

802.3 HUB MANAGEMENT STUDY GROUP

Phoenix, November 10, 1988

MOTION: 802.3 APPROVES THE FORMATION OF A STUDY GROUP TO INVESTIGATE NETWORK MANAGEMENT FOR ACTIVE HUB DEVICES.

Duration of charter until next Plenary Thursday meeting

Made by: Tony Peatfield

Second: Charles Marsh

Yes: 31, No: 1, Abstain: 7

MOTION: [New Orleans, March 23, 1989] Charter of Study Group be extended to the end of the next Plenary

Made by: Keith Amundsen

Second: Mark Darby

Yes: 47, No: 0, Abstain: 1

SCOPE

DISCUSSION LIMITED SET OF 802.3 "HUB" SPECIFIC MANAGEMENT PARAMETERS TO PROVIDE THE MEANS TO MANAGE 10BASE"X" HUBS:

I.E.

REPEATERS

FIBER OPTIC HUBS

~~BROADBAND~~

(Broadband removed at New Orleans)

EXCLUDING

BRIDGES

MAUs

FOCUS ON ITEMS THAT AFFECT INTEROPERABILITY

INVESTIGATE

- OBJECTS
- ACTIONS
- STATISTICS

WILL NOT DEFINE

- PROTOCOLS
- APPLICATIONS

WORK TO BE BASED UPON 802.1 AND ISO GUIDELINES
AND 802.3 LAYER MANAGEMENT.

LIASON WITH 802.1

OBJECTIVES FOR HUB MANAGEMENT

- 1. Provide Hub Management for 10Base-X Hub That is, Repeaters, 10Base-FA Active Star**
- 2. Define managed objects for Hub Management.**
- 3. Define attributes encapsulated within the managed objects and the operations and notifications associated with the managed objects.**
- 4. Provide a Standard that can be expanded to accomodate additional hub types.**
- 5. Provide access to Hub Management facilities that is "independent of any particular management application or management protocol"***
***(wording drawn from 802.3 LM, 5.1.)**
- 6. Provide Hub Management that does not change existing Data Transfer Service.**
- 7. Enable products that provide an Interoperable Management Service.**
- 8. Provide a means to manage the configuration of hubs.**
- 9. Provide a means to manage the configuration of the physical network.**
- 10. Provide a Hub Management specification that is independent of MAU type.**
- 11. Examine global 802.3 Management issues and to make recommendations to 802.3 for further standards work beyond the current scope of Hub Managment.**
- 12. Provide a Hub Management specification that is complimentary to existing or in process 802.3 management standards.**

802.3 HUB MANAGEMENT STUDY GROUP

San Jose, California Interim Meeting

MOTION

THE HUB MANAGEMENT STUDY GROUP
ADOPT THE OSI MANAGEMENT MODEL FOR
MANAGEMENT AND PURSUE DEVELOPMENT
OF A STANDARD ACCORDING TO THE
GUIDELINES SET FORTH IN THE ISO
AND 802.1 DOCUMENTS.

