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SERIES X: DATA NETWORKS AND OPEN SYSTEM
COMMUNICATIONS

OSI management – Management functions and ODMA
functions

**Configuration audit support function for ITU-T
applications**

ITU-T Recommendation X.792

(Previously CCITT Recommendation)

ITU-T X-SERIES RECOMMENDATIONS
DATA NETWORKS AND OPEN SYSTEM COMMUNICATIONS

PUBLIC DATA NETWORKS	
Services and facilities	X.1–X.19
Interfaces	X.20–X.49
Transmission, signalling and switching	X.50–X.89
Network aspects	X.90–X.149
Maintenance	X.150–X.179
Administrative arrangements	X.180–X.199
OPEN SYSTEMS INTERCONNECTION	
Model and notation	X.200–X.209
Service definitions	X.210–X.219
Connection-mode protocol specifications	X.220–X.229
Connectionless-mode protocol specifications	X.230–X.239
PICS proformas	X.240–X.259
Protocol Identification	X.260–X.269
Security Protocols	X.270–X.279
Layer Managed Objects	X.280–X.289
Conformance testing	X.290–X.299
INTERWORKING BETWEEN NETWORKS	
General	X.300–X.349
Satellite data transmission systems	X.350–X.399
MESSAGE HANDLING SYSTEMS	X.400–X.499
DIRECTORY	X.500–X.599
OSI NETWORKING AND SYSTEM ASPECTS	
Networking	X.600–X.629
Efficiency	X.630–X.639
Quality of service	X.640–X.649
Naming, Addressing and Registration	X.650–X.679
Abstract Syntax Notation One (ASN.1)	X.680–X.699
OSI MANAGEMENT	
Systems Management framework and architecture	X.700–X.709
Management Communication Service and Protocol	X.710–X.719
Structure of Management Information	X.720–X.729
Management functions and ODMA functions	X.730–X.799
SECURITY	X.800–X.849
OSI APPLICATIONS	
Commitment, Concurrency and Recovery	X.850–X.859
Transaction processing	X.860–X.879
Remote operations	X.880–X.899
OPEN DISTRIBUTED PROCESSING	X.900–X.999

For further details, please refer to ITU-T List of Recommendations.

ITU-T RECOMMENDATION X.792

CONFIGURATION AUDIT SUPPORT FUNCTION FOR ITU-T APPLICATIONS

Summary

This Recommendation is concerned with support of the auditing of the configuration of managed objects by providing for the ability of a managing system to request a managed system to request the managed system to generate a file containing the managed object information.

Source

ITU-T Recommendation X.792 was prepared by ITU-T Study Group 4 (1997-2000) and was approved under the WTSC Resolution No. 1 procedure on the 26th of March 1999.

FOREWORD

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CONTENTS

	Page
1	Scope 1
2	Normative references..... 1
2.1	Identical Recommendations International Standards 1
2.2	Paired Recommendations International Standards equivalent in technical content . 2
2.3	Additional references 2
3	Definitions 2
3.2	Basic reference model definitions 2
3.3	Management framework definitions..... 3
3.4	Systems management overview definitions 3
3.5	CMIS definitions 3
3.6	OSI conformance testing definitions 3
4	Abbreviations 3
5	Conventions..... 4
6	Requirements..... 4
7	Model 4
8	Generic definitions 5
8.1	Managed objects..... 5
	8.1.1 Configuration audit controller..... 6
8.2	Compliance..... 8
8.3	Generic definitions from the generic network information model..... 8
9	Service definition 8
9.1	Introduction 8
9.2	Notification services..... 8
9.3	Action services 9
10	Systems management functional units 10
11	Relationships with other functions 10
12	Conformance 10

	Page
Annex A – Configuration audit support management support objects.....	11
A.1 Managed object class definitions	11
A.2 Attribute definitions	11
A.3 Notification definitions	12
A.4 Action definitions.....	12
A.5 Name binding definitions	13
A.6 ASN.1 definitions.....	13

Recommendation X.792

CONFIGURATION AUDIT SUPPORT FUNCTION FOR ITU-T APPLICATIONS

(Geneva, 1999)

1 Scope

This Recommendation defines a function intended to support the auditing of the configuration of the Management Information Base (MIB) in a managed system by one of the managing systems that interface with it.

The need for this auditing could arise in several situations. For example, a new managing system may need to obtain the current MIB information in the systems that it manages. Another example is when a managing system has been out of communication with a managed system for an extended period of time and the managed system has to be managed by other means.

