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INTERNATIONAL TELECOMMUNICATION UNION

ITU-T

TELECOMMUNICATION
STANDARDIZATION SECTOR
OF ITU

X.746

(04/95)

**DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS
OSI MANAGEMENT**

**INFORMATION TECHNOLOGY –
OPEN SYSTEMS INTERCONNECTION –
SYSTEMS MANAGEMENT:
SCHEDULING FUNCTION**

ITU-T Recommendation X.746
Superseded by a more recent version

(Previously "CCITT Recommendation")

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FOREWORD

ITU (International Telecommunication Union) is the United Nations Specialized Agency in the field of telecommunications. The ITU Telecommunication Standardization Sector (ITU-T) is a permanent organ of the ITU. Some 179 member countries, 84 telecom operating entities, 145 scientific and industrial organizations and 38 international organizations participate in ITU-T which is the body which sets world telecommunications standards (Recommendations).

The approval of Recommendations by the Members of ITU-T is covered by the procedure laid down in WTSC Resolution No. 1 (Helsinki, 1993). In addition, the World Telecommunication Standardization Conference (WTSC), 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 ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC. The text of ITU-T Recommendation X.746 was approved on the 10th of April 1995. The identical text is also published as ISO/IEC International Standard 10164-15.

NOTE

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

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DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

(February 1994)

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Summary

This Recommendation | International Standard specifies a model and management information for the creation and administration by a remote manager of activity schedules for management activity; this includes such things as schedules for performance data collection and scheduled, or routine test. This Specification is of generic application and can be used by many different types of application. It is expected to be adopted for TMN use.

INTERNATIONAL STANDARD

ITU-T RECOMMENDATION

INFORMATION TECHNOLOGY – OPEN SYSTEMS INTERCONNECTION – SYSTEMS MANAGEMENT: SCHEDULING FUNCTION

1 Scope

This Recommendation | International Standard defines the scheduling function. The scheduling function is a systems management function which may be used by an application process in a centralized or decentralized management environment to exchange information and commands for the purpose of systems management, as defined by CCITT Rec. X.700 | ISO/IEC 7498-4. This Recommendation | International Standard 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 by CCITT Rec. X.701 | ISO/IEC 10040.

This Recommendation | International Standard:

- identifies a set of requirements satisfied by the function;
- provides a model for scheduling;
- specifies the management requirements of the function and how these are realized by specification of managed objects and their behaviour;
- defines the conformance requirements to be met by implementations of this Recommendation | International Standard;
- defines managed objects.

This Recommendation | International Standard does not define:

- the manner in which management is to be accomplished by the user of the scheduling function;
- the nature of any implementation intended to provide the scheduling function;
- the nature of any interactions which result in the use of the scheduling function;
- the interactions which result by the simultaneous use of several management functions;
- the occasions where the use of the scheduling function is appropriate;
- the services necessary for the establishment, normal and abnormal release of a management association.

2 Normative references

The following CCITT/ITU-T 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 Telecommunication Standardization Bureau of the ITU maintains a list of currently valid ITU-T Recommendations.

2.1 Identical CCITT/ITU-T Recommendations | International Standards

- CCITT Recommendation X.296¹⁾ | ISO/IEC 9646-7...¹⁾, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Implementation conformance statements*.
- CCITT Recommendation X.701 (1992) | ISO/IEC 10040:1992, *Information technology – Open Systems Interconnection – Systems management overview*.
- CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1:1993, *Information technology – Open Systems Interconnection – Structure of management information: Management information model*.

¹⁾ Presently at the stage of draft.

- CCITT Recommendation X.721 (1992) | ISO/IEC 10165-2:1992, *Information technology – Open Systems Interconnection – Structure of management information: Definition of management information.*
- CCITT Recommendation X.722 (1992) | 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) | 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) | ISO/IEC 10164-1:1993, *Information technology – Open Systems Interconnection – Systems management: Object management function.*
- CCITT Recommendation X.731 (1992) | ISO/IEC 10164-2:1993, *Information technology – Open Systems Interconnection – Systems management: State management function.*
- CCITT Recommendation X.734 (1992) | ISO/IEC 10164-5:1993, *Information technology – Open Systems Interconnection – Systems management: Event report management function.*
- ITU-T Recommendation X.738 (1993) | ISO/IEC 10164-13:1995, *Information technology – Open Systems Interconnection – Systems management: Summarization function.*
- ITU-T Recommendation X.739 (1993) | ISO/IEC 10164-11:1994, *Information technology – Open Systems Interconnection – Systems management: Metric objects and attributes.*
- ITU-T Recommendation X.745 (1993) | ISO/IEC 10164-12:1994, *Information technology – Open Systems Interconnection – Systems management: Test management function.*

2.2 Paired CCITT/ITU-T 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.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.210 (1988), *Open Systems Interconnection layer service definition conventions.*
ISO/TR 8509 (1987), *Information processing systems – Open Systems Interconnection – Service conventions.*
- CCITT Recommendation X.291 (1992), *OSI conformance testing methodology and framework for protocol Recommendations for CCITT applications – Abstract test suite specification.*
ISO/IEC 9646-2:1991, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 2: Abstract test suite specification.*
- ITU-T Recommendation X.296¹⁾, *OSI conformance testing methodology and framework for protocol Recommendations for ITU-T applications – Implementation conformance statements – Requirements and guidance on ICS and ICS proforma.*
ISO/IEC 9646-7:1995, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 7: Implementation Conformance Statements – Requirements and guidance on ICS and ICS proforma.*
- CCITT Recommendation X.700 (1992), *Management framework for Open Systems Interconnection (OSI) for CCITT applications.*

¹⁾ Presently at the stage of draft.

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.*

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.

- open system;
- systems management.

3.2 Abstract syntax notation one definitions

This Recommendation | International Standard makes use of the following term defined in CCITT Rec. X.208 | ISO/IEC 8824:

- object identifier.

3.3 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.

3.4 Common management information service definitions

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

- attribute;
- common management information service.

3.5 Systems management overview definitions

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

- agent;
- managed object class;
- manager;
- notification;
- systems management operations.

3.6 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) actual class;
- c) behaviour;
- d) characteristic;
- e) conditional package;
- f) inheritance;
- g) instantiation;
- h) mandatory package;
- i) name binding;
- j) package;
- k) subclass;
- l) superclass.

3.7 Additional definitions

3.7.1 aperiodic scheduling: A type of scheduling that controls the triggering of activities at certain specified times within specified managed object instances.

3.7.2 interval scheduling: A type of scheduling that controls a number of intervals of operation of activities within specified managed object instances.

3.7.3 periodic scheduling: A type of scheduling that controls the repetitive triggering of activities within specified managed object instances.

3.7.4 scheduling: The method of controlling the timing of the execution of a scheduled activity within or represented by a managed object.

3.7.5 Scheduled Managed Object (SMO): The managed object whose activities are to be scheduled.

3.7.6 Scheduler Object (SO): The managed object that defines the type and values of the schedule to be applied to activities within SMOs.

3.7.7 trigger scheduling: A type of scheduling the controls the triggering of activities within specified managed object instances.

4 Abbreviations

ASN.1	Abstract Syntax Notation One
CMIS	Common Management Information Service
ICS	Information Conformance Statement
MAPDU	Management Application Protocol Data Unit
MCS	Management Conformance Statement
MOCS	Managed Object Conformance Statement
MRCS	Management Relationship Conformance Statement
SMO	Scheduled Managed Object
SO	Scheduler Object

5 Conventions

The ICS proformas specified in this Recommendation | International Standard (see Annexes B to F) use the common notations, defined in CCITT Rec. X.291 | ISO/IEC 9646-2 and CCITT Rec. X.296 | ISO/IEC 9646-7.

6 Requirements

In terms of functionality, the requirements to be satisfied are:

- Provide a function that can schedule a number of activities within multiple managed objects according to a single schedule.
- Be able to specify the time duration that the schedule is active.
- For schedules that control the interval of operation of an activity within a managed object, the start and stop time should be defined as the actual time within a 24-hour clock.
- Provide a function that can schedule aperiodic and periodic triggering of an activity.

Interval scheduling

- Provide a function that controls the scheduled activities of one or more managed objects.
- Provide a configurable schedule that repeats over a specified time period. The specified time period may be a day, a week or a month.
- Provide a user defined number of intervals together with the start and stop times of each of these intervals within the specified period.

Trigger scheduling

- Provide a function that controls the triggering of an activity of one or more managed objects.
- Provide a configurable period for the repetitions of the triggering.
- Provide a user defined list of trigger times.

7 Model

Scheduling can be modelled as a part of the managed object whose operation or activity is to be scheduled, or as a separate managed object.

Characteristics for the control of a schedule can be imported into a managed object class or can be defined as a separate managed object. These two ways of defining scheduling of a managed object are termed internal and external scheduling, respectively. This Recommendation | International Standard describes models for both internal and external scheduling.

This Recommendation | International Standard also describes two types of scheduling in 7.3: interval and periodic scheduling. Both of these scheduling types can be used with internal and external scheduling mechanisms.

The activities which can be controlled by scheduling are defined as part of the scheduled managed object (SMO) class. There need to be characteristics in the SMO related to these scheduled activities.

7.1 Internal scheduling mechanism

It is appropriate to define the scheduling mechanism within a managed object class if it will not need to be altered in the future and the managed object is to be individually scheduled. The scheduling mechanism can be defined within a managed object class by including the appropriate scheduling components (e.g. attributes and behaviour.) If more than one type of scheduling is defined within a managed object class, the conditions for instantiation of each type of scheduling must be defined in the managed object class definition.

When the scheduling mechanism is defined within the managed object whose activity is scheduled, no additional objects are required and the scheduling may be manipulated through the use of systems management operations. However, when multiple activities within a managed object are to be scheduled using this mechanism separate scheduling characteristics are required for each activity.

Scheduling characteristics for each activity may include more than one type of scheduling (see 7.3) and the conditions for instantiation of each type shall be defined in the managed object class definition.

7.2 External scheduling mechanism

It is beneficial to define an external scheduling mechanism so that schedules may be determined independently of SMOs. Many managed objects may be controlled by a single schedule. If a single Scheduler Object (SO) provides the schedule, there may be no need for scheduling components in the SMOs. This eliminates the need to replicate and coordinate schedules across SMOs.

The scheduling function is represented by SO which are separate from the SMOs, as shown in Figure 1. One SO may control activities in any number of SMOs. Multiple external schedules are allowed for the same activity. The approach for defining more than one type of scheduling for the same activity is described in 7.3.

The scheduler object provides a schedule to a SMO. SMOs shall have attributes which identify the SOs providing schedules. Each of these attributes shall have and be associated with behaviour which describes the effect of the schedule upon the SMO.

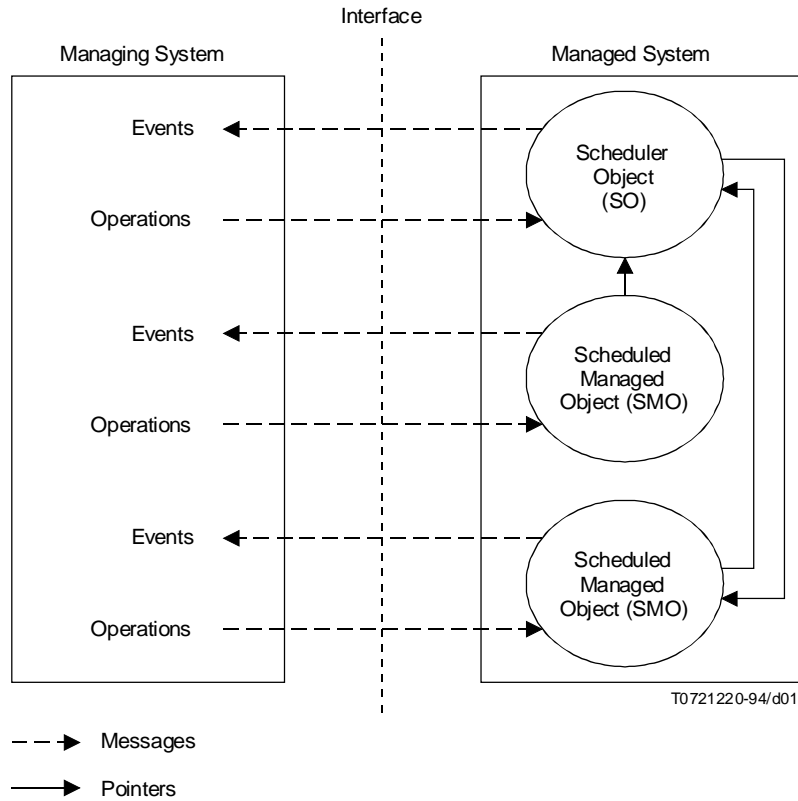


Figure 1 – Scheduler Object model

7.3 Types of scheduling

There are three specific types of scheduling: interval scheduling, trigger scheduling and operations scheduling. This document describes three types of interval scheduling – daily, weekly, and monthly interval scheduling (see 7.3.1); two types of trigger scheduling – periodic and aperiodic scheduling (see 7.3.2) and operations scheduling. These types of scheduling are defined by packages which may be included in managed objects for the purpose of internal scheduling (except for the operations scheduling) or in a scheduler object for external scheduling.

NOTE – Other scheduling packages are defined in CCITT Rec. X.734 | ISO/IEC 10164-5.

If a combination of interval and trigger scheduling is required for one activity, the triggering is effective only within the intervals defined by the interval schedule.

7.3.1 Interval scheduling

Interval scheduling is used to define a schedule that controls a sequence of transitions of an activity of a SMO between the active and inactive state. The schedule may repeat in one of the following ways: a given number of days with specified intervals for each day, a given number of weeks with specified intervals for specified days of each week or a given number of months with specified intervals for specified days of each month. Each of these types of interval scheduling, daily, weekly and monthly is specified by selecting the intervals of day parameter for the day, week or month mask attribute in the appropriate scheduler object class.

The duration over which interval scheduling affects the operation of the SMOs may be controlled by the specified duration start time and duration stop time (date and time).

The intervals of operation are specified by a set of interval start and interval stop times.

