENT IF "the value for probableCause attribute is thresholdCrossed",

        stateChangeDefinitionPackage      PACKAGE
        ATTRIBUTES
        stateChangeDefinition     GET;
        REGISTERED AS{smi2Package 6}; PRESENT IF "there is a state transition for the states defined in State
        Management Function, corresponding to the alarm type specified in the alarm record",

        monitoredAttributesPackage        PACKAGE
        ATTRIBUTES
        monitoredAttributes       GET;
        REGISTERED AS{smi2Package 7}; PRESENT IF "the monitoredAttributes parameter is present in the alarm
        notification or event report corresponding to the instance of alarm record",

        proposedRepairActionsPackage PACKAGE
        ATTRIBUTES
        proposedRepairActions GET;
        REGISTERED AS{smi2Package 8}; PRESENT IF "the proposedRepairActions parameter is present in the
        alarm notification or event report corresponding to the instance of alarm record";

REGISTERED AS  {smi2MObjectClass 1};
```


6.2 Attribute value change record

The **attributeValueChangeRecord** managed object class is used to define the information stored in the log as a result of receiving attribute value change notifications or attribute value change event reports. The semantics of the managed object class, namely its attributes and behaviour are derived from the Attribute Value Change notification described in CCITT Rec. X.730 | ISO/IEC 10164-1.

```
attributeValueChangeRecord          MANAGED OBJECT CLASS
 DERIVED FROM    eventLogRecord;
 CHARACTERIZED BY
-- The appropriate object identifier values for the eventType attribute, inherited from eventLogRecord
-- managed object class, is attributeValueChange
attributeValueChangeRecordPackage          PACKAGE
        BEHAVIOUR
        attributeValueChangeRecordBehaviour       BEHAVIOUR
        DEFINED AS "This managed object is used to represent logged information that resulted from attribute value
        change notifications or event reports";;
        ATTRIBUTES
        attributeValueChangeDefinition     GET;;;

CONDITIONAL PACKAGES
        sourceIndicatorPackage              PRESENT IF "the sourceIndicator parameter is present in the
        attributeValueChange notification or event report corresponding to the instance of attribute value change
        record",

        attributeIdentifierListPackage      PRESENT IF "the attributeIdentifierList parameter is present in the
        attributeValueChange notification or event report corresponding to the instance of attribute value change
        record";
```

```
REGISTERED AS  {smi2MObjectClass 2};
```

6.3 Discriminator

The **discriminator** managed object class is used to define the criteria for controlling management services. The semantics of the managed object class, namely its attributes and behaviour are described in CCITT Rec. X.734 | ISO/IEC 10164-5.

```
discriminator          MANAGED OBJECT CLASS
 DERIVED FROM    top;
 CHARACTERIZED BY
discriminatorPackage          PACKAGE
          BEHAVIOUR
          discriminatorBehaviour     BEHAVIOUR
          DEFINED AS "This managed object is used to represent the criteria for controlling management services.";;
          ATTRIBUTES
          discriminatorId     GET,
          discriminatorConstruct
          REPLACE-WITH-DEFAULT
          DEFAULT VALUE Attribute-ASN1Module.defaultDiscriminatorConstruct          GET-REPLACE,
          administrativeState          GET-REPLACE,
          operationalState   GET;
          NOTIFICATIONS
          stateChange,
          attributeValueChange,
          objectCreation,
          objectDeletion;;
-- the above events are defined in CCITT Rec. X.731 | ISO/IEC10164-2, CCITT Rec. X.730 | ISO/IEC10164-1
CONDITIONAL PACKAGES
          availabilityStatusPackage PRESENT IF "any of the scheduling packages, ( duration, weekly scheduling,
          external) are present",

          duration          PRESENT IF "the discriminator function is scheduled to start at a specified time and stop at
          either a specified time or function continuously "

          dailyScheduling          PRESENT IF "both the weekly scheduling package and external scheduler packages
          are not present in an instance and daily scheduling is supported by that instance",

          weeklyScheduling PRESENT IF "both the daily scheduling package and external scheduler packages are not
          present in an instance and weekly scheduling is supported by that instance",

          externalScheduler PRESENT IF "both the daily scheduling package and weekly scheduling packages are not
          present in an instance and external scheduling is supported by that instance";
-- see CCITT Rec. X.734 | ISO/IEC 10164-5 for the description of this managed object class.

REGISTERED AS  {smi2MObjectClass 3};
```


6.4 Event forwarding discriminator

The **eventForwardingDiscriminator** managed object class is used to define the conditions that shall be satisfied by potential event reports before the event report is forwarded to a particular destination.This managed object class is a subclass of **discriminator** managed object class. The semantics of the managed object class, namely its attributes, management operations and behaviour, are described in CCITT Rec. X. 734 | ISO/IEC 10164-5.

```
eventForwardingDiscriminator          MANAGED OBJECT CLASS
DERIVED FROM    discriminator;
CHARACTERIZED BY
-- The value for the administrative state if not specified at initiation defaults to the value unlocked.
efdPackage          PACKAGE
          BEHAVIOUR
          eventForwardingDiscriminatorBehaviour     BEHAVIOUR
```

```
        DEFINED AS "This managed object is used to represent the criteria that shall be satisfied by potential event
        reports before the event report is forwarded to a particular destination.";;
        ATTRIBUTES
        destination          GET-REPLACE;;;
-- discriminatorConstruct attribute is defined using the attributes of a potential event report object
-- described in CCITT Rec. X.734 | ISO/IEC 10164-5.