This Recommendation does not define all the procedures necessary to align the managing and managed systems. Rather, it defines a support function that allows the manager to obtain the current view of the managed system's MIB. The support function allows a managing system to request that a managed system create a file that contains the MIB information. While there are other techniques that a managing system can use to obtain this information, they are likely to be both slower and to use more computing and communication resources than the technique defined in this Recommendation.

This Recommendation defines the way a managing system can request a managed system to create a file containing the MIB information. It also defines the format of the file. It does not specify the way the file is to be transferred between the managed and managing systems. It does not specify how the managing system uses the information in the file once it is transferred.

2 Normative references

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; all users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published.

2.1 Identical Recommendations | International Standards

- ITU-T Recommendation X.200 (1994) | ISO/IEC 7498-1:1994, *Information technology – Open Systems Interconnection – Basic Reference Model: The basic model.*
- ITU-T Recommendation X.210 (1993) | ISO/IEC 10731:1994, *Information technology – Open Systems Interconnection – Basic Reference Model – Conventions for the definition of OSI services.*
- ITU-T Recommendation X.701 (1997) | ISO/IEC 10040:1998, *Information technology – Open Systems Interconnection – Systems management overview.*

- ITU-T Recommendation X.710 (1997) | ISO/IEC 9595:1998, *Information technology – Open Systems Interconnection – Common management information service definition.*
- ITU-T Recommendation X.711 (1997) | ISO/IEC 9596-1:1998, *Information technology – Open Systems Interconnection – Common management information protocol: Specification.*
- CCITT Recommendation X.720 (1992) | ISO/IEC 10165-1:1993, *Information technology – Open Systems Interconnection – Structure of management information: Management information model.*
- 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.*

2.2 Paired Recommendations | International Standards equivalent in technical content

- 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.700 (1992), *Management framework definition for Open Systems Interconnection (OSI) for CCITT applications.*
ISO/IEC 7498-4:1989, *Information processing systems – Open Systems Interconnection – Basic Reference Model – Part 4: Management framework.*
- ITU-T Recommendation X.290 (1995), *OSI conformance testing methodology and framework for protocol recommendations for ITU-T applications – General concepts.*
ISO/IEC 9646-1:1994, *Information technology – Open Systems Interconnection – Conformance testing methodology and framework – Part 1: General concepts.*

2.3 Additional references

- ITU-T Recommendation M.3100 (1995), *Generic network information model.*

3 Definitions

This Recommendation defines the following term:

3.1 MIB file: The MIB file is a logical file that contains the selected management information. It may consist of several physical files.

3.2 Basic reference model definitions

This Recommendation makes use of the following terms defined in ITU-T Rec. X.200 | ISO/IEC 7498-1:

- a) open system;
- b) systems management.

3.3 Management framework definitions

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

- a) managed object;
- b) management information;
- c) management information base.

3.4 Systems management overview definitions

This Recommendation makes use of the following terms defined in ITU-T Rec. X.701 | ISO/IEC 10040:

- a) agent;
- b) agent role;
- c) dependent conformance;
- d) general conformance;
- e) generic definitions;
- f) managed system;
- g) management operation;
- h) manager;
- i) manager role;
- j) managing system;
- k) notification;
- l) systems management functional unit.

3.5 CMIS definitions

This Recommendation makes use of the following terms defined in ITU-T Rec. X.710 | ISO/IEC 9595:

- a) attribute;
- b) common management information service.

3.6 OSI conformance testing definitions

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

- system conformance statement.

4 Abbreviations

This Recommendation uses the following abbreviations:

ASN.1	Abstract Syntax Notation One
CMIP	Common Management Information Protocol
CMIS	Common Management Information Service

MIB	Management Information Base
RDN	Relative Distinguished Name

5 Conventions

This Recommendation defines services for the configuration audit support function following the descriptive conventions defined in ITU-T Rec. X.210 | ISO/IEC 10731.

The following notation is used in the service parameter tables:

- M The parameter is mandatory.
- C The parameter is conditional. The condition(s) are defined by the text which describes the parameter.
- (=) The value of the parameter is identical to the corresponding parameter in the interaction described by the preceding related service primitive.
- U The use of the parameter is a service-user option.
- The parameter is not present in the interaction described by the primitive concerned.
- P The parameter is subject to the constraints imposed by ITU-T Rec. X.710 | ISO/IEC 9595.