The operation of the interval schedulers can be suspended by setting their administrative state attribute to locked and resumed by setting their administrative state attribute to unlocked.

7.3.2 Trigger scheduling

7.3.2.1 Periodic scheduling

Periodic scheduling is used to define a schedule that repetitively triggers specified activities at regular time intervals within specified managed object instances. The time duration over which the activities, specified in the SMOs, can be triggered, may be controlled by the specified duration start time and duration stop time (date and time). When a periodic scheduler is created, it either triggers at the specified duration start time (which may be the object creation time) or it synchronizes the first triggering point to a specified synchronization time. It then synchronizes the period to this initial triggering point.

The operation of a scheduler can be suspended and resumed by setting its administrative state attribute. Two methods of synchronization of the triggering points can be used when the operation of the scheduler is resumed, either period synchronization time or resynchronize mode. If a period synchronization time is specified, the triggering will always be synchronized to that time. If a resynchronize mode has been specified in the SO, the triggering may be synchronized to the specified duration start time, or it may be synchronized to the time of resumption of the SO, depending on the resynchronize mode selected. If period synchronization time and resynchronize mode are absent, the period will always be synchronized to the specified duration start time.

7.3.2.2 Aperiodic scheduling

An activity in a managed object can be triggered at scheduled times. This is achieved by specifying a set of trigger times for the activity rather than specifying an interval for the operation of that activity. This mechanism allows activities in a managed object to be triggered at absolute times as opposed to the triggering of activities at regular intervals relative to a start time as defined for periodic scheduling (see 7.3.2.1.)

An aperiodic trigger schedule may repeat in one of the following ways: a given number of days with specified trigger times for each day, a given number of weeks with specified trigger times for specified days of each week or a given number of months with specified trigger times for specified days of each month. Each of these types of aperiodic scheduling, daily, weekly and monthly is specified by selecting the trigger times parameter for the day, week or month mask attribute in the appropriate scheduler object class.

7.3.3 Operations scheduling

In accord with its schedule, a scheduling object which uses the operation scheduling approach determines operations performed upon SMOs.

In this case the SO may have notifications to report success and failure in the execution of the operations. A scheduling object which uses the operation scheduling approach has attributes to identify a schedule, the SMOs which are being scheduled and the operations and parameters which are to be requested in accord with the schedule. When the result notification is issued the managed object class and managed object instance parameters shall be present in the operation result(s).

NOTE – The sending of messages between managed objects in the same system, either expressed or implied in this model, does not imply any need for conformance testing of these inter-object interactions.

7.4 Relationships between SOs and SMOs

A SMO may be scheduled by more than one SO. In order to be scheduled by an external interval or trigger scheduler a SMO shall have an attribute which points at the SO (the external scheduler name attribute.) The SO may optionally have an attribute which points at the SMO (the scheduled managed objects attribute.) SMOs which have multiple activities to be scheduled shall have an attribute associated with each activity that points to the appropriate SOs. A single SO may provide a schedule for many SMOs. See Figure 1.

If a SMO is deleted, the entry for that object in the scheduled managed objects attribute in the related SO(s) will be deleted. If there are no remaining entries in the scheduled managed objects attribute, the SO will continue to exist. If the SO is deleted, the state of the activities of the SMO shall be as defined by the behaviour of the SMO.

Changes in the administrative and operational state of the SMO will have no effect on the SO. If the administrative state of the SO is changed to locked or the operational state is changed to disabled, the state of the activity in the SMO becomes inactive. This state may be represented by an attribute of the SMO associated with this activity. If the administrative state of the SO is changed to unlocked or the operational state is changed to enabled, the SMO is set to the status as indicated by the schedule defined for the SO.

The relationship between the SO and the SMO is established at the creation time of the SMO or when the identifier of the SO is added to the external scheduler name attribute of an existing SMO. When the SMO is created with the identifier of the SO included in the external scheduler name attribute, the identifier of the SMO instance is added to the scheduled managed objects attribute of the SO (if the SO instance supports it.) The relationship may be terminated by deleting either of the objects as described above, by removing the identifier of the SO from the scheduled managed objects attribute of the SMO.

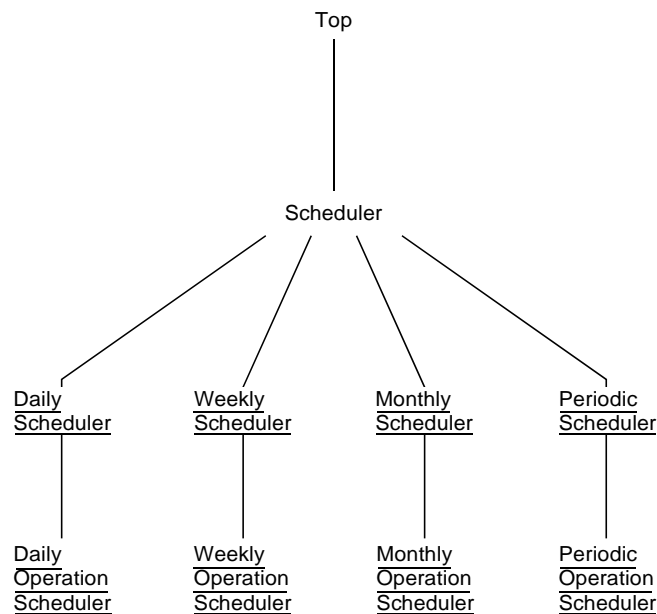
8 Generic definitions

8.1 Management information required for internal scheduling

To define a managed object class including a scheduling mechanism, the appropriate scheduling packages (i.e. periodic scheduling, daily scheduling, weekly scheduling, multiple-daily scheduling, multiple-weekly scheduling, or multiple-monthly scheduling) can be imported into the managed object class definition and tied to the appropriate activities within the behaviour clause. (The daily and weekly scheduling packages are defined in CCITT Rec. X.734 | 10164-5.)

8.2 Managed objects

This Recommendation | International Standard defines a set of scheduling managed object classes. The inheritance structure of these managed object classes is shown in Figure 2.



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NOTE – Instantiable objects are underlined.

Figure 2 – Inheritance structure of scheduling objects

The managed object classes shown in Table 1 are defined to fulfill the requirements of the scheduling types described in 7.3.

Table 1 – Scheduling types versus managed object classes

Type of scheduling	Managed object class(es)
Interval scheduling	Daily scheduler, weekly scheduler, monthly scheduler
Periodic scheduling (trigger)	Periodic scheduler
Aperiodic scheduling (trigger)	Daily scheduler, weekly scheduler, monthly scheduler
Operations scheduling	Daily operation scheduler, weekly operation scheduler, monthly operation scheduler, periodic operation scheduler

8.2.1 Scheduler

8.2.1.1 Overview

The scheduler object class is a superclass from which other scheduler object classes are derived.

8.2.1.2 Packages of the scheduler

The scheduler managed object class has the following mandatory packages:

- scheduler object package; and
- duration as defined in CCITT Rec. X.734 | ISO/IEC 10164-5.

The scheduler managed object class has the following conditional package:

- scheduled managed objects package.

8.2.2 Daily scheduler

8.2.2.1 Overview

The daily scheduler object class is a subclass of the scheduler object class. It is used to schedule intervals of activity or the aperiodic triggering of an activity of a SMO on a daily basis.

8.2.2.2 Packages of the daily scheduler

The daily scheduler managed object class has the following mandatory package:

- multiple daily scheduling.

8.2.3 Weekly scheduler

8.2.3.1 Overview

The weekly scheduler object class is a subclass of the scheduler object class. It is used to schedule intervals of activity or the aperiodic triggering of an activity of a SMO on a weekly basis.

8.2.3.2 Packages of the weekly scheduler

The weekly scheduler managed object class has the following mandatory package:

- multiple weekly scheduling.

8.2.4 Monthly scheduler

8.2.4.1 Overview

The monthly scheduler object class is a subclass of the scheduler object class. It is used to schedule intervals of activity or the aperiodic triggering of an activity of a SMO on a monthly basis.

8.2.4.2 Packages of the monthly scheduler

The monthly scheduler managed object class has the following mandatory package:

- multiple monthly scheduling.

8.2.5 Periodic scheduler

8.2.5.1 Overview

The periodic scheduler object class is a subclass of the scheduler object class. It is used to schedule triggering of an activity of a SMO on a regular periodic basis.

8.2.5.2 Packages of the periodic scheduler

The periodic scheduler managed object class has the following mandatory package:

- periodic scheduling package.

The periodic scheduler managed object class has the following conditional packages which may not both be present in an instance of the Periodic Scheduler object:

- resynchronize mode package;
- period synchronization package as defined in ITU-T Rec. X.738 | ISO/IEC 10164-13.

8.2.6 Daily operation scheduler

8.2.6.1 Overview

The daily operation scheduler object class is a subclass of the daily scheduler object class. It is used to schedule get, set and action operations on a SMO on a daily basis.

8.2.6.2 Packages of the daily operation scheduler

The daily operation scheduler managed object class has the following mandatory package:

- operations scheduling package.

The daily operation scheduler managed object class has the following conditional package:

- operation result package.

The scheduled managed objects package inherited from the scheduler object class shall not be instantiated for this object class. The value for trigger times of the sequence of days attribute shall be specified.

8.2.7 Weekly operations scheduler

8.2.7.1 Overview

The weekly operation scheduler object class is a subclass of the weekly scheduler object class. It is used to schedule get, set and action operations on a SMO on a weekly basis.

8.2.7.2 Packages of the weekly operation scheduler

The weekly operation scheduler managed object class has the following mandatory package:

- operations scheduling package.

The weekly operation scheduler managed object class has the following conditional package:

- operation result package.

The scheduled managed objects package inherited from the scheduler object class shall not be instantiated for this object class. The value for trigger times of the sequence of weeks attribute shall be specified.

8.2.8 Monthly operation scheduler

8.2.8.1 Overview

The monthly operation scheduler object class is a subclass of the monthly scheduler object class. It is used to schedule get, set and action operations on a SMO on a monthly basis.

8.2.8.2 Packages of the monthly operation scheduler

The monthly operation scheduler managed object class has the following mandatory package:

- operations scheduling package.

The monthly operation scheduler managed object class has the following conditional package:

- operation result package.

The scheduled managed objects package inherited from the scheduler object class shall not be instantiated for this object class. The value for trigger times of the sequence of months attribute shall be specified.

8.2.9 Periodic operation scheduler

8.2.9.1 Overview

The periodic operation scheduler object class is a subclass of the periodic scheduler object class. It is used to schedule operations on a SMO on a regular periodic basis.

8.2.9.2 Packages of the periodic operation scheduler

The periodic operation scheduler managed object class has the following mandatory package:

- operations scheduling package.

The periodic operation scheduler managed object class has the following conditional package:

- operation result package.

The scheduled managed objects package inherited from the scheduler object class shall not be instantiated for this object class.

8.3 Packages

Mandatory packages must be present in all managed object instances of a managed object class while the presence of the conditional packages are determined at the time of managed object creation.

8.3.1 Scheduler object package

8.3.1.1 Overview

The Scheduler object package comprises the mandatory characteristics of the scheduler object.

8.3.1.2 Attributes of the scheduler object package

The scheduler object package has the following attributes:

- a) *Scheduler ID* – This attribute contains a value which identifies an instance of the scheduler managed object class (used for naming).
- b) *Administrative state* – This attribute is defined in CCITT Rec. X.731 | ISO/IEC 10164-2.
- c) *Operational state* – This attribute is defined in CCITT Rec. X.731 | ISO/IEC 10164-2.

8.3.1.3 Notifications of the scheduler object package

The scheduler object package contains the following notifications:

- attribute value change as defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- state change as defined in CCITT Rec. X.731 | ISO/IEC 10164-2;
- object creation as defined in CCITT Rec. X.731 | ISO/IEC 10164-2; and
- object deletion as defined in CCITT Rec. X.731 | ISO/IEC 10164-2.

8.3.1.4 Behaviour of the scheduler object package

The scheduler object package provides the naming attribute for the SO using the scheduler ID attribute. It provides the ability to suspend and resume the functioning of the SO by changing the administrative state. The administrative state attribute exhibits the locked, unlocked and shutting down states. The operational state attribute exhibits the enabled and disabled operational states. The scheduler object is active if the administrative state is unlocked and the operational state is enabled.

When the administrative state is changed to locked during a scheduled interval the interval is terminated immediately and the administrative state attribute is changed to locked. When the administrative state is changed to shut down during a scheduled interval the interval is continued until its normal end time at which time the administrative state is changed to locked and the schedule is terminated.

Attribute value change notifications are generated when the start time and end time attributes are changed.

State change notifications are generated when the administrative state and operational state attributes are changed.

The object creation notification is generated when an instance of a managed object class which contains the Scheduler object package is instantiated.

The object deletion notification is generated when an instance of a managed object class which contains the scheduler object package is deleted.

8.3.2 Scheduled managed objects package

8.3.2.1 Overview

The scheduled managed objects package contains a list of the SMOs which the SO is currently scheduling.

8.3.2.2 Attributes of the scheduled managed objects package

The scheduled managed objects package has the following attribute:

- *Scheduled managed objects* – This attribute identifies the SMOs which are using this SO to schedule their activities and optionally, the identifier of the attribute in the SMO that describes the activity being scheduled by the SO. Attribute value change notifications are generated when the scheduled managed objects attribute is changed.

8.3.3 Behaviour common to interval schedulers

An interval schedule comprises a collection (constructed as a sequence or a sequence of set) of schedules for a single day. Each schedule for a single day comprises a set of distinct (i.e. non-overlapping) intervals. Each of these intervals is specified as a sequence of a start time and a stop time, the values of which represent a twenty-four hour clock co-ordinated with the time base specified for the start time in the duration package. The stop time shall not be less than the start time. An interval may be continued into the next day by specifying a stop time of 24:00 and by specifying an interval with a start time of 0:00 for the next day.

If an activity in a managed object needs to be scheduled using a time zone base other than the local time then the values of the start time and end time attributes shall be specified using the UTC time format of generalized time and the value of the time intervals shall be synchronized to the time specified in these attributes.