Made by: RICHARD WILLIAMS

Second: ANDY LUQUE

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N	<u>0</u>
A	<u>0</u>

3 MAY 89

16:50

KICH WILLIAMS
SAN JOSE
MAY 3, 1989
HM# 35

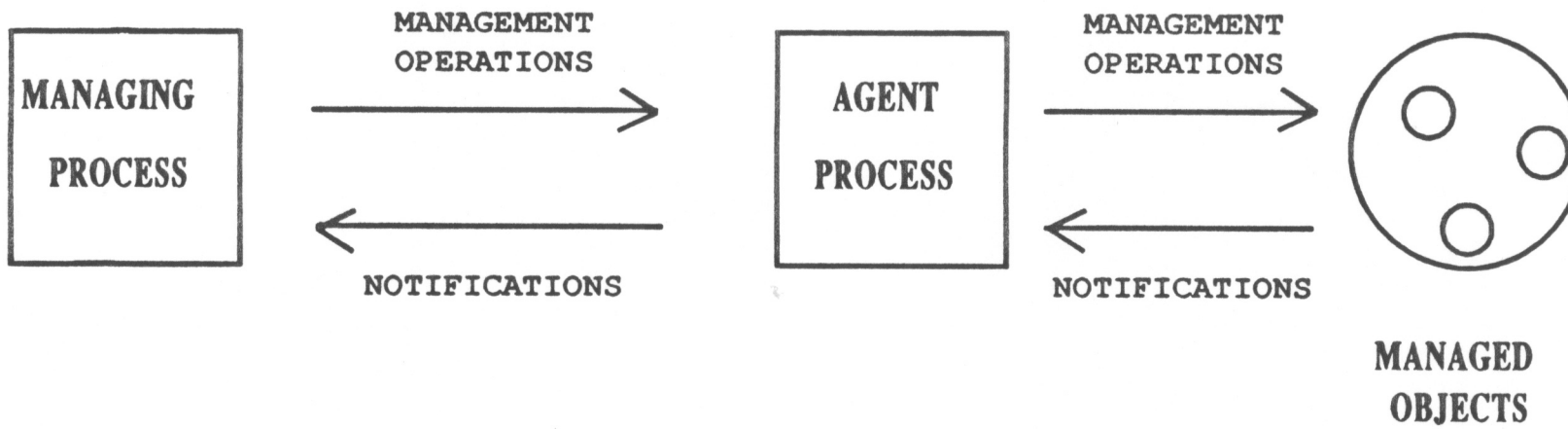
MODEL OF OSI SYSTEMS MANAGEMENT

Management is a distributed application modeled as a set of interacting management processes.

Processes are categorized as managing processes or agent processes.

Management activities are effected through the manipulation of managed objects.

FRM # 22



MODELS

INFORMATION ASPECT

The set of managed objects together with their attributes in a system constitutes the systems Management Information Base (MIB).

OBJECTS ARE THE THINGS TO BE MANAGED

- * HAVE ATTRIBUTES**
- * HAVE A DEFINED SET OF OPERATIONS THAT MAY BE PERFORMED ON THE OBJECT**
- * EXHIBIT A SPECIFIED BEHAVIOR IN RESPONSE TO MANAGEMENT OPERATIONS**
- * EMIT NOTIFICATIONS**

These attributes, operations and notifications are available both locally and remotely of the managed system.

MODELS

3 THINGS TO PERFORM MANAGEMENT

DEFINE:

- 1. SERVICES AND PROTOCOLS USED TO COMMUNICATE OPERATIONS AND NOTIFICATIONS**
- 2. OPERATIONS THAT MAY BE PERFORMED ON A MANAGED SYSTEM AND THE EFFECT OF THOSE OPERATIONS**
- 3. PROTOCOL ENCODING OF MANAGEMENT CONTROL AND INFORMATION**

ITEM 2 MAY BE DEFINED IN A MANNER THAT IS INDEPENDENT OF THE PROTOCOL TO BE USED.

MANAGED OBJECTS

WHAT IS A MANAGED OBJECT?

MANAGEMENT VIEW OF A SYSTEM RESOURCE THAT IS SUBJECT TO MANAGEMENT.

EXAMPLES OF MANAGED OBJECTS:

- * LAYER ENTITY**
- * CONNECTION**
- * PHYSICAL COMMUNICATIONS EQUIPMENT**

OBJECTS MAY BE LOGICAL CONSTRUCTS OR PHYSICAL DEVICES

OBJECTS

OBJECTS ARE DEFINED WITH 4 THINGS

- * ATTRIBUTES
PROPERTIES (AS SEEN BY MANAGEMENT) OF AN
OBJECT**
- * OPERATION
OPERATIONS THAT MANAGEMENT CAN PERFORM
ON AN OBJECT AND ITS ATTRIBUTES**
- * BEHAVIOR
HOW THE OBJECT REACTS TO MANAGEMENT
OPERATIONS**
- * NOTIFICATION
REPORTS OF EVENTS GENERATED BY AN OBJECT**