NOTE – The parameters which are marked "P" in service tables of this Recommendation are mapped directly onto the corresponding parameters of the CMIS service primitive, without changing the semantics or syntax of the parameters. The remaining parameters are used to construct a MAPDU.

6 Requirements

The configuration management support functions makes it possible for a managing system to obtain information from a managed system about the Management Information Base (MIB) available in the managed system.

This function shall provide for:

- the ability for a managing system to request that the managed system make MIB information available in a file (MIB file);
- the ability for a managing system to control the managed object classes to be included in the MIB file;
- the ability for a managing system to control the attributes included for requested managed object classes in the MIB file;
- the ability for the managed system to inform the managing system of the information needed by the managing system to retrieve the file using a file transfer protocol;
- the ability for the managed system to report to the managing system the termination status of the file generation;
- the ability for the managing system to determine if a MIB file is in the process of being created;
- the ability for the managing system to request that the creation of a MIB file be terminated.

7 Model

The configuration audit support function allows a managing system to request that the managed system create a file (MIB file) that contains information currently in the MIB.

The managing system requests the managed system to create a MIB file with the audit initiate request. (See Figure 1.) The managing system may indicate in this request that only certain managed object classes be included in the file. If the managing system requests that only certain managed object classes be included, then it may also request the attributes to be included for these classes. By default all managed object classes and attributes are included.

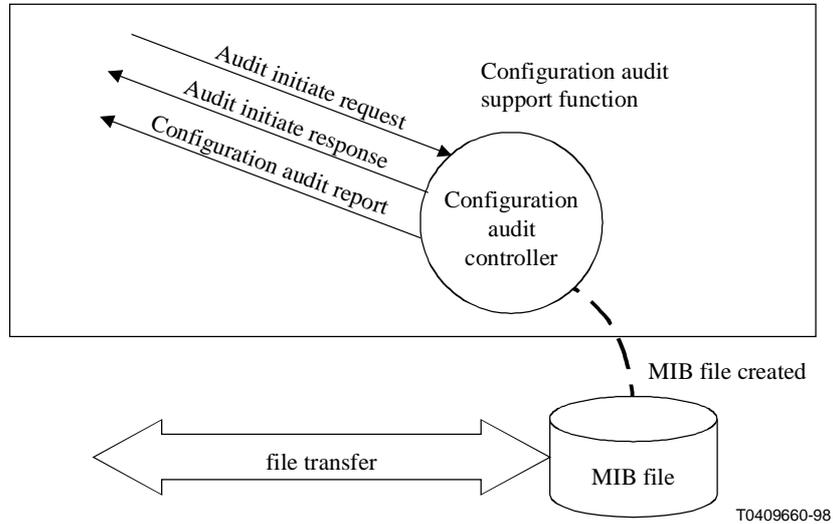


Figure 1/X.792 – Configuration audit model

The managed system determines if the requested MIB file can be created and returns this information to the manager system in its audit initiate response. The managed system then attempts to create the requested MIB file.

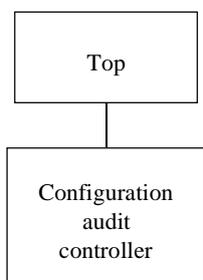
The results of the attempt to create the MIB file are reported by the managed system to the managing system in the configuration audit report.

If the file was successfully created, the manager may retrieve the file using a file transfer protocol and then use the information in the file to audit its view of the MIB. These steps are outside the scope of this Recommendation. The management of the MIB files, such as the number of MIB files, the deletion of MIB files and the duration of MIB file existence is outside the scope of this Recommendation.

8 Generic definitions

8.1 Managed objects

This Recommendation defines a new managed object class. This new class, configuration audit controller, is subclassed from top (as found in CCITT Rec. X.721 | ISO/IEC 10165-2). (See Figure 2.)