8.3.4 Multiple daily scheduling package

8.3.4.1 Overview

The multiple daily scheduling package comprises the mandatory characteristics of the daily interval scheduler object.

8.3.4.2 Attributes of the multiple daily scheduling package

The multiple daily scheduling package has the following attribute:

- *Sequence of days* – This attribute defines a sequence of time intervals for a day by specifying interval start and interval end times. A value of (hours = 0, minutes = 0) for start time means start of day, and the value of (hours = 0, minutes = 0) for end time means end of day (i.e. 24 hours, 0 minutes). If the value of this attribute is not specified in the create request, its value defaults to a single interval encompassing the entire 24-hour period of a day. An interval end time of hours = 0, minutes = 0 implies that the interval may continue into the following day. If the first interval start time of the next day is hours = 0, minutes = 0, then the interval is continued, otherwise it ends at the end of the day.

8.3.4.3 Multiple daily scheduling package behaviour

The multiple daily scheduling package provides the ability to automatically control an activity within a managed object. It provides the capability of scheduling the operation of an activity with a periodicity of 24 hours. A sequence of daily schedules can be defined that repeat continuously. Time intervals can be specified for specific days of a sequence.

The schedule identified by the first element in the sequence shall be implemented when the object becomes active. Each succeeding schedule shall be implemented in turn until the sequence is exhausted, when the sequence shall be repeated.

The intervals of day component within the sequence of days attribute defines the list of time intervals (interval-start and interval-end times of day) for which the scheduled activity will be operable. During excluded intervals the scheduled activity will be inactive.

If the value of the sequence of days attribute is not specified in the create request, its value is set to the default specified. This value results in the activity in the SMO being continually active.

Attribute value change notifications are generated when the sequence of days attribute is changed.

8.3.5 Multiple weekly scheduling package

8.3.5.1 Overview

The multiple weekly scheduling package comprises the mandatory characteristics of the weekly interval scheduler object.

8.3.5.2 Attributes of the multiple weekly scheduling package

The multiple weekly scheduling package has the following attribute:

- *Sequence of weeks* – This attribute defines a sequence of time intervals for each day of the week, as defined by a sequence of week masks. Each week mask is a set of mask components, each specifying a set of time intervals on a 24-hour time-of-day clock, pertaining to selected days of the week.

The days of week component within the sequence of weeks attribute type defines the days of the week on which the scheduling mechanism operates. This component, if not present in a create request, will default to all seven days of the week.

The intervals of day component within the sequence of weeks attribute type defines a list of time intervals (interval-start and interval-end times of day). A value of (hours = 0, minutes = 0) for start time means start of day, and the value of (hours = 0, minutes = 0) for end time means end of day (i.e. 24 hours, 0 minutes). If the value of this attribute is not specified in the create request, its value defaults to a single interval encompassing the entire 24-hour period of a day. An interval end time of hours = 0, minutes = 0 implies that the interval may continue into the following day. If the first interval start time of the next day is hours = 0, minutes = 0, then the interval is continued, otherwise it ends at the end of the day.

8.3.5.3 Multiple weekly scheduling package behaviour

The multiple weekly scheduling package provides the ability to automatically control an activity within a managed object. It provides the capability of scheduling the operation of an activity with a periodicity of one week. Time intervals can be specified for specified days of each week. A sequence of weekly schedules can be defined that repeat continuously.

The schedule identified by the first element in the sequence shall be implemented when the object becomes active. Each succeeding schedule shall be implemented in turn until the sequence is exhausted, when the sequence shall be repeated. A schedule for a single week comprises of a set of a sequence comprising an element which identifies days of the week and an element which identifies a schedule for a single day. Taken as a whole, this set identifies a disjoint collection of intervals spanning a whole week, beginning at 12 am on Sunday relative to the time base specified for the start time of the duration package.

The intervals of day component within the sequence of weeks attribute defines the list of time intervals (interval-start and interval-end times of day) for which the scheduled activity will be operable. During excluded intervals the scheduled activity will be inactive.

If the value of the sequence of weeks attribute is not specified in the create request, its value is set to the default specified. This value results in the activity in the SMO being continually active.

Attribute change notifications are generated when the sequence of weeks attribute is changed.

8.3.6 Multiple monthly scheduling package

8.3.6.1 Overview

The multiple monthly scheduling package comprises the mandatory characteristics of the monthly scheduler object.

8.3.6.2 Attributes of the multiple monthly scheduling package

The multiple monthly scheduling package has the following attribute:

- *Sequence of months* – This attribute defines a sequence of time intervals for each day of the month, as defined by a sequence of month masks. Each month mask is a set of mask components, each specifying a set of time intervals on a 24-hour time-of-day clock, pertaining to selected days of the month.

The Days of month component within the sequence of months attribute type defines the days of the month on which the scheduling mechanism operates. This attribute allows for selection of days of the month forward from the first day of the month and backwards from the last day of the month. The component consists of two bit strings. The days from first bit string selects the days of the month starting from the first day of the month (i.e. the first bit in the bit string represents the first day of the month, etc.) The days

from last bit string selects days of the month starting from the end of the month and working backwards from the end of the month (i.e. the first bit in this bit string represents the 30th day of the month which has 30 days while the second bit of this bit string represents the 29th day of the month which has 30 days. A day of the month is selected if either of the corresponding bits in the days from first or days from last is set.

This component, if not present in a create request, will default to every day of the month.

The intervals of day component within the Sequence of months attribute type defines a list of time intervals (interval-start and interval-end times of day). A value of (hours = 0, minutes = 0) for start time means start of day, and the value of (hours = 0, minutes = 0) for end time means end of day (i.e. 24 hours, 0 minutes). If the value of this attribute is not specified in the create request, its value defaults to a single interval encompassing the entire 24-hour period of a day. An interval end time of hours = 0, minutes = 0 implies that the interval may continue into the following day. If the first interval start time of the next day is hours = 0, minutes = 0, then the interval is continued, otherwise it ends at the end of the day.

8.3.6.3 Multiple monthly scheduling package behaviour

The multiple monthly scheduling package provides the ability to automatically control an activity within a managed object. It provides the capability of scheduling the operation of an activity with a periodicity of one month. Time intervals can be specified for specified days of each month. A sequence of monthly schedules can be defined that repeat continuously.

The schedule identified by the first element in the sequence shall be implemented when the object becomes active. Each succeeding schedule shall be implemented in turn until the sequence is exhausted, when the sequence shall be repeated. A schedule for a single month comprises of a set of a sequence comprising an element which identifies days of the month and an element which identifies a schedule for a single day. Taken as a whole, this set identifies a disjoint collection of intervals spanning a whole month, beginning at 12 am on the first of the month relative to the time base specified for the start time of the duration package. Extraneous days are ignored.

The intervals of day component within the sequence of months attribute defines the list of time intervals (interval-start and interval-end times of day) for which the scheduled activity will be operable. During excluded intervals the scheduled activity will be inactive.

If the value of the sequence of months attribute is not specified in the create request, its value is set to the default specified. This value results in the activity in the SMO being continually active.

Attribute change notifications are generated when the sequence of months attribute is changed.

8.3.7 Periodic scheduling package

8.3.7.1 Overview

The periodic scheduling package comprises the mandatory characteristics of the periodic scheduler object.

8.3.7.2 Attributes of the periodic scheduling package

The periodic scheduling package has the following attribute:

- *Time period* – This attribute defines the length of the time period for the periodic triggering of an activity in a SMO.

8.3.7.3 Periodic scheduling package behaviour

The periodic scheduling package provides the capability of scheduling the triggering of activities within a SMO based on a defined schedule. An activity within a SMO will be triggered by the periodic scheduler object.

If the value of the time period attribute is not specified in the create request, its value defaults to zero seconds. This means that triggering does not take place.

The operation of a scheduler can be suspended and resumed by setting its administrative state. Two methods of synchronization of the triggering points can be used when the operation of the scheduler is resumed, either period synchronization time or resynchronize mode. If a period synchronization time is specified in the period synchronization attribute the triggering will always be synchronized to that time. If the resynchronize mode attribute is present in the SO, the triggering will be synchronized to the specified duration start time, if the resynchronize mode is false, or it will be synchronized to the time of resumption of the SO, if the resynchronize mode is true.

If the period synchronization package and the resynchronize mode package are not present in the object instance, the time period is synchronized to the start time in the duration package. If the start time in the duration package is not specified the time period is synchronized to the object creation time.

Attribute value change notifications are generated when the time period, period synchronization, or resynchronize mode attributes are changed.

8.3.8 Resynchronize mode package

8.3.8.1 Overview

The resynchronize mode package is used to specify how a periodic scheduler object is to resynchronize the triggering of the periodic schedule when the SO is resumed.

8.3.8.2 Attributes of the resynchronize mode package

The resynchronize mode package has the following attribute:

- *Resynchronize mode* – This attribute defines the way in which the time period is defined or re-defined when the operation of the periodic scheduler is activated (i.e. the administrative state is changed to unlocked with the operational state enabled, or the operational state is changed to enabled with the administrative state unlocked).

8.3.8.3 Resynchronize mode behaviour

The resynchronize mode attribute provides the ability to control the mode of synchronization of a periodic scheduler’s triggering periods upon suspension and activation or re-activation of the scheduler managed object. If the value is false, it implies that the triggering period will be synchronized to the initial triggering point or the pre-suspended triggering points when the operation of the scheduler managed object has been activated or re-activated respectively. If the value is true, it implies that, when the scheduler managed object has been created in a suspended state or placed in a suspended state after creation (i.e. locked), it triggers on resumption and synchronizes the time period to the resumption time. In the example in Figure 3 it is assumed that the operational state is enabled.

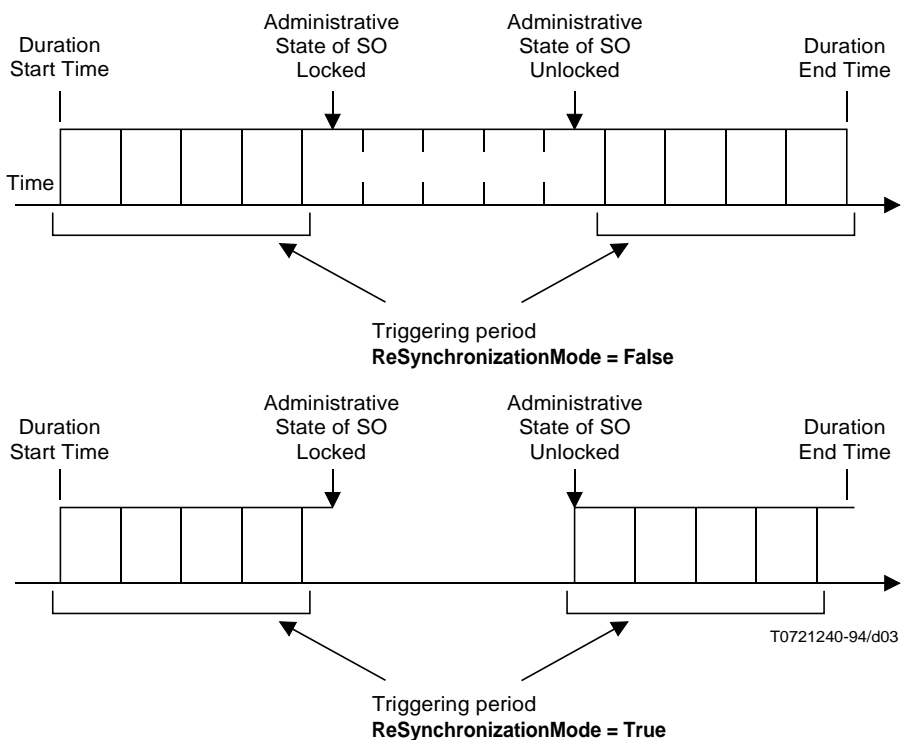


Figure 3 – Example use of the resynchronize mode attribute

8.3.9 Period synchronization package

The period synchronization package, as defined in ITU-T Rec. X.738 | 10164-13, specifies the synchronization time for periods. The start for each period is at a time which is an integral number of periods before or after the period synchronization time.

8.3.10 Operations scheduling package

8.3.10.1 Overview

The operations scheduling package identifies the specific operations to be scheduled in the scheduled managed object. An SO containing this package shall determine the performance of the specified operations upon the specified SMOs in accord with the schedule supported by the SO.

8.3.10.2 Attributes of the operation scheduling package

The operations scheduling package has the following attribute:

- *Operation specifications* – The operation specifications attribute identifies the specific operations to be scheduled in the scheduled managed object. This read-write and set-operable (add/remove) attribute identifies SMOs and the operations to be performed upon the SMOs in accord with the schedule.

8.3.11 Operation notification package

8.3.11.1 Overview

The operation notification package contains the operation result notification which contains the results of the operation performed on the SMO.

8.3.11.2 Notifications of the operation notification package

The operation scheduling package has the following notification:

- *Operation result* – The operation result notification identifies the specific SMO instances and the results of the operations that were performed on the scheduled managed object. This information is contained in the operation result parameter of the notification.

8.4 Properties of SMOs

8.4.1 Packages and attributes used in SMOs

The relationship of the SMO to the scheduler is represented by either:

- the external scheduler name attribute;
- an attribute derived from the external scheduler name attribute; or
- the external scheduler package,

in the SMO. The external scheduler package is defined in CCITT Rec. X.734 | ISO/IEC 10164-5. The external scheduler name attribute is defined in 8.4.1.1.

The status of the activity may be specified in a SMO using either:

- the availability status as defined in CCITT Rec. X.731 | ISO/IEC 10164-2; or
- the on duty attribute defined in 8.4.1.2.

8.4.1.1 External scheduler name attribute

The external scheduler name attribute is incorporated in a managed object definition when an activity within a SMO is to be scheduled by an external scheduler. It specifies the name of one or more external scheduler managed objects that are related to an activity within a SMO. This relationship implies that the activity will be controlled by the external scheduler object(s). If multiple activities are to be scheduled in the SMO other attributes derived from this attribute must be included in the object.