CONDITIONAL PACKAGES
        backUpDestinationListPackage     PACKAGE
        ATTRIBUTES
        activeDestination  GET,
        backUpDestinationList     GET-REPLACE;
        REGISTERED AS{smi2Package 9} ; PRESENT IF "the event forwarding discriminator is required to provide a
        backup for the destination",

        modePackage     PACKAGE
        ATTRIBUTES
        confirmedMode    GET;

        REGISTERED AS{smi2Package 10}; PRESENT IF "the event forwarding discriminator permits mode for
        reporting events to be specified by the managing system";

REGISTERED AS  {smi2MObjectClass 4};
```

6.5 Event log record

The **eventLogRecord** managed object class is used to define the information stored in the log as a result of receiving notifications or event reports. This is a superclass from which records for specific event types are derived.


```
eventLogRecord    MANAGED OBJECT CLASS
 DERIVED FROM   logRecord;
 CHARACTERIZED BY
eventLogRecordPackage    PACKAGE
        BEHAVIOUR
        eventLogRecordBehaviour          BEHAVIOUR
        DEFINED AS "This managed object represents the information stored in the log as a result of receiving
        notifications or incoming event reports.";;
        ATTRIBUTES
        managedObjectClass      GET,
        managedObjectInstance   GET,
        eventType               GET;;;

CONDITIONAL PACKAGES
        eventTimePackage        PACKAGE
        ATTRIBUTES
        eventTime        GET;
        REGISTERED AS{smi2Package 11}; PRESENT IF "the event time parameter was present in the received
        event report",

        notificationIdentifierPackage        PRESENT IF "the notification Identifier parameter is present in the
        notification or event report corresponding to the instance of an event record or an instance of its subclasses",

        correlatedNotificationsPackage    PRESENT IF "the correlatedNotifications parameter is present in the
        notification or event report corresponding to the instance of an event record or an instance of its subclasses",

        additionalTextPackage             PRESENT IF "the Additional text parameter is present in the notification or
        report corresponding to the instance of event record or an instance of its subclasses",

        additionalInformationPackage      PRESENT IF "the Additional information parameter is present in the
        notification or report corresponding to the instance of event record or an instance of its subclasses";

REGISTERED AS  {smi2MObjectClass 5};
```

6.6 Log

The **log** managed object class is used to define the criteria for controlling the logging of the information in an open system. The semantics of the managed object class, namely its attributes and behaviour are described in CCITT Rec. X.735 | ISO/IEC 10164-6.

```
log                 MANAGED OBJECT CLASS
 DERIVED FROM   top;
 CHARACTERIZED BY
-- see CCITT Rec. X.735 | ISO/IEC 10164-6 for the description of this managed object class.
logPackage          PACKAGE
        BEHAVIOUR
        logBehaviour      BEHAVIOUR
        DEFINED AS "This managed object is used to store incoming event reports and local system notifications.
        Additional details are defined in CCITT Rec. X. 735 | ISO/IEC 10164-6. ";;
        ATTRIBUTES
        logId      GET,
        discriminatorConstruct     GET-REPLACE ,
        administrativeState        GET-REPLACE,
        operationalState   GET,
        availabilityStatus PERMITTED VALUES Attribute-ASN1Module.LogAvailability
                           REQUIRED VALUES Attribute-ASN1Module.UnscheduledLogAvailability        GET,
        logFullAction      GET-REPLACE;
        NOTIFICATIONS
        objectCreation,
        objectDeletion,
        attributeValueChange,
        stateChange,
        processingErrorAlarm;;;
```



```
CONDITIONAL PACKAGES
        finiteLogSizePackage     PACKAGE
        ATTRIBUTES
        maxLogSize       GET-REPLACE,
        currentLogSize   GET,
        numberOfRecords        GET;
        REGISTERED AS{smi2Package 12} ;      PRESENT IF "an instance supports it",

        logAlarmPackage PACKAGE
        ATTRIBUTES
        capacityAlarmThreshold   GET-REPLACE ADD-REMOVE;
        REGISTERED AS{smi2Package 13} ;      PRESENT IF "a log is of finite size and halts logging when the
        availability status has the log full value.",

        availabilityStatusPackage                    PRESENT IF "any of the scheduling packages, (duration, weekly
        scheduling, external) are present. The presence of this package makes available the off-duty value of the
        available status attribute to the object.",

        duration                              PRESENT IF "the logging function is scheduled to start at a specified time
        and stop at either a specified time or function continuously.",

        dailyScheduling                       PRESENT IF "both the weekly scheduling package and external
        scheduler packages are not present in an instance and daily scheduling is supported by that instance.",

        weeklyScheduling                      PRESENT IF "both the daily scheduling package and external scheduler
        packages are not present in an instance and weekly scheduling is supported by that instance.",

        externalScheduler                     PRESENT IF "both the daily scheduling package and weekly scheduling
        packages are not present in an instance and external scheduling is supported by that instance.";

REGISTERED AS   {smi2MObjectClass 6};
```