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Figure 2/X.792 – Inheritance

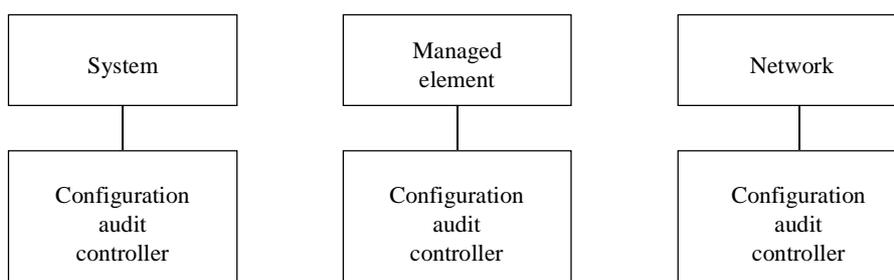
8.1.1 Configuration audit controller

This managed object class controls the generation of the MIB file. Each instance of this managed object allows the managed system to run processes to generate a MIB file. Multiple MIB files may exist but only one may be in the process of being created by each instance of this managed object class. The format of the MIB file is defined in ASN.1 module AuditASN1FileModule. That is, each instance of this managed object class only allows creating one MIB file at a time.

8.1.1.1 Attributes of configuration audit controller

The configuration audit controller has the following attributes in addition to those inherited from top (Figure 3):

- Configuration Audit Controller Id – This is the RDN attribute for the managed object.
- Last Successful Audit Time – This attribute contains the time this managed object successfully created a MIB file. (This means the configuration audit report returned a value of succeeded.) If no MIB file has ever been created by this managed object then this attribute will have a never run choice (NULL). The precision of the time stored is a local matter.
- Audit Running – A true value of this attribute indicates that this managed object is currently running an audit.



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Figure 3/X.792 – Name bindings

8.1.1.2 Notifications of configuration audit controller

This managed object has one new notification: the configuration audit report. This notification is emitted when the configuration audit being run by this managed object terminates (for any reason). If a file was generated, then the name of the file or files is included in the notification. Multiple files may be created due to file size limits. The structure of the file name is beyond the scope of this Recommendation. However, the name shall be adequate to allow the managing system to retrieve the

files and if multiple files are created, then the file names shall indicate the order of the files. In addition, the order of the files shall be indicated by the order of the file names in the *outputResult* sequence. The notification also includes the result of the MIB file generation. Possible results are:

- *succeeded*;
- *partialSuccess*;
- *terminated externally* before completion;
- *terminated internally* before completion;
- *terminated no file space* if the termination was due to a lack of file space.

For all results except *succeeded*, the integrity of each file shall be indicated by the *filesuspect* member of the *OutputResult* syntax. The FALSE value is the default value of *filesuspect* and indicates that the file named by the *filename* member of the *OutputResult* syntax is not suspected of defects. Partial success is possible. Some files in the *OutputResult* sequence may be suspect and others may not.

8.1.1.3 Actions of configuration audit controller

This managed object supports two new actions.

8.1.1.3.1 Configuration audit initiate

This confirmed action requests the initiation of the creation of a MIB file. The managed objects responds with information on the status of the initiation.

The action information contains the following:

- Classes – This sequence indicates which classes are to be included or excluded from the MIB file. If the same class is indicated as being included in a specified subset and excluded in a specified subset, the class shall be included. The two items are:
 - Include – This item either indicates that all classes are to be included in the MIB file (NULL) or indicates a subset of all are to be included.
 - Exclude – This item either indicates that no classes are to be excluded (NULL) from the MIB file or indicates a subset of classes are to be excluded.
- Attributes – This sequence indicates which attributes are to be included in the MIB file. The set of attributes considered are those found in the managed objects classes selected by the Classes field. This function does not support including an attribute when in one class and excluding it when in another. Attributes are included or excluded from all managed object classes selected in Classes. If the same attribute is indicated as being included in a specified subset and excluded in a specified subset, the attribute shall be included. The two items are:
 - Include – This item either indicates that all attributes (found in the set of managed objects selected by classes) are to be included in the MIB file (NULL) or indicates a subset of all are to be included.
 - Exclude – This item either indicates that no attributes are to be excluded (NULL) from the MIB file or indicates a subset of attributes are to be excluded.

The action reply contains the result of the attempt to start the creation of the MIB file. The following results are possible:

- *Started* – indicates the MIB file is being created;
- *Audit Already Running* – indicates that a MIB file is already being created and the initiate request was not acted upon;

- *Resource Limit* – indicates that the MIB file could not be created due to a resource limit in the managed system;
- *Not Started Other* – indicates that the MIB file could not be created due to some other reason.

8.1.1.3.2 Configuration audit terminate

This action is used to terminate an ongoing generation of a MIB file. It does not have any action information. It returns the result of the attempted termination. The following results are possible:

- *Terminated* – indicates the MIB file generation has been stopped;
- *No Audit Running* – indicates that no MIB file generation was underway to stop;
- *Could Not Terminate* – indicates that the MIB file generation could not be stopped.