The empty set shall indicate that no scheduler object is being specified (e.g. if the SO has been deleted.)

Attribute value change notifications are generated when this attribute is changed.

8.4.1.2 On-duty attribute

The on-duty attribute is read only and is used to indicate the status of a scheduled activity within a SMO. This attribute is used to identify the specific activity within the SMO to which the schedule applies. Its identifier is included in the scheduled managed objects attribute in the SO (see A.4.4.) When the value of this attribute is true it indicates that the activity is scheduled to be active, and when the value is false it indicates that the activity is scheduled to be inactive. For each individual activity of a SMO that requires separate scheduling, an activity-specific on duty attribute shall be specified which is derived from the on duty attribute (see A.4.2.)

8.4.1.3 Requested window package

The requested window package is defined in CCITT Rec. X.745 | ISO/IEC 10164-12. This package may be imported into a SMO if there is a requirement for controlling the time window within which an activity is to be performed.

8.4.2 SMO behaviour for interval scheduling

Each interval scheduler object instance can control any number of managed object instances.

When an interval scheduler is created and the scheduling relationship is set up, the activities within the SMOs will be set to no duty or off duty as defined by the interval scheduler's schedule for that particular time. If the interval scheduler is created at a time outside the schedule's defined intervals of operation, the activity within the SMO will become off-duty. The behaviour of each activity under these conditions will be defined in the behaviour clause in the SMO's class definition. One option is that any activity being performed at this time will continue to completion but no other activities will be started.

When the operation of an interval scheduler is suspended the scheduled activities within the SMOs will be off-duty. If the operation of an interval scheduler is suspended during any of the schedule's defined intervals of operation the scheduled activities within the SMOs will become off-duty. The behaviour of each activity under these conditions will be defined in the behaviour clause in the SMO's class definition. One option is that any activity being performed at this time will continue to completion, but no other operations will be started.

For each activity that is scheduled in a SMO, a status attribute may be defined to indicate that the activity is scheduled. For an activity scheduled by one SO, if the administrative state of the corresponding SO is set to locked, or the operational state of the corresponding SO changes to disabled, the status attribute for the selected activity in the SMO is set to indicate that it is not scheduled. If there is only one activity in a SMO, then the availability status defined in 10164-2 may be used to indicate the scheduled status. When the administrative state of the SO is set to unlocked or the operational state changes to enabled, the status attribute for this activity in the SMO is modified depending on the schedule defined for the SO. The definition of the SMO needs to specify how it is affected by the SOs. For example, for a SMO with one activity, the availability status is set to off-duty when the schedule in the SO indicates off duty.

When an interval scheduler is resumed the scheduled activities within the SMOs will be set to on-duty or off-duty as defined by the interval scheduler's schedule.

If a SMO contains its own periodic schedule it may be scheduled by an interval scheduler. In this case the periodic schedule in the SMO is only active during the intervals specified in the SO, an example is shown in Figure 4.

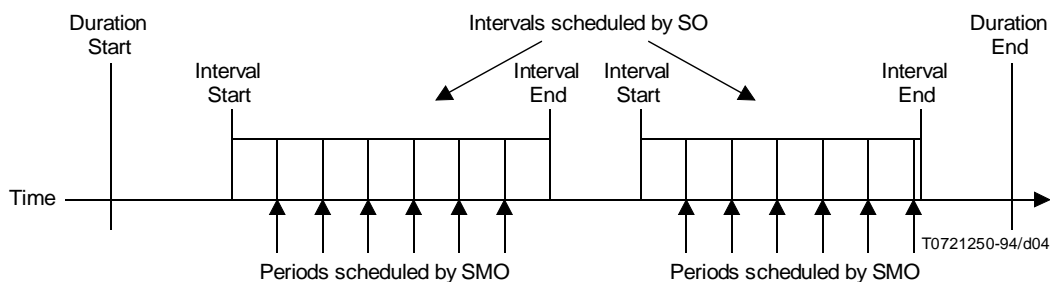


Figure 4 – Example of periodic scheduling within a scheduled interval

8.4.3 SMO behaviour for periodic and aperiodic trigger scheduling

When a trigger (periodic or aperiodic) scheduler managed object is created and the scheduling relationship is set up, the scheduled activities of the SMOs will be triggered when the scheduler starts functioning and at the appropriate periodicity or trigger times according to their schedule.

When the operation of a periodic or aperiodic scheduler is suspended, the scheduled activities within the SMOs will not be triggered.

8.5 Compliance

Managed object class definitions support the functions defined in this Recommendation | International Standard by incorporating the specification of the management information through reference to the management templates defined in Annex A. The reference mechanism is defined in CCITT Rec. X.722 | ISO/IEC 10165-4.

8.6 Generic definitions from the object management function

This Recommendation | International Standard makes use of the following generic definitions in CCITT Rec. X.730 | ISO/IEC 10164-1:

- attribute value change notification;
- object creation notification;
- object deletion notification.

8.7 Generic definitions from the state management function

This Recommendation | International Standard makes use of the following generic definitions in CCITT Rec. X.731 | ISO/IEC 10164-2:

- administrative state;
- operational state;
- state change notification;
- availability status.

8.8 Generic definitions from the event report management function

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

- duration package;
- external scheduler package.

8.9 Generic definitions from the test management function

This Recommendation | International Standard makes use of the following generic definitions in ITU-T Rec. X.745 | ISO/IEC 10164-12:

- requested time window package.

8.10 Generic definitions from the summarization function

This Recommendation | International Standard makes use of the following generic definitions in ITU-T Rec. X.738 | ISO/IEC 10164-13:

- period synchronization package.

9 Service definition

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

This Recommendation | International Standard uses:

- the PT-EVENT service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the PT-GET service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the PT-SET service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the PT-CREATE service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the PT-DELETE service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the object creation reporting service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the object deletion reporting service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;
- the attribute value change reporting service defined in CCITT Rec. X.730 | ISO/IEC 10164-1; and
- the state change reporting service defined in CCITT Rec. X.731 | ISO/IEC 10164-2.

10 Functional units

The following functional units defined in CCITT Rec. X.730 | ISO/IEC 10164-1 may be negotiated for the purpose of managing scheduler objects:

- all events;
- control;
- monitor; and
- object events.

The following functional units defined in CCITT Rec. X.731 | ISO/IEC 10164-2 may be negotiated for the purpose of managing scheduler objects:

- state change reporting.

11 Protocol and abstract syntax

11.1 Managed objects

This Recommendation | International Standard defines the following scheduler objects, the abstract syntax of which is specified in Annex A:

- scheduler;
- daily scheduler;
- weekly scheduler;
- monthly scheduler;
- periodic scheduler;
- daily operation scheduler;
- weekly operation scheduler;
- monthly operation scheduler;
- periodic operation scheduler;
- operation result.

11.2 Management attributes

This Recommendation | International Standard defines the following attributes, the abstract syntax of which is specified in Annex A:

- external scheduler name;
- on-duty;
- operation specifications;
- operation result;
- resynchronize mode;

- scheduled managed objects;
- scheduler ID;
- sequence of days;
- sequence of months;
- sequence of weeks;
- time period.

11.3 Management actions

There are no specific management actions defined for this systems management function.

11.4 Management notifications

This Recommendation | International Standard defines the following notification, the abstract syntax of which is specified in Annex A:

- operation result.

This Recommendation | International Standard references the following management notifications:

- attribute value change;
- state change;
- object creation;
- object deletion.

12 Relationships with other functions

This Recommendation | International Standard uses services defined in CCITT Rec. X.730 | ISO/IEC 10164-1 for the creation and deletion of managed objects, the retrieval of attributes and the notification of attribute changes, the definition in CCITT Rec. X.731 | ISO/IEC 10164-2 for the notification of state changes, the definition in ITU-T Rec. X.739 | ISO/IEC 10164-11 for the syntax of the time period attribute. It also references a number of objects, packages and attributes defined in CCITT X.721 | ISO/IEC 10165-2.

13 Conformance

Implementations claiming to conform to this Recommendation | International Standard shall comply with the conformance requirements as defined in the following subclauses.

13.1 Static conformance

The implementation shall conform to the requirements of this Recommendation | International Standard in the manager role, the agent role, or both roles. A claim of conformance to at least one role shall be made in Table B.1. If a claim of conformance is made for support in the manager role, the implementation shall support at least one of the attributes, notifications, actions, or managed objects described in Table B.2. A claim of conformance in the manager role requires the support of at least one management operation or notification as specified by those management definitions.

If a claim of conformance is made for support in the agent role, the implementation shall support at least one of the attributes, actions, or managed objects described in Table B.3. A claim of conformance in the agent role requires the support of all the mandatory operations and mandatory notifications specified by those management definitions.

The implementation shall support the transfer syntax derived from the encoding rules specified in CCITT Rec. X.209 | ISO/IEC 8825 named {joint-iso-ccitt asn1(1) basicEncoding(1)} for the abstract data types referenced by the definitions for which support is claimed.

13.2 Dynamic conformance

Implementations claiming to conform to this Recommendation | International Standard shall support the elements of procedure and definitions of semantics corresponding to the definitions for which support is claimed.

13.3 Management implementation conformance statement requirements

Any MCS proforma, PICS proforma, MOCS proforma, and MIDS proforma which conforms to this Recommendation | International Standard shall be technically identical to the proformas specified in Annexes B, C, D and E preserving table numbering and the index numbers of items, and differing only in pagination and page headers.

The supplier of an implementation which is claimed to conform to this Recommendation | International Standard shall complete a copy of the management conformance summary (MCS) provided in Annex A as part of the conformance requirements together with any other ICS proformas referenced as applicable from that MCS. An MCS, MIDS, MOCS, MRCS and PICS which conforms to this Recommendation | International Standard shall:

- describe an implementation which conforms to this Recommendation | International Standard;
- have been completed in accordance with the instructions for completion given in ITU-T Rec. X.724 | ISO/IEC 10165-6;
- include the information necessary to uniquely identify both the supplier and the implementation.

Claims of conformance to the management information defined in this Recommendation | International Standard in managed object classes defined elsewhere shall include the requirements of the MIDS proforma in the MOCS proforma for the managed object class.

Annex A

Definition of management information

(This annex forms an integral part of this Recommendation | International Standard)

A.1 Object class definitions

A.1.1 Scheduler object definition

scheduler **MANAGED OBJECT CLASS**
DERIVED FROM **"Rec. X.721 | ISO/IEC 10165-2:1992":top;**
CHARACTERIZED BY
 schedulerObjectPackage,
 "Rec. X.721 | ISO/IEC 10165-2:1992":duration;
CONDITIONAL PACKAGES
 scheduledManagedObjectsPackage
 PRESENT IF "An instance supports it.";
REGISTERED AS {schedMo 1};

A.1.2 Daily scheduler object definition

dailyScheduler **MANAGED OBJECT CLASS**
DERIVED FROM **scheduler;**
CHARACTERIZED BY
 multipleDailyScheduling;
REGISTERED AS {schedMo 2};

A.1.3 Weekly scheduler object definition

weeklyScheduler **MANAGED OBJECT CLASS**
DERIVED FROM **scheduler;**
CHARACTERIZED BY
 multipleWeeklyScheduling;
REGISTERED AS {schedMo 3};

A.1.4 Monthly scheduler object definition

monthlyScheduler **MANAGED OBJECT CLASS**
DERIVED FROM **scheduler;**
CHARACTERIZED BY
 multipleMonthlyScheduling;
REGISTERED AS {schedMo 4};

A.1.5 Periodic scheduler object definition

periodicScheduler **MANAGED OBJECT CLASS**
DERIVED FROM **scheduler;**
CHARACTERIZED BY
 periodicSchedulingPackage;
CONDITIONAL PACKAGES
 resynchronizeModePackage **PRESENT IF "an instance supports it and the periodSynchronizationPackage**
 package is not present",
 "Rec. X.738 | ISO/IEC 10164-13":periodSynchronizationPackage **PRESENT IF "Synchronization to a specified**
 time other than the duration start time is required, and the resynchronizeMode package is not
 present.";
REGISTERED AS {schedMo 5};

A.1.6 Daily operation scheduler object definition

dailyOperationScheduler **MANAGED OBJECT CLASS**
DERIVED FROM **dailyScheduler;**
CHARACTERIZED BY
 operationsSchedulingPackage;
CONDITIONAL PACKAGES
 operationNotificationPackage **PRESENT IF "the results of the operation need to be reported or the operation**
 performed is a GET operation";
REGISTERED AS {schedMo 6};

A.1.7 Weekly operation scheduler object definition

```

weeklyOperationScheduler          MANAGED OBJECT CLASS
DERIVED FROM                      weeklyScheduler;
CHARACTERIZED BY
    operationsSchedulingPackage;
CONDITIONAL PACKAGES
    operationNotificationPackage  PRESENT IF "the results of the operation
    performed is a GET operation";
REGISTERED AS {schedMo 7};
    
```

A.1.8 Monthly operation scheduler object definition

```

monthlyOperationScheduler        MANAGED OBJECT CLASS
DERIVED FROM                      monthlyScheduler;
CHARACTERIZED BY
    operationsSchedulingPackage;
CONDITIONAL PACKAGES
    operationNotificationPackage  PRESENT IF "the results of the operation
    performed is a GET operation";
REGISTERED AS {schedMo 8};
    
```

A.1.9 Periodic operation scheduler object definition

```

periodicOperationScheduler       MANAGED OBJECT CLASS
DERIVED FROM                      periodicScheduler;
CHARACTERIZED BY
    operationsSchedulingPackage;
CONDITIONAL PACKAGES
    operationNotificationPackage  PRESENT IF "the results of the operation
    performed is a GET operation";
REGISTERED AS {schedMo 9};
    
```

A.1.10 Operation result record object definition

```

operationResultRecord            MANAGED OBJECT CLASS
DERIVED FROM                      "Rec. X.721 | ISO/IEC 10165-2":eventLogRecord;
CHARACTERIZED BY
    operationResultRecordPackage  PACKAGE
    operationResultRecordBehaviour BEHAVIOUR
    DEFINED AS                    "see 8.3.11.2";
ATTRIBUTES
    operationResult               GET;;;
REGISTERED AS {schedMo 10};
    
```

A.2 Name bindings

Additional Name Bindings may be defined and registered for each scheduler object class.