OBJECTS

ATTRIBUTES

**PROPERTIES OF AN OBJECT, AS SEEN BY
MANAGEMENT**

TYPES

**IDENTIFIERS - Distinguish instances within an object
class**

Example: relative distinguished name

**CHARACTERISTICS - Used to control behavior of the
object**

May only change by management operation

**STATUS - Used to monitor the behavior of the object
Cannot be changed directly by management**

Example: State

**STATISTICS - Used to measure the behavior of the
object**

Examples: Counter, Gauge, Tide-mark

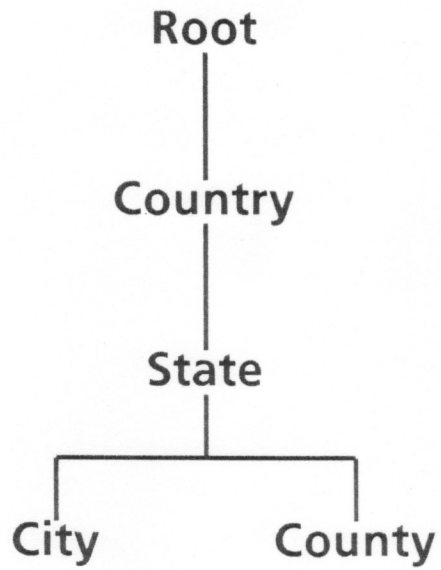
OBJECTS

ATTRIBUTES HAVE

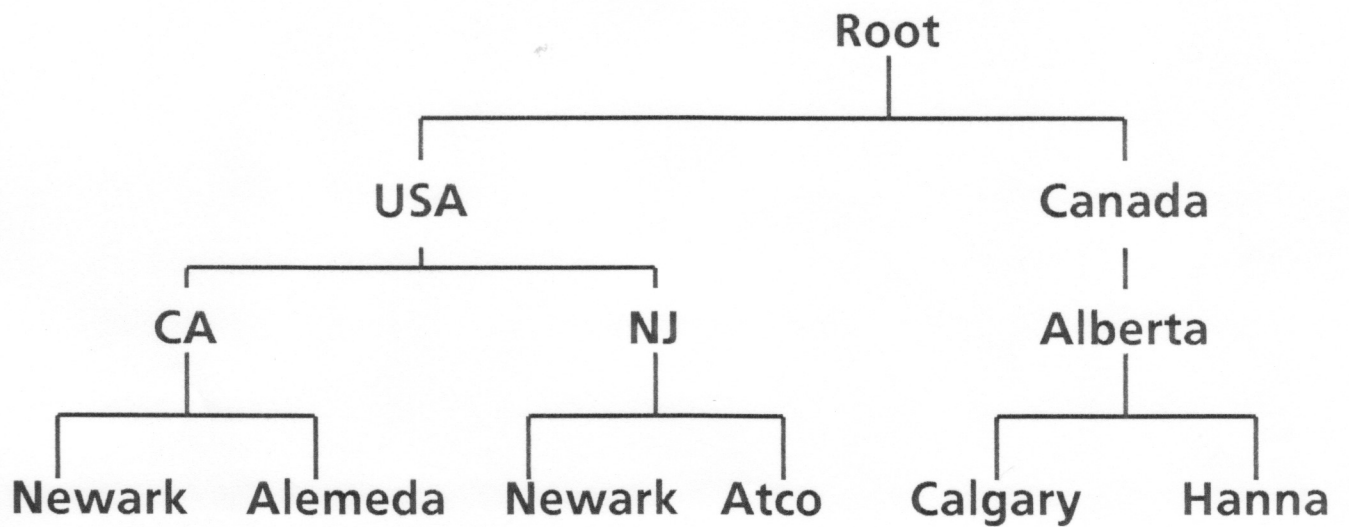
- * A NAME
- * A DATA TYPE
- * UNITS
- * A DEFAULT VALUE

ATTRIBUTES CAN BE SETTABLE, NON-SETTABLE, WRITE ONLY