8.2 Compliance

Managed object class definitions may import the appropriate specification of managed objects, notifications, actions, and/or attribute types defined in this Recommendation. This is achieved by reference to the templates defined in this Recommendation and in CCITT Rec. X.721 | ISO/IEC 10165-2. The reference mechanism is defined in CCITT Rec. X.722 | ISO/IEC 10165-4.

8.3 Generic definitions from the generic network information model

This Recommendation makes use of the following generic definitions in Recommendation M.3100:

- managed element;
- network.

This Recommendation makes use of the following generic definition in CCITT Rec. X.721 | ISO/IEC 10165-2:

- system.

9 Service definition

9.1 Introduction

This Recommendation uses the services defined in other functions as listed below:

- the PT-GET service defined in CCITT Rec. X.730 | ISO/IEC 10164-1;

9.2 Notification services

Table 1/X.792 – Configuration audit report notification

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Mode	P	–
Managed object class	P	P
Managed object instance	P	P
Event type	M	C1(=)
Event time	P	–

Table 1/X.792 – Configuration audit report notification (concluded)

Parameter name	Req/Ind	Rsp/Conf
Event information		
Result	M	–
Output Result	C2	–
Current time	–	P
Event reply	–	P
Errors	–	P
C1 Condition defined in CCITT Rec. X.710 ISO/IEC 9595		
C2 Present if one or more files are produced (see 8.1.1.2)		

9.3 Action services

Table 2/X.792 – Configuration audit initiate

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Linked identifier	–	P
Mode	P	–
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Managed object class	–	P
Managed object instance	–	P
Access control	P	–
Synchronization	P	–
Action type	M	M(=)
Action information		
Classes	M	–
Attributes	M	–
Current time	–	P
Action reply		
Audit initiate result	–	M
Errors	–	P
C1 Optional (see 8.1.1.3.1)		

Table 3/X.792 – Configuration audit terminate

Parameter name	Req/Ind	Rsp/Conf
Invoke identifier	P	P
Linked identifier	–	P
Mode	P	–
Base object class	P	–
Base object instance	P	–
Scope	P	–
Filter	P	–
Managed object class	–	P
Managed object instance	–	P
Access control	P	–
Synchronization	P	–
Action type	M	M(=)
Action information	–	–
Current time	–	P
Action reply		
Audit terminate result	–	M
Errors	–	P

10 Systems management functional units

The configuration audit support function forms a single systems management functional unit.

11 Relationships with other functions

This Recommendation does not use the services defined in other Recommendations other than the standard services defined in Recommendation X.720 and PT-GET service defined in CCITT Rec. X.730 | ISO/IEC 10164-1.

This Recommendation defines two new action services:

- Configuration audit initiate (see 8.1.1.3.1)
- Configuration audit terminate (see 8.1.1.3.2)

and one new notification service:

- Configuration audit report (see 8.1.1.2).

12 Conformance

For conformance with this Recommendation at least one instance of the configurationAuditController managed object class must be supported by the Agent. The object class must support configurationAuditInitiate and the configurationAuditTerminate actions and the required configurationAuditReport notification defined in that managed object class. The abstract syntax of each file generated must conform to the syntax given in the AuditASN1FileModule ASN.1 module. In addition, the system containing the agent must support an appropriate file transfer protocol.

ANNEX A

Configuration audit support management support objects

A.1 Managed object class definitions

```
configurationAuditController MANAGED OBJECT CLASS
DERIVED FROM "Recommendation X.721: 1992":top;
CHARACTERIZED BY
configurationAuditControllerPackage PACKAGE
BEHAVIOUR
configurationAuditControllerBehaviour BEHAVIOUR
DEFINED AS
"The Configuration Audit Controller object class is a class of
managed objects that manage the configuration audit process within a
managed element.

Only one audit can be active at any time.

The configurationAuditInitiate Action is used to initiate an audit.
It is used to select the managed objects and attributes to include
in the audit. Its reply syntax indicates if the audit is started or
if there was a problem that prevented the audit from starting.

The configurationAuditTerminate Action is used to terminate an audit
by the managed system if there is some problem.

When the audit is finished or stopped the configurationAuditReport is
emitted. This indicates the result of the audit and the names of
the files generated (if any files were produced).";
ATTRIBUTES
configurationAuditControllerId GET SET-BY-CREATE,
lastSuccessfulAuditTime GET,
auditRunning GET;
ACTIONS
configurationAuditInitiate,
configurationAuditTerminate;
NOTIFICATIONS
configurationAuditReport;;;
REGISTERED AS {configAuditSupMObjectClass 1};
```