A.2.1 Scheduler name binding

The following NAME-BINDING template provides the name binding currently defined for naming instances of the scheduler managed object classes.

```

scheduler-system  NAME BINDING
SUBORDINATE OBJECT CLASS
scheduler AND SUBCLASSES;
NAMED BY
SUPERIOR OBJECT CLASS
    "Rec. X.721 | ISO/IEC 10165-2:1992":system
AND SUBCLASSES;
WITH ATTRIBUTE
    schedulerID;
CREATE
WITH-REFERENCE-OBJECT,
WITH-AUTOMATIC-INSTANCE-NAMING
    "Rec. X.738|ISO/IEC 10164-13:1992":conflictingPackagesRequestedError;
DELETE
ONLY-IF-NO-CONTAINED-OBJECTS;
REGISTERED AS {schedNb 1};
    
```

A.3 Packages

A.3.1 Multiple daily scheduling package

```
multipleDailyScheduling          PACKAGE
    BEHAVIOUR                    multipleDailySchedulingBehaviour    BEHAVIOUR
    DEFINED AS                    "See 8.3.3 and 8.3.4.3";
    ATTRIBUTES
    sequenceOfDays                DEFAULT VALUE
                                   Schedule-ASN1Module.defaultSequenceOfDays

    GET-REPLACE
    ADD-REMOVE;
REGISTERED AS    {schedPkg 1};
```

A.3.2 Multiple monthly scheduling package

```
multipleMonthlyScheduling       PACKAGE
    BEHAVIOUR                    multipleMonthlySchedulingBehaviour    BEHAVIOUR
    DEFINED AS                    "See 8.3.3 and 8.3.6.3";
    ATTRIBUTES
    sequenceOfMonths              DEFAULT VALUE
                                   Schedule-ASN1Module.defaultSequenceOfMonths

    GET-REPLACE
    ADD-REMOVE;
REGISTERED AS    {schedPkg 2};
```

A.3.3 Multiple weekly scheduling package

```
multipleWeeklyScheduling        PACKAGE
    BEHAVIOUR                    multipleWeeklySchedulingBehaviour    BEHAVIOUR
    DEFINED AS                    "See 8.3.3 and 8.3.5.3";
    ATTRIBUTES
    sequenceOfWeeks               DEFAULT VALUE
                                   Schedule-ASN1Module.defaultSequenceOfWeeks

    GET-REPLACE
    ADD-REMOVE;
REGISTERED AS    {schedPkg 3};
```

A.3.4 Periodic scheduling package

```
periodicSchedulingPackage       PACKAGE
    BEHAVIOUR                    periodicSchedulingBehaviour    BEHAVIOUR
    DEFINED AS                    "See 8.3.7.3";
    ATTRIBUTES
    timePeriod                    DEFAULT VALUE
                                   Schedule-ASN1Module.defaultTimePeriod

    GET ADD-REMOVE;
REGISTERED AS    {schedPkg 4};
```

A.3.5 Resynchronize mode package

```
resynchronizeModePackage        PACKAGE
    BEHAVIOUR                    resynchronizeModeBehaviour    BEHAVIOUR
    DEFINED AS                    "See 8.3.8.3";
    ATTRIBUTES
    resynchronizeMode             GET-REPLACE;
REGISTERED AS    {schedPkg 5};
```

A.3.6 Scheduled managed objects package

```
scheduledManagedObjectsPackage PACKAGE
    BEHAVIOUR                    scheduledManagedObjectBehaviour    BEHAVIOUR
    DEFINED AS                    "See 8.3.2";
    ATTRIBUTES
    scheduledManagedObjects       GET;
REGISTERED AS    {schedPkg 6};
```


A.3.7 Scheduler object package

```

schedulerObjectPackage          PACKAGE
    BEHAVIOUR                    schedulerObjectBehaviour  BEHAVIOUR
    DEFINED AS                   "See 8.3.1.4";;
    ATTRIBUTES
        schedulerID              GET,
        "Rec. X.721 | ISO/IEC 10165-2:1992":administrativeState
                                GET-REPLACE,
        "Rec. X.721 | ISO/IEC 10165-2:1992":operationalState  GET;
    NOTIFICATIONS
        "Rec. X.721 | ISO/IEC 10165-2:1992":attributeValueChange,
        "Rec. X.721 | ISO/IEC 10165-2:1992":stateChange,
        "Rec. X.721 | ISO/IEC 10165-2:1992":objectCreation,
        "Rec. X.721 | ISO/IEC 10165-2:1992":objectDeletion;
REGISTERED AS    {schedPkg 7};
    
```

A.3.8 Operations scheduling package

```

operationsSchedulingPackage     PACKAGE
    BEHAVIOUR                    operationsSchedulingBehaviour  BEHAVIOUR
    DEFINED AS                   "See 8.3.10";;
    ATTRIBUTES
        operationSpecifications  GET-REPLACE ADD-REMOVE;
REGISTERED AS    {schedPkg 8};
    
```

A.3.9 Operation notification package

```

operationNotificationPackage    PACKAGE
    BEHAVIOUR                    operationNotificationBehaviour  BEHAVIOUR
    DEFINED AS                   "See 8.3.11";;
    NOTIFICATIONS
        operationResult;
REGISTERED AS    {schedPkg 9};
    
```

A.4 Attributes

A.4.1 External scheduler name attribute

This attribute is included in Scheduled Managed objects. It specifies the SO instance that controls the activity in the SMO.

```

externalSchedulerName          ATTRIBUTE
    BEHAVIOUR                    externalSchedulerNameBehaviour  BEHAVIOUR
    DEFINED AS                   "See 8.4.1.1";;
    WITH ATTRIBUTE SYNTAX
        Schedule-ASN1Module.ExternalSchedulerName;
    MATCHES FOR EQUALITY;
REGISTERED AS    {schedAtt 1};
    
```

A.4.2 On duty attribute

This attribute is included in SMOs. It specifies the current status of the activity in the SMO.

```

onDuty  ATTRIBUTE
    BEHAVIOUR                    onDutyBehaviour  BEHAVIOUR
    DEFINED AS                   "See 8.4.1.2";;
    WITH ATTRIBUTE SYNTAX
        Schedule-ASN1Module.OnDuty;
    MATCHES FOR EQUALITY;
REGISTERED AS    {schedAtt 2};
    
```

A.4.3 Resynchronize mode attribute

This attribute defines the mode of synchronization of a periodic scheduler's triggering periods.

```

resynchronizeMode              ATTRIBUTE
    WITH ATTRIBUTE SYNTAX
        Schedule-ASN1Module.ResynchronizeMode;
    MATCHES FOR EQUALITY;
    
```

BEHAVIOUR resynchronizeModeBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.8.2";;
REGISTERED AS {schedAtt 3};

A.4.4 Scheduled managed objects attribute

This attribute is defined in the Scheduler object to specify the SMO instances and the attribute identifier of the attribute associated with the activities within those instances that are controlled by the SO.

scheduledManagedObjects **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX Schedule-ASN1Module.ScheduledManagedObjectsList;
MATCHES FOR SET-COMPARISON, SET-INTERSECTION;
BEHAVIOUR scheduledManagedObjectsBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.2.2";;
REGISTERED AS {schedAtt 4};

A.4.5 Scheduler ID attribute

This attribute is the distinguished attribute for naming instances of a SO.

schedulerID **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX Schedule-ASN1Module.SimpleNameType;
MATCHES FOR EQUALITY, SUBSTRINGS;
BEHAVIOUR schedulerIDBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.1.2";;
REGISTERED AS {schedAtt 5};

A.4.6 Sequence of days attribute

This structured attribute defines a sequence of intervals of day.

sequenceOfDays **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX Schedule-ASN1Module.SequenceOfDays;
MATCHES FOR EQUALITY;
BEHAVIOUR sequenceOfDaysBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.4.2";;
REGISTERED AS {schedAtt 6};

A.4.7 Sequence of months attribute

This structured attribute defines a sequence of month masks.

sequenceOfMonths **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX Schedule-ASN1Module.SequenceOfMonths;
MATCHES FOR EQUALITY;
BEHAVIOUR sequenceOfMonthsBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.6.2";;
REGISTERED AS {schedAtt 7};

A.4.8 Sequence of weeks attribute

This structured attribute defines a sequence of week masks.

sequenceOfWeeks **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX Schedule-ASN1Module.SequenceOfWeeks;
MATCHES FOR EQUALITY;
BEHAVIOUR sequenceOfWeeksBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.5.2";;
REGISTERED AS {schedAtt 8};

A.4.9 Time period attribute

This attribute defines the length of the time period for the periodic triggering of an activity in a SMO by the Periodic scheduling object.

timePeriod **ATTRIBUTE**
WITH ATTRIBUTE SYNTAX Schedule-ASN1Module.TimePeriod;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR timePeriodBehaviour **BEHAVIOUR**
DEFINED AS "See 8.3.7.2";;
REGISTERED AS {schedAtt 9};

A.4.10 Operation specifications attribute

This attribute defines the operations which may be scheduled for a SMO by an operations scheduling object.

```
operationSpecifications ATTRIBUTE
  WITH ATTRIBUTE SYNTAX
    Schedule-ASN1Module.OperationSpecifications;
  MATCHES FOR EQUALITY, SET-COMPARISON, SET-INTERSECTION;
  BEHAVIOUR operationSpecificationsBehaviour BEHAVIOUR
  DEFINED AS "See 8.3.10.2";;
REGISTERED AS {schedAtt 10};
```

A.4.11 Operation result attribute

This attribute is included in operation result record objects. It specifies the result of operations performed by operations schedulers.

```
operationResult ATTRIBUTE
  BEHAVIOUR operationResultBehaviour BEHAVIOUR
  DEFINED AS "See 8.3.11.2";;
  WITH ATTRIBUTE SYNTAX
    Schedule-ASN1Module.OperationResult;
  MATCHES FOR EQUALITY;
REGISTERED AS {schedAtt 11};
```

A.5 Notifications

A.5.1 Operation result notification

```
operationResult NOTIFICATION
  WITH INFORMATION SYNTAX
    Schedule-ASN1Module.OperationResult
  AND ATTRIBUTE IDS
    OperationResult operationResult;
  BEHAVIOUR operationResultBehaviour;
REGISTERED AS {schedNotif 1};
```

A.6 ASN.1 definitions

```
Schedule-ASN1Module { joint-iso-ccitt ms(9) function(2) part15(15) modules (1) }
DEFINITIONS IMPLICIT TAGS ::=
```

```
BEGIN
```

```
-- EXPORTS everything
```

```
IMPORTS
```

```
Attribute,AttributeId,ObjectInstance,ActionResult,SetResult,SetListError,
ActionError,ModifyOperator,ActionInfo,GetResult,GetListResult,GetArgument FROM CMIP-1
{joint-CCITT-iso ms(9) cmip(1) modules(0) protocol(3)}
```

```
SimpleNameType,defaultStopTime FROM Attribute-ASN1Module
{joint-CCITT-iso ms(9) smi(3) part2(2) asn1Module(2) 1}
```

```
TimePeriod FROM metricModule
{joint-CCITT-iso ms(9) smf(4) part11(11) asn1Module(2) 1};
```

```
schedMo OBJECT IDENTIFIER ::=
{joint-iso-ccitt ms(9) function(2) part15(15) managedObjectClass(3)}
schedAtt OBJECT IDENTIFIER ::=
{joint-iso-ccitt ms(9) function(2) part15(15) attribute(7)}
schedNotif OBJECT IDENTIFIER ::=
{joint-iso-ccitt ms(9) function(2) part15(15) notification(10)}
schedPkg OBJECT IDENTIFIER ::=
{joint-iso-ccitt ms(9) function(2) part15(15) package(4)}
schedNb OBJECT IDENTIFIER ::=
{joint-iso-ccitt ms(9) function(2) part15(15) nameBinding(6)}
```

-- default value definitions

defaultDaysOfMonth DaysOfMonth ::= {{'11111111111111111111111111111111'B},
{'11111111111111111111111111111111'B}}

defaultIntervalsOfDayWps IntervalsOfDayWps ::= {{
intervalStart {hour 0, minute 0, second 0},
intervalEnd {hour 0, minute 0, second 0}}}

defaultResynchronizeMode ResynchronizeMode ::= FALSE

defaultSequenceOfDayWps SequenceOfDayWps ::= {defaultIntervalsOfDayWps}

defaultSequenceOfMonths SequenceOfMonths ::= {{
daysOfMonth defaultDaysOfMonth,
intervalsOfDayWps defaultIntervalsOfDayWps }}

defaultSequenceOfWeeks SequenceOfWeeks ::= {defaultWeekMaskWps}

defaultTimePeriod TimePeriod ::= second 0

defaultWeekMaskWps WeekMaskWps ::= {{
daysOfWeek '1111111'B,
intervalsOfDayWps defaultIntervalsOfDayWps}}

-- supporting productions

DaysOfMonth ::=SEQUENCE {
daysFromFirst BITSTRING (SIZE (31)) DEFAULT {"B"},
daysFromLast BITSTRING (SIZE (31)) DEFAULT {"B}}

DaysOfWeek ::=BIT STRING {
sunday(0),monday(1),tuesday(2),wednesday(3),thursday(4),
friday(5),saturday(6)} (SIZE(7))

ExternalSchedulerName ::= SET OF ObjectInstance

IntervalsOfDayWps ::= SET OF SEQUENCE {
intervalStart Time24Wps,
intervalEnd Time24Wps}

MonthMask ::= SET OF SEQUENCE {
daysOfMonth DaysOfMonth,
timesOfDayWps TimesOfDayWps}

-- Specifies the TimesOfDayWps for different days of the same month if
-- they have different intervals.

ModificationList ::= SET OF SEQUENCE{
modifyOperator [2] IMPLICIT ModifyOperator DEFAULT replace,
attributeId AttributeId,
attributeValue ANY DEFINED BY attributeId OPTIONAL
-- absent for setToDefault }

OnDuty ::= BOOLEAN

OperationSpecifications ::= SET OF SEQUENCE{
scheduledObjects SET OF ObjectInstance,
scheduledOperations CHOICE{
set [0] IMPLICIT ModificationList,
action [1] IMPLICIT ActionInfo,
get [2] IMPLICIT GetArguement}}

OperationResult ::= SET OF CHOICE{
getResult [0] IMPLICIT GetResult,
getListError [1] IMPLICIT GetListError,
setResult [2] IMPLICIT SetResult,
setListError [1] IMPLICIT SetListError,
actionResult [4] IMPLICIT ActionResult,
commonError [5] IMPLICIT CommonError}

CommonError ::=SEQUENCE{
managedObjectClass ObjectClass,
managedObjectInstance ObjectInstance,
errorId Remote-Operation-Notation.ERROR,

```

errorValue                ANY DEFINED BY errorId OPTIONAL}

ScheduledManagedObjectsList ::= SET OF SEQUENCE {
    objectInstance         ObjectInstance,
    activity                AttributeId OPTIONAL}

ResynchronizeMode ::= BOOLEAN

SequenceOfDays ::= SEQUENCE OF IntervalsOfDayWps

SequenceOfWeeks ::= SEQUENCE OF WeekMaskWps

SequenceOfMonths ::= SEQUENCE OF MonthMask

Time24Wps ::= SEQUENCE {
    hour                   [1] INTEGER (0..23),
    minute                 [2] INTEGER (0..59) OPTIONAL,
    second                 [3] INTEGER (0..59) OPTIONAL,
    milliseconds           [4] INTEGER (0..999) OPTIONAL,
    microseconds           [5] INTEGER (0..999999) OPTIONAL,
    nanoseconds            [6] INTEGER (0..999999999) OPTIONAL,
    picoseconds            [7] INTEGER (0..999999999999) OPTIONAL}

TimesOfDay ::= CHOICE {
    intervalsOfDayWps      IntervalsOfDayWps,
    triggerTimes           TriggerTimes}

TriggerTimes ::= SET OF Time24Wps

WeekMaskWps ::= SET OF SEQUENCE {
    daysOfWeek             DaysOfWeek,
    timesOfDayWps         TimesOfDayWps}

END    -- end of supporting productions

```

Annex B

MCS proforma²⁾

(This annex forms an integral part of this Recommendation | International Standard)

B.1 Introduction

B.1.1 Purpose and structure

The management conformance summary (MCS) is a statement by a supplier that identifies an implementation and provides information on whether the implementation claims conformance to any of the listed set of documents that specify conformance requirements to OSI management.

The MCS proforma is a document, in the form of a questionnaire that, when completed by the supplier of an implementation, becomes the MCS.

B.1.2 Instructions for completing the MCS proforma to produce an MCS³⁾

The supplier of the implementation shall enter an explicit statement in each of the boxes provided. Specific instruction is provided in the text which precedes each table.

B.1.3 Symbols, abbreviations and terms

For all annexes of this Recommendation | International Standard, the following common notations, defined in CCITT Rec. X.291 | ISO/IEC 9646-2 and CCITT Rec. X.296 | ISO/IEC 9646-7 are used for the Status column:

- m Mandatory;
- o Optional;
- c Conditional;
- x Prohibited;
- Not applicable or out of scope.

NOTES

- 1 'c', 'm', and 'o' are prefixed by a 'c:' when nested under a conditional or optional item of the same table;
- 2 'o' may be suffixed by '.n' (where n is a unique number) for mutually exclusive or selectable options among a set of status values. Support of at least one of the choices (from the items with the same values of n) is required.

For all annexes of this Recommendation | International Standard, the following common notations, defined in CCITT Rec. X.291 | ISO/IEC 9646-2 and CCITT Rec. X.296 | ISO/IEC 9646-7 are used for the Support column:

- Y Implemented;
- N Not implemented;
- No answer required;
- Ig The item is ignored (i.e. processed syntactically but not semantically).

B.2 Identification of the implementation

B.2.1 Date of statement

The supplier of the implementation shall enter the date of this statement in the box below. Use the format DD-MM-YYYY.

Date of statement

²⁾ Users of this Recommendation | International Standard may freely reproduce the MOCS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MOCS.

³⁾ Instructions for completing the MCS proforma are specified in ITU-T Rec. X.724 | ISO/IEC 10165-6.

B.2.2 Identification of the implementation

The supplier of the implementation shall enter information necessary to uniquely identify the implementation and the system(s) in which it may reside, in the box below.

B.2.3 Contact

The supplier of the implementation shall provide information on whom to contact if there are any queries concerning the content of the MCS, in the box below.

B.3 Identification of the Recommendation | International Standard in which the management information is defined

The supplier of the implementation shall enter the title, reference number and date of the publication of the Recommendation | International Standard which specifies the management information to which conformance is claimed, in the box below.

Recommendation | International Standard to which conformance is claimed

B.3.1 Technical corrigenda implemented

The supplier of the implementation shall enter the reference numbers of implemented technical corrigenda which modify the identified Recommendation | International Standard, in the box below.

B.3.2 Amendments implemented

The supplier of the implementation shall state the titles and reference numbers of implemented amendments to the identified Recommendation | International Standard, in the box below.

B.4 Management conformance summary

The supplier of implementation shall state the capabilities and features supported and provide summary of conformance claims to Recommendations | International Standards using the tables in this annex.

The supplier of the implementation shall specify the roles that are supported, in Table B.1.

Table B.1 – Roles

Index	Roles supported	Status	Support	Additional information
1	Manager role support	o.1		
2	Agent role support	o.1		

The supplier of the implementation shall specify support for the general purpose platform profile and systems management functional units, in Table B.2.

Table B.2 – General purpose platform profile

Index	Capability	Manager		Agent		Additional information
		Status	Support	Status	Support	
1	Support for the general purpose platform profile	o		o		
2	objectEvents functional unit	c1		c2		
3	allEvents functional unit	c1		c2		
4	control functional unit	c1		c2		
5	monitor functional unit	c1		c2		
6	stateChange functional unit	c1		c2		
c1 If B2/1a then m else o. c2 If B2/1b then m else o.						

The supplier of the implementation shall specify support for management information in the manager role, in Table B.3.

Table B.3 – Manager role minimum conformance requirement

Index	Item	Status	Support	Table reference	Additional information
1	OperationResultNotification	c3			
2	dailyScheduling Managed Object	c3			
3	weeklyScheduling Managed Object	c3			
4	monthlyScheduling Managed Object	c3			
5	periodicScheduling Managed Object	c3			
6	dailyOperationScheduling Managed Object	c3			
7	weeklyOperationScheduling Managed Object	c3			
8	monthlyOperationScheduling Managed Object	c3			
9	periodicOperationScheduling Managed Object	c3			
10	externalSchedulerName	c3			
11	onDuty	c3			
c3 If B1/1a then o.2 else –. NOTES 1 At least one applicable systems management operation shall be supported for at least one of the managed objects listed in items 2 through 9 and the attributes in items 10 and 11 (see clause 13). 2 The Table reference column in the above table is the (notification, attribute, action, name binding or managed object class) table reference that the supplier of implementation has filled in.					

The supplier of the implementation shall specify support for management information in the agent role, in Table B.4.

Table B.4 – Agent role minimum conformance requirement

Index	Item	Status	Support	Table reference	Additional information
1	OperationResultNotification	c4			
2	dailyScheduling Managed Object	c4			
3	weeklyScheduling Managed Object	c4			
4	monthlyScheduling Managed Object	c4			
5	periodicScheduling Managed Object	c4			
6	dailyOperationScheduling Managed Object	c4			
7	weeklyOperationScheduling Managed Object	c4			
8	monthlyOperationScheduling Managed Object	c4			
9	periodicOperationScheduling Managed Object	c4			
10	externalSchedulerName attribute	c4			
11	onDuty attribute	c4			
12	multipleDailyScheduling package	c4			
13	multipleWeeklyScheduling package	c4			
14	multipleMonthlyScheduling package	c4			
15	periodicScheduling package	c4			
c4 If B1/2a then o.3 else –. NOTE – The Table reference column in the above table is the (notification, attribute, action, name binding or managed object class) table reference of the MOCS supplied by the supplier of the managed object which claims to import the notification or attribute from this Recommendation International Standard.					

Table B.5 – Logging of event records

Index		Status	Support	Additional information
1	Does the implementation support logging of event records in agent role?	o		

NOTE – Conformance to this Recommendation | International Standard does not require conformance to CCITT Rec. X.735 | ISO/IEC 10164-6.

The supplier of the implementation shall provide information on claims of conformance to any of the Recommendation | International Standards summarized in Tables B.6 to B.8. For each Recommendation | International Standard that the supplier of the implementation claims conformance to, the corresponding conformance statement(s) shall be completed, or referenced by, the MCS. The supplier of the implementation shall complete the Support, Table numbers and Additional information columns.

In Tables B.6, B.7 and B.8, the Status column is used to indicate whether the supplier of the implementation is required to complete the referenced tables or referenced items. Conformance requirements are as specified in the referenced tables or referenced items and are not changed by the value of the MCS Status column. Similarly, the Support column is used by the supplier of the implementation to indicate completion of the referenced tables or referenced items.

Table B.6 – PICS support summary

Index	Identification of the document that includes the PICS proforma	Table numbers of PICS proforma	Description	Constraints and values	Status	Support	Table numbers of PICS	Additional information
1	ITU-T Rec X.746 ISO/IEC 10164-15	Annex C all tables	–	–	m			
2	CCITT Rec X.730 ISO/IEC 10164-1	Annex E all tables	SM application Context	–	m			
3	CCITT Rec X.730 ISO/IEC 10164-1	Annex B MAPDU tables	Object Management MAPDUs	–	m			
4	CCITT Rec X.731 ISO/IEC 10164-2	Annex B MAPDU tables	State Management MAPDUs	–	m			

Table B.7 – MOCS support summary

Index	Identification of the document that includes the MOCS proforma	Table numbers of MOCS proforma	Description	Constraints and values	Status	Support	Table numbers of MOCS	Additional information
1	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Daily Scheduler	–	o.5			
2	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Weekly Scheduler	–	o.5			
3	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Monthly Scheduler	–	o.5			
4	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Periodic Scheduler	–	o.5			
5	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Daily Operation Scheduler	–	o.5			
6	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Weekly Operation Scheduler	–	o.5			
7	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Monthly Operation Scheduler	–	o.5			
8	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Periodic Operation Scheduler	–	o.5			
9	ITU-T Rec X.746 ISO/IEC 10164-15	Annex D all tables	Operation Result Record	–	o.5			

Table B.8 – MRCS support summary

Index	Identification of the document that includes the MRCS proforma	Table numbers of MRCS proforma	Description	Constraints and values	Status	Support	Table numbers of MRCS	Additional information
1	CCITT Rec X.735 ISO/IEC 10164-6	Annex F	logRecord-Log	–	o			
2	CCITT Rec X.746 ISO/IEC 10164-15	Annex F	scheduler-System	–	o			

Annex C

PICS proforma⁴⁾

(This annex forms an integral part of this Recommendation | International Standard)

C.1 Instructions for completing the PICS proforma

C.1.1 Purpose and structure

The purpose of this PICS proforma is to provide a mechanism whereby a supplier of an implementation of ITU-T Rec. X.746 | ISO/IEC 10164-15 may provide information in a standard form. The PICS proforma is subdivided into clauses for the following categories of information:

- protocol details;
- overall conformance claim;
- implementation capabilities.

C.1.2 Symbols, abbreviation and terms

The PICS proforma contained in this annex is comprised of information in a tabular form in accordance with the guidelines presented in CCITT Rec. X.291 | ISO/IEC 9646-2.

The notations used in the Status and Support columns are specified in B.1.3.

Within this PICS proforma, space has been provided for the supplier of the implementation to specify support for individual items and if appropriate provide additional information. It is recommended that references to additional specifications are included where appropriate (for example, to list the OBJECT IDENTIFIER values and/or ranges supported), and that these additional specifications be appended to the completed PICS proforma.

C.1.3 Nesting rules

In the “Status” column of the tables in this Recommendation | International Standard, a mandatory element contained within an optional or conditional constructor parameter is mandatory only if the option or condition is taken. The “c:” notation, specified in CCITT Rec X.296 | ISO/IEC 9646-7 is used to express these nesting rules.

C.1.4 Instructions for completing the PICS

The supplier of the implementation shall enter an explicit statement in each of the boxes provided using the notation described in B.1.3. Specific instruction is provided in the text which precedes each table.

C.2 Capabilities

C.2.1 Systems management functional unit negotiation support

The supplier of the implementation shall state the capability for negotiating the use of the object management functional units, in Table C.1.

Table C.1 – SMFU negotiation support

Index	Negotiation capability	Status	Support	Additional information
1	Does the implementation support the negotiation of the object management functional units?	o		

The tables for the functional unit negotiation mechanism are specified in Annex E of the first amendment to CCITT Rec. X.730 | ISO/IEC 10164-1.

⁴⁾ Users of this Recommendation | International Standard may freely reproduce the PICS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed PICS.

C.2.2 MAPDU support

The supplier of the implementation shall state support for the MAPDU in the management role(s) for which conformance is claimed, in Table C.2.

Table C.2 – MAPDUs

Index	MAPDU (agent sending) (manager receiving)	Status	Support	Additional information
1	OperationResultNotification (agent sending)	c1		
2	OperationResultNotification (manager receiving)	c2		
c1 If B.3/1a then m else –. c2 If B.2/1a then m else –.				

A standard mechanism for configuring event forwarding characteristics of an open system has been defined in CCITT Rec. X.734 | ISO/IEC 10164-5. For systems not using this mechanism, the supplier of the implementation shall state the condition under which event reports will be forwarded by the system, in the box below.

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If support for the OperationResultNotification MAPDU in the agent role is claimed (B.3/1a), then the supplier of the implementation shall state whether or not each parameter of the MAPDU is supported in Table C.3.