A.2 Attribute definitions

```
auditRunning ATTRIBUTE
WITH ATTRIBUTE SYNTAX AuditASN1Module.Boolean;
MATCHES FOR EQUALITY;
BEHAVIOUR
auditRunningAttrBehaviour BEHAVIOUR
DEFINED AS
"A true value of this attribute indicates that an audit is currently
running. A false value indicates that no audit is currently running.";;
REGISTERED AS {configAuditSupAttribute 2};

configurationAuditControllerId ATTRIBUTE
WITH ATTRIBUTE SYNTAX AuditASN1Module.NameType;
MATCHES FOR EQUALITY, ORDERING, SUBSTRINGS;
BEHAVIOUR
"Rec. X.721 | ISO/IEC 10165-2 : 1992":rDNIDBehaviour;
REGISTERED AS {configAuditSupAttribute 1};
```

```

lastSuccessfulAuditTime ATTRIBUTE
WITH ATTRIBUTE SYNTAX AuditASN1Module.TimeStamp;
MATCHES FOR EQUALITY, ORDERING;
BEHAVIOUR
lastSuccessfulAuditTimeAttBehaviour BEHAVIOUR
DEFINED AS
    "This attribute indicates the last time that a configuration audit was
    successfully run. That is the configurationAuditReport returned a result
    of succeeded. If the configurationAuditReport has never been run the
    neverRun syntax is used.";;
REGISTERED AS {configAuditSupAttribute 3};

```

A.3 Notification definitions

```

configurationAuditReport NOTIFICATION
BEHAVIOUR
configurationAuditReportBehaviour BEHAVIOUR
DEFINED AS
    "This notification is generated when the configuration audit terminates.
    It is used to report the status of the termination as well as the name of
    the audit files if generated.";;
WITH INFORMATION SYNTAX AuditASN1Module.AuditReportInformation;
REGISTERED AS {configAuditSupNotification 1};

```

A.4 Action definitions

```

configurationAuditInitiate ACTION
BEHAVIOUR
configurationAuditInitiateBehaviour BEHAVIOUR
DEFINED AS
    "This action is used to initiate the configuration audit. The manager may
    specify the audit report only to include selected managed object classes
    and selected attributes within these object classes.

    The managed objects to include and exclude are selected by the classes
    member of the initiate information. The attributes of the selected
    managed objects to include and exclude are selected by the attributes
    member of the initiate information.

    The reply syntax indicates if the audit was successfully started or if it
    could not be started for some reason.";;
-- See 8.1.1.3.1
MODE CONFIRMED;
WITH INFORMATION SYNTAX AuditASN1Module.AuditInitiateInformation;
WITH REPLY SYNTAX AuditASN1Module.AuditInitiateResult;
REGISTERED AS {configAuditSupAction 1};

```

```

configurationAuditTerminate ACTION
BEHAVIOUR
configurationAuditTerminateBehaviour BEHAVIOUR
DEFINED AS
    "This action is used to terminate an ongoing configuration audit. It
    returns the result of the attempted termination.";;
-- see 8.1.1.3.2
MODE CONFIRMED;
WITH REPLY SYNTAX AuditASN1Module.AuditTerminateResult;
REGISTERED AS {configAuditSupAction 2};

```

A.5 Name binding definitions

```
configurationAuditController-managedElement NAME BINDING
SUBORDINATE OBJECT CLASS configurationAuditController AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "Rec. M.3100 : 1995":managedElement AND SUBCLASSES;
WITH ATTRIBUTE configurationAuditControllerId;
BEHAVIOUR
    configurationAuditControllerNBBehv BEHAVIOUR
    DEFINED AS
        "This is the name binding for configurationAuditController .
        configurationAuditControllers using this name binding are
        not created or deleted by system management protocol.";;
REGISTERED AS {configAuditSupNameBinding 1};
```

```
configurationAuditController-system NAME BINDING
SUBORDINATE OBJECT CLASS configurationAuditController AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "Rec. X.721 | ISO/IEC 10165-2 : 1992":system AND SUBCLASSES;
WITH ATTRIBUTE configurationAuditControllerId;
BEHAVIOUR
    configurationAuditControllerNBBehv;
REGISTERED AS {configAuditSupNameBinding 2};
```

```
configurationAuditController-network NAME BINDING
SUBORDINATE OBJECT CLASS configurationAuditController AND SUBCLASSES;
NAMED BY SUPERIOR OBJECT CLASS "Rec. M.3100 : 1995":network AND SUBCLASSES;
WITH ATTRIBUTE configurationAuditControllerId;
BEHAVIOUR
    configurationAuditControllerNBBehv;
REGISTERED AS {configAuditSupNameBinding 3};
```