Table C.3 – OperationResultNotification MAPDU (Agent sending)

Index	Parameter name	Constraints and values	Status	Support	Additional information
1	OperationResult		m		
1.1	getResult	ManagedObjectClass and ManagedObjectInstance parameters shall be present	o.5		
1.2	getListError	ManagedObjectClass and ManagedObjectInstance parameters shall be present	o.5		
1.3	setResult	ManagedObjectClass and ManagedObjectInstance parameters shall be present	o.5		
1.4	setListError	ManagedObjectClass and ManagedObjectInstance parameters shall be present	o.5		
1.5	actionResult	ManagedObjectClass and ManagedObjectInstance parameters shall be present	o.5		
1.6	commonError	ManagedObjectClass and ManagedObjectInstance parameters shall be present	o.5		
1.6.1	managedObjectClass		m		
1.6.2	managedObjectInstance		m		
1.6.3	errorId		m		
1.6.4	errorValue		m		

If support for the object creation MAPDU in the manager role is claimed (B.2/1a), then the supplier of the implementation shall state whether or not each parameter of the MAPDU is supported in Table C.4.

Table C.4 – OperationResultNotification MAPDU (Manager receiving)

Index	Parameter name	Constraints and values	Status	Support	Additional information
1	OperationResult		m		
1.1	getResult		m		
1.2	getListError		m		
1.3	setResult		m		
1.4	setListError		m		
1.5	actionResult		m		
1.6	commonError		m		
1.6.1	managedObjectClass		m		
1.6.2	managedObjectInstance		m		
1.6.3	errorId		m		
1.6.4	errorValue		m		

Annex D

MOCS proforma⁵⁾

(This annex forms an integral part of this Recommendation | International Standard)

D.1 Introduction

The purpose of this MOCS proforma is to provide a mechanism for a supplier of an implementation of this Recommendation | International Standard which claims conformance to a managed object class to provide conformance information in a standard form.

D.1.1 Symbols, abbreviations and terms

The MOCS proforma contained in this annex is comprised of information in a tabular form in accordance with the guidelines presented in ISO/IEC 9646-2.

The following common notations, defined in ISO/IEC 9646-2 are used for the status column:

- c Conditional
- m Mandatory
- o Optional
- x Prohibited
- Not applicable

The following common notations, defined in ISO/IEC 9646-2 are used for the support column:

- Ig The item is ignored (i.e. processed systematically but not semantically)
- N Not implemented
- Y Implemented
- Not applicable

The following abbreviations are used throughout this Recommendation | International Standard:

- dmiAtt joint-iso-ccitt ms(9) smi(3) part2(2) attribute(7)
- dmiPkg joint-iso-ccitt ms(9) smi(3) part2(2) package(4)
- dmiNotif joint-iso-ccitt ms(9) smi(3) part2(2) notification(10)
- schedMo joint-iso-ccitt ms(9) function(2) part15(15) managedObjectClass(3)
- schedAtt joint-iso-ccitt ms(9) function(2) part15(15) attribute(7)
- schedNotif joint-iso-ccitt ms(9) function(2) part15(15) notification(10)
- schedPkg joint-iso-ccitt ms(9) function(2) part15(15) package(4)
- schedNb joint-iso-ccitt ms(9) function(2) part15(15) nameBinding(6)

D.1.2 Instructions for completing the MOCS proforma to produce a MOCS⁶⁾

The supplier of the implementation shall state which items are supported in the tables below and, if necessary provide additional information.

D.2 Daily Scheduler managed object class

D.2.1 Statement of conformance to the managed object class

See Table D.1.

⁵⁾ Users of this Recommendation | International Standard may freely reproduce the MOCS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MOCS. Instructions for constructing MOCS proforma are found in ITU-T Rec. X.724 | ISO/IEC 10165-6, 5.2.2.

⁶⁾ Instructions for MOCS proforma are found in ITU-T Rec. X.724 | ISO/IEC 10165-6, clause 5.

Table D.1

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	dailyScheduler	{schedMo 2}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.2.

Table D.2

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.2.2 Packages

See Table D.3.

Table D.3 – Daily scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c1		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	multipleDailyScheduling	{schedPkg 1}		m		
c1 If D.3/3 or D.3/6 then m else –.						

D.2.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.4). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.4 – Daily scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c2		x	
4	allomorphs	{dmiAtt 50}		–		c3		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrative State	{dmiAtt 31}		m		m		m	
7	operational State	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduled Managed Objects	{schedAtt 4}		x		c4		x	
11	sequenceOf Days	{schedAtt 6}		m		m		m	

c2 If D.3/2 then m else –.
c3 If D.3/3 then m else –.
c4 If D.3/6 then m else –.

Table D.4 (end) – Daily scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	m		m		o		

D.2.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below. The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes (see Table D.5).

Table D.5 – Daily scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{ dmiNotif 1 }		m			
2	StateChange	{ dmiNotif 14 }		m			
3	ObjectCreation	{ dmiNotif 6 }		m			
4	ObjectDeletion	{ dmiNotif 7 }		m			

Table D.5 (continued) – Daily scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{ dmiAtt 7 }		o		
	1.2	AttributeIdentifierList	{ dmiAtt 8 }		o		
	1.3	AttributeValueChangeDefinition	{ dmiAtt 10 }		m		
	1.4	NotificationIdentifier	{ dmiAtt 16 }		c20		
	1.5	CorrelatedNotifications	{ dmiAtt 12 }		o		
	1.6	AdditionalText	{ dmiAtt 7 }		o		
	1.7	AdditionalInformation	{ dmiAtt 6 }		–		
2	2.1	SourceIndicator	{ dmiAtt 7 }		o		
	2.2	AttributeIdentifierList	{ dmiAtt 8 }		o		
	2.3	StateChangeDefinition	{ dmiAtt 28 }		m		
	2.4	NotificationIdentifier	{ dmiAtt 16 }		c21		
	2.5	CorrelatedNotifications	{ dmiAtt 12 }		o		
	2.6	AdditionalText	{ dmiAtt 7 }		o		
	2.7	AdditionalInformation	{ dmiAtt 6 }		–		
3	3.1	SourceIndicator	{ dmiAtt 7 }		o		
	3.2	AttributeList	{ dmiAtt 9 }		o		
	3.3	NotificationIdentifier	{ dmiAtt 16 }		c22		
	3.4	CorrelatedNotifications	{ dmiAtt 12 }		o		
	3.5	AdditionalText	{ dmiAtt 7 }		o		
	3.6	AdditionalInformation	{ dmiAtt 6 }		–		

Table D.5 (end) – Daily scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c23		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	AdditionalInformation	{dmiAtt 6}		–		
c20 If D.5/1.5 then m else o. c21 If D.5/2.5 then m else o. c22 If D.5/3.4 then m else o. c23 If D.5/4.4 then m else o.							

D.3 Weekly scheduler managed object class

D.3.1 Statement of conformance to the managed object class

See Table D.6.

Table D.6

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	WeeklyScheduler	{schedMo 3}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.7.

Table D.7

Index	Managed object class template label	Value of object identifier for actual class	Additional information

D.3.2 Packages

See Table D.8.

Table D.8 – Weekly scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c5		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	multipleWeeklyScheduling	{schedPkg 3}		m		
c5 If D.8/3 or D.8/6 then m else –.						

D.3.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.9). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.9 – Weekly scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c6		x	
4	allomorphs	{dmiAtt 50}		–		c7		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduledManagedObjects	{schedAtt 4}		x		c8		x	
11	sequenceOfWeeks	{schedAtt 8}		m		m		m	
c6 If D.8/2 then m else –.									
c7 If D.8/3 then m else –.									
c8 If D.8/6 then m else –.									

Table D.9 (end) – Weekly scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	m		m		o		

D.3.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.10). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.10 – Weekly scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			

Table D.10 (end) – Weekly scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c24		
	1.5	CorrelatedNotifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c25		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c26		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c27		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	AdditionalInformation	{dmiAtt 6}		–		
c24 If D.10/1.5 then m else o. c25 If D.10/2.5 then m else o. c26 If D.10/3.4 then m else o. c27 If D.10/4.4 then m else o.							

D.4 Monthly scheduler managed object class

D.4.1 Statement of conformance to the managed object class

See Table D.11.

Table D.11

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	MonthlyScheduler	{ schedMo 4 }		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.12.

Table D.12

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.4.2 Packages

See Table D.13.

D.13 – Monthly scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{ dmiPkg 16 }		c9		
3	allomorphicPackage	{ dmiPkg 17 }		o		
4	schedulerObjectPackage	{ schedPkg 7 }		m		
5	duration	{ dmiPkg 26 }		m		
6	scheduledManagedObjectsPackage	{ schedPkg 6 }		o		
7	multipleMonthlyScheduling	{ schedPkg 2 }		m		
c5 If D.13/3 or D.13/6 then m else –.						

D.4.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.14). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.14 – Monthly scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c10		x	
4	allomorphs	{dmiAtt 50}		–		c11		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduledManagedObjects	{schedAtt 4}		x		c12		x	
11	sequenceOfMonths	{schedAtt 7}		m		m		m	
c10 If D.13/2 then m else –. c11 If D.13/3 then m else –. c12 If D.13/6 then m else –.									

Table D.14 (end) – Monthly scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	m		m		o		

D.4.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.15). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.15 – Monthly scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			

Table D.15 (continued) – Monthly scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c28		
	1.5	CorrelatedNotifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c29		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c30		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		

Table D.15 (end) – Monthly scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c31		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	AdditionalInformation	{dmiAtt 6}		–		
c28 If D.15/1.5 then m else o. c29 If D.15/2.5 then m else o. c30 If D.15/3.4 then m else o. c31 If D.15/4.4 then m else o.							

D.5 Periodic scheduler managed object class

D.5.1 Statement of conformance to the managed object class

See Table D.16.

Table D.16

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	Periodic scheduler	{schedMo 5}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.17.

Table D.17

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.5.2 Packages

See Table D.18.

Table D.18 – Periodic scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c13		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	periodicSchedulingPackage	{schedPkg 4}		m		
8	ResynchronizeModePackage	{schedPkg 5}		o		
9	periodSynchronizationPackage	{joint-iso-ccitt ms(9) function(2) part13(13) package(4) 10}		o		

c13 If D.18/3 or D.18/6 or D.18/8 or D.18/9 then m else –.

D.5.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.19). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.19 – Periodic scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c14		x	
4	allomorphs	{dmiAtt 50}		–		c15		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	

Table D.19 (continued) – Periodic scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
10	scheduledManagedObjects	{ schedAtt 4 }		x		c16		x	
11	timePeriod	{ schedAtt 9 }		m		m		m	
12	resynchronizeMode	{ schedAtt 3 }		m		c17		c17	
13	periodSynchronizationTime	{ joint-iso-ccitt ms(9) function(2) part13(13) attribute(7) 24 }		m		c19		c19	
c14 If D.18/2 then m else –. c15 If D.18/3 then m else –. c16 If D.18/6 then m else –. c17 If D.18/8 then m else –. c19 If D.18/9 then m else –.									

Table D.19 (end) – Periodic scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	–		–		o		
12	–		–		c18		
13	–		–		–		
c18 If D.18/8 then o else –.							

D.5.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.20). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.20 – Periodic scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			

Table D.20 (continued) – Periodic scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c32		
	1.5	CorrelatedNotifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c33		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c34		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		

Table D.20 (end) – Periodic scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
4	4.1	SourceIndicator	{ dmiAtt 7 }		o		
	4.2	AttributeList	{ dmiAtt 9 }		o		
	4.3	NotificationIdentifier	{ dmiAtt 16 }		c35		
	4.4	CorrelatedNotifications	{ dmiAtt 12 }		o		
	4.5	AdditionalText	{ dmiAtt 7 }		o		
	4.6	AdditionalInformation	{ dmiAtt 6 }		–		
c32 If D.20/1.5 then m else o. c33 If D.20/2.5 then m else o. c34 If D.20/3.4 then m else o. c35 If D.20/4.4 then m else o.							

D.6 Daily Operation Scheduler managed object class

D.6.1 Statement of conformance to the managed object class

See Table D.21.

Table D.21

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	dailyOperation Scheduler	{ schedMo 6 }		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.22.

Table D.22

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.6.2 Packages

See Table D.23.

Table D.23 – Daily operation scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c36		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	operationsSchedulingPackage	{schedPkg 8}		m		
8	multipleDailyScheduling	{schedPkg 1}		m		
9	operationNotificationPackage	{schedPkg 9}		o		
c36 If D.23/3 or D.23/6 or D.23/9 then m else –.						

D.6.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.24). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.24 – Daily operation scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c37		x	
4	allomorphs	{dmiAtt 50}		–		c38		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduledManagedObjects	{schedAtt 4}		x		c39		x	
11	sequenceOfDays	{schedAtt 6}		m		m		m	
12	operationSpecifications	{schedAtt 10}		m		m		m	
c37 If D.23/2 then m else –.									
c38 If D.23/3 then m else –.									
c39 If D.23/6 then m else –.									

Table D.24 (end) – Daily operation scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	m		m		o		
12	m		m		o		

D.6.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.25). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.25 – Daily operation scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			
5	OperationResult	{schedNotif 1}		o			

Table D.25 (end) – Daily operation scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c40		
	1.5	CorrelatedNotifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c41		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c42		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c43		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	AdditionalInformation	{dmiAtt 6}		–		
5	5.1	OperationResult	{schedAtt 11}		m		
c40 If D.25/1.5 then m else o. c41 If D.25/2.5 then m else o. c42 If D.25/3.4 then m else o. c43 If D.25/4.4 then m else o.							

D.7 Weekly operation scheduler managed object class

D.7.1 Statement of conformance to the managed object class

See Table D.26.

Table D.26

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	WeeklyOperation Scheduler	{schedMo 7}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.27.

Table D.27

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.7.2 Packages

See Table D.28.

Table D.28 – Weekly operation scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c44		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	operationsSchedulingPackage	{schedPkg 8}		m		
8	multipleWeeklyScheduling	{schedPkg 3}		m		
9	operationNotificationPackage	{schedPkg 9}		o		
c44 If D.28/3 or D.28/6 or D.28/9 then m else –.						

D.7.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (See Table D.29). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.29 – Weekly operation scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c45		x	
4	allomorphs	{dmiAtt 50}		–		c46		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduledManagedObjects	{schedAtt 4}		x		c47		x	
11	sequenceOfWeeks	{schedAtt 8}		m		m		m	
12	operationSpecifications	{schedAtt 10}		m		m		m	
c45 If D.28/2 then m else –. c46 If D.28/3 then m else –. c47 If D.28/6 then m else –.									

Table D.29 (end) – Weekly operation scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	m		m		o		
12	m		m		o		

D.7.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.30). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.30 – Weekly operation scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			
5	OperationResult	{schedNotif 1}		o			

Table D.30 (continued) – Weekly operation scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c48		
	1.5	CorrelatedNotifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c49		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c50		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		

Table D.30 (end) – Weekly operation scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c51		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	AdditionalInformation	{dmiAtt 6}		–		
5	5.1	OperationResult	{schedAtt 11}		m		
c48 If D.30/1.5 then m else o. c49 If D.30/2.5 then m else o. c50 If D.30/3.4 then m else o. c51 If D.30/4.4 then m else o.							

D.8 Monthly operation scheduler managed object class

D.8.1 Statement of conformance to the managed object class

See Table D.31.

Table D.31

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	MonthlyOperation Scheduler	{schedMo 8}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.32.

Table D.32

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.8.2 Packages

See Table D.33.

Table D.33 – Monthly operation scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
y2	packagePackage	{dmiPkg 16}		c52		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	operationsSchedulingPackage	{schedPkg 8}		m		
8	multipleMonthlyScheduling	{schedPkg 2}		m		
9	operationNotificationPackage	{schedPkg 9}		o		
c52 If D.33/3 or D.33/6 or D.33/9 then m else –.						

D.8.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.34). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.34 – Monthly operation scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c53		x	
4	allomorphs	{dmiAtt 50}		–		c54		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduledManagedObjects	{schedAtt 4}		x		c55		x	
11	sequenceOfMonths	{schedAtt 7}		m		m		m	
12	operationSpecifications	{schedAtt 10}		m		m		m	
c53 If D.33/2 then m else –.									
c54 If D.33/3 then m else –.									
c55 If D.33/6 then m else –.									

Table D.34 (end) – Monthly operation scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		
9	–		–		o		
10	x		x		x		
11	m		m		o		
12	m		m		o		

D.8.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.35). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.35 – Weekly operation scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			
5	OperationResult	{schedNotif 1}		o			

Table D.35 (end) – Monthly operation scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c56		
	1.5	CorrelatedNotifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c57		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c58		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c59		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	AdditionalInformation	{dmiAtt 6}		–		
5	5.1	OperationResult	{schedAtt 11}		m		
c56 If D.35/1.5 then m else o. c57 If D.35/2.5 then m else o. c58 If D.35/3.4 then m else o. c59 If D.35/4.4 then m else o							

D.9 Periodic operation scheduler managed object class

D.9.1 Statement of conformance to the managed object class

See Table D.36.

Table D.36

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	PeriodicOperation Scheduler	{schedMo 9}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.37.

Table D.37

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.9.2 Packages

See Table D.38.

Table D.38 – Periodic operation scheduler packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c60		
3	allomorphicPackage	{dmiPkg 17}		o		
4	schedulerObjectPackage	{schedPkg 7}		m		
5	duration	{dmiPkg 26}		m		
6	scheduledManagedObjectsPackage	{schedPkg 6}		o		
7	periodicSchedulingPackage	{schedPkg 1}		m		
8	ResynchronizeModePackage	{schedPkg 5}		o		
9	periodSynchronizationPackage	{joint-iso-ccitt ms(9) function(2) part13(13) package(4) 10}		o		
10	operationsSchedulingPackage	{schedPkg 8}		m		
11	operationNotificationPackage	{schedPkg 9}		o		

c60 If D.38/3 or D.38/6 or D.38/8 or D.38/9 or D.38/11 then m else –.

D.9.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.39). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.39 – Periodic operation scheduler attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c61		x	
4	allomorphs	{dmiAtt 50}		–		c62		x	
5	schedulerId	{schedAtt 5}		m		m		x	
6	administrativeState	{dmiAtt 31}		m		m		m	
7	operationalState	{dmiAtt 35}		–		m		x	
8	startTime	{dmiAtt 68}		m		m		m	
9	stopTime	{dmiAtt 69}		m		m		m	
10	scheduledManagedObjects	{schedAtt 4}		x		c63		x	
11	timePeriod	{schedAtt 4}		m		m		m	
12	resynchronizeMode	{schedAtt 5}		m		c64		c64	
13	periodSynchronizationTime	{joint-iso-ccitt ms(9) function(2) part13(13) attribute(7) 24}		m		c65		c65	
14	operationSpecifications	{schedAtt 10}		m		m		m	

c61 If D.38/2 then m else –.
c62 If D.38/3 then m else –.
c63 If D.38/6 then m else –.
c64 If D.38/8 then m else –.
c65 If D.38/9 then m else –.

Table D.39 (continued) – Periodic operation scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		x		
4	x		x		x		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		o		

Table D.39 (end) – Periodic operation scheduler attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
9	–		–		o		
10	x		x		x		
11	–		–		o		
12	–		–		c66		
13	–		–		–		
14	m		m		o		

c66 If D.38/8 then o else –.

D.9.4 Notifications

The supplier of the implementation shall state whether or not notifications specified by all packages instantiated in a managed object of this class are supported, in the “Support” and “Additional information” columns below (see Table D.40). The supplier of the implementation shall indicate support in terms of the confirmed and non-confirmed modes.

Table D.40 – Periodic operation scheduler notification support

Index	Notification type template label	Value of object identifier for notification type	Constraints and values	Status	Support		Additional information
					Cnf	Non-Cnf	
1	AttributeValueChange	{dmiNotif 1}		m			
2	StateChange	{dmiNotif 14}		m			
3	ObjectCreation	{dmiNotif 6}		m			
4	ObjectDeletion	{dmiNotif 7}		m			
5	OperationResult	{schedNotif 1}		o			

Table D.40 (end) – Periodic operation scheduler notification support

Index	Subindex	Notification field name label	Value of object identifier of attribute type associated with field	Constraints and values	Status	Support	Additional information
1	1.1	SourceIndicator	{dmiAtt 7}		o		
	1.2	AttributeIdentifierList	{dmiAtt 8}		o		
	1.3	AttributeValueChangeDefinition	{dmiAtt 10}		m		
	1.4	NotificationIdentifier	{dmiAtt 16}		c67		
	1.5	Correlated Notifications	{dmiAtt 12}		o		
	1.6	AdditionalText	{dmiAtt 7}		o		
	1.7	AdditionalInformation	{dmiAtt 6}		–		
2	2.1	SourceIndicator	{dmiAtt 7}		o		
	2.2	AttributeIdentifierList	{dmiAtt 8}		o		
	2.3	StateChangeDefinition	{dmiAtt 28}		m		
	2.4	NotificationIdentifier	{dmiAtt 16}		c68		
	2.5	CorrelatedNotifications	{dmiAtt 12}		o		
	2.6	AdditionalText	{dmiAtt 7}		o		
	2.7	AdditionalInformation	{dmiAtt 6}		–		
3	3.1	SourceIndicator	{dmiAtt 7}		o		
	3.2	AttributeList	{dmiAtt 9}		o		
	3.3	NotificationIdentifier	{dmiAtt 16}		c69		
	3.4	CorrelatedNotifications	{dmiAtt 12}		o		
	3.5	AdditionalText	{dmiAtt 7}		o		
	3.6	AdditionalInformation	{dmiAtt 6}		–		
4	4.1	SourceIndicator	{dmiAtt 7}		o		
	4.2	AttributeList	{dmiAtt 9}		o		
	4.3	NotificationIdentifier	{dmiAtt 16}		c70		
	4.4	CorrelatedNotifications	{dmiAtt 12}		o		
	4.5	AdditionalText	{dmiAtt 7}		o		
	4.6	Additional Information	{dmiAtt 6}		–		
5	5.1	OperationResult	{schedAtt 11}		m		
c67 If D.40/1.5 then m else o. c68 If D.40/2.5 then m else o. c69 If D.40/3.4 then m else o. c70 If D.40/4.4 then m else o.							

D.10 Operation result record managed object class

D.10.1 Statement of conformance to the managed object class

See Table D.41.

Table D.41

Index	Managed object class template label	Value of object identifier for the class	Support of all mandatory features	Is the actual class the same as the managed object class to which conformance is claimed? (Y/N)
	OperationResultRecord	{schedMo 10}		

If the answer to the actual class question in the managed object class support table is no, the supplier of the implementation shall fill in the actual class support Table D.42.

Table D.42

Index	Actual managed object class template label	Value of object identifier for actual class	Additional information

D.10.2 Packages

See Table D.43

Table D.43 – Operation result record packages

Index	Package Name	Value of object identifier	Constraints and values	Status	Support	Additional information
1	topPackage	–		m		
2	packagePackage	{dmiPkg 16}		c71		
3	allomorphicPackage	{dmiPkg 17}		o		
4	logRecordPackage	–		m		
5	eventLogRecordPackage	–		m		
6	eventTimePackage	{dmiPkg 11}		o		
7	notificationIdentifierPackage	{dmiPkg 24}		o		
8	correlatedNotificationsPackage	{dmiPkg 23}		o		
9	additionalTextPackage	{dmiPkg 19}		o		
10	additionalInformationPackage	{dmiPkg 18}		o		
11	operationResultRecordPackage	{schedPkg 10}		m		

c71 If D.43/3 or D.43/6 or D.43/7 or D.43/8 or D.43/9 or D.43/10 then m else –.

D.10.3 Attributes

The supplier of the implementation shall state whether or not the attributes specified by all the packages instantiated in a managed object class definition are supported, in the “Support” and “Additional Information” columns below (see Table D.44). The supplier of the implementation shall indicate support for each of the operations supported.

Table D.44 – Operation result record attribute support

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	ObjectClass	{dmiAtt 65}		–		m		x	
2	nameBinding	{dmiAtt 63}		o		m		x	
3	packages	{dmiAtt 66}		o		c72		x	
4	allomorphs	{dmiAtt 50}		–		c73		x	
5	logRecordId	{dmiAtt 3}		x		m		x	
6	loggingTime	{dmiAtt 59}		x		m		m	
7	managedObjectClass	{dmiAtt 60}		x		m		x	
8	managedObjectInstance	{dmiAtt 61}		x		m		x	
9	eventType	{dmiAtt 14}		x		m		x	
10	eventTime	{dmiAtt 13}		x		c74		x	
11	notificationIdentifier	{dmiAtt 16}		x		c75		x	
12	correlatedNotifications	{dmiAtt 12}		x		c76		x	
13	additionalText	{dmiAtt 7}		x		c77		x	
14	additionalInformation	{dmiAtt 6}		x		c78		x	
15	operationResult	{schedAtt 11}		x		m		x	
c72 If D.43/2 then m else –. c73 If D.43/3 then m else –. c74 If D.43/6 then m else –. c75 If D.43/7 then m else –. c76 If D.43/8 then m else –. c77 If D.43/9 then m else –. c78 If D.43/10 then m else –.									

Table D.44 (end) – Operation result record attribute support

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		–		
2	–		–		–		
3	x		x		–		
4	x		x		–		
5	–		–		–		
6	–		–		–		
7	–		–		–		
8	–		–		–		
9	–		–		–		
10	–		–		–		
11	–		–		–		
12	x		x		–		
13	–		–		–		
14	x		x		–		
145	x		x		–		

Annex E

MIDS proforma⁷⁾

(This annex forms an integral part of this Recommendation | International Standard)

Table E.1 – Attribute support for Scheduled managed objects

Index	Attribute template label	Value of object identifier for attribute	Constraints and values	SetByCreate		Get		Replace	
				Status	Support	Status	Support	Status	Support
1	externalSchedulerName	{schedAtt 1}		o		m		m	
2	onDuty	{schedAtt 2}		x		m		x	

Table E.1 (end) – Attribute support for Scheduled managed objects

Index	Add		Remove		SetToDefault		Additional information
	Status	Support	Status	Support	Status	Support	
1	–		–		x		
2	–		–		x		

⁷⁾ Users of this Recommendation | International Standard may freely reproduce the MIDS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MIDS. Instructions for constructing MIDS proforma are found in ITU-T Rec. X.724 | ISO/IEC 10165-6, subclause 5.2.2.

Annex F

MRCS proforma⁸⁾

(This annex forms an integral part of this Recommendation | International Standard)

F.1 Name bindings

The purpose of this MRCS for name bindings is to provide a mechanism for a supplier which claims conformance to a name binding to provide conformance information in a standard form.

F.2 Instructions for completing the MRCS proforma for name bindings to produce a MRCS⁹⁾

The supplier of the implementation shall state which name bindings in which instances of the class can be subordinate are supported, in the “Support” and “Additional Information” columns below.

F.3 Statement of conformance to the name binding

See Table F.1.

Table F.1 – Name binding support

Index	Name binding template label	Value of object identifier for name binding	Constraints and values	Status	Support	Additional information
1	scheduler-system	{ schedNb 1 }		m		

Table F.1 (end) – Name binding support

Index	Subindex	Operation	Constraints and values	Status	Support	Additional information
1	1.1	Create support		m		
	1.2	Create with reference object		m		
	1.3	Create with automatic instance naming		m		
	1.4	Delete support		m		
	1.5	Delete only if no contained objects		m		
	1.6	Delete contained objects		x		

⁸⁾ Users of this Recommendation | International Standard may freely reproduce the MIDS proforma in this annex so that it can be used for its intended purpose, and may further publish the completed MIDS. Instructions for constructing MIDS proforma are found in ITU-T Rec. X.724 | ISO/IEC 10165-6, subclause 5.2.2.

⁹⁾ Instructions for MRCS proforma are found in ITU-T Rec. X.724 | ISO/IEC 10165-6, clause 5.