A.6 ASN.1 definitions

```
AuditASN1FileModule {itu-t recommendation x(22) configAud(792) informationModel(0) fileDefinition(3)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORT Everything
```

```
IMPORTS
ObjectClass, ObjectInstance, Attribute FROM
CMIP-1 {joint-iso-ccitt ms(9) cmip(1) modules(0) protocol(3)};
```

```
AuditFile ::= SET OF SEQUENCE {
                                managedObjectClass      ObjectClass OPTIONAL,
                                managedObjectInstance    ObjectInstance,
                                attributeList            SET OF Attribute }
```

```
END      -- of AuditASN1FileModule
```

```
AuditASN1Module {itu-t recommendation x(22) configAud(792) informationModel(0) asn1Modules(2)
asn1DefinedTypeModules(0)}
DEFINITIONS IMPLICIT TAGS ::=
BEGIN
-- EXPORTS everything
```

```
IMPORTS
NameType FROM
ASN1DefinedTypesModule
{ccitt recommendation m gnm(3100) informationModel(0) asn1Modules(2) asn1DefinedTypesModule(0)} ;
```

```

configAuditSup OBJECT IDENTIFIER ::= {itu-t recommendation x configAud(752) informationModel(0) }
configAuditSupstandardSpecificExtension OBJECT IDENTIFIER ::= {configAuditSup standardSpecificExtension(0)}
configAuditSupMObjectClass OBJECT IDENTIFIER ::= {configAuditSup managedObjectClass(3)}
configAuditSupPackage OBJECT IDENTIFIER ::= {configAuditSup package(4)}
configAuditSupParameter OBJECT IDENTIFIER ::= {configAuditSup parameter(5)}
configAuditSupAttribute OBJECT IDENTIFIER ::= {configAuditSup attribute(7)}
configAuditSupNameBinding OBJECT IDENTIFIER ::= {configAuditSup nameBinding(6)}
configAuditSupAction OBJECT IDENTIFIER ::= {configAuditSup action(9)}
configAuditSupNotification OBJECT IDENTIFIER ::= {configAuditSup notification(10)}
-- Reserved arcs below configAuditSup are (8) for attribute groups

```

```

AuditInitiateInformation ::= SEQUENCE {
    classes SEQUENCE {
        include CHOICE {
            all NULL,
            subset SET OF OBJECT IDENTIFIER },
        exclude CHOICE {
            none NULL,
            subset SET OF OBJECT IDENTIFIER }
    },
    attributes SEQUENCE {
        include CHOICE {
            all NULL,
            subset SET OF OBJECT IDENTIFIER },
        exclude CHOICE {
            none NULL,
            subset SET OF OBJECT IDENTIFIER }
    }
}

```

```

AuditInitiateResult ::= ENUMERATED { started(0) auditAlreadyRunning(1) resourceLimit(2) notStartedOther(3) }
AuditTerminateResult ::= ENUMERATED { terminated(0) noAuditRunning(1) couldNotTerminate(2) }
AuditResult ::= ENUMERATED { succeeded(0) partialSuccess(1) terminatedExternally(2) terminatedInternally(3)
terminatedNoFileSpace(4) }

```

FileSuspect ::= BOOLEAN -- *False means file is OK (not suspect)*

```

OutputResult ::= SEQUENCE OF SEQUENCE { filename GraphicString,
                                         fileSuspect FileSuspect DEFAULT FALSE }

```

```

AuditReportInformation ::= SEQUENCE {
    result          AuditResult,
    outputResult   OutputResult OPTIONAL
}

```

Boolean ::= BOOLEAN

```

TimeStamp ::= CHOICE {
    neverRun      NULL,
    run          GeneralizedTime }

```

END -- of AuditASN1Module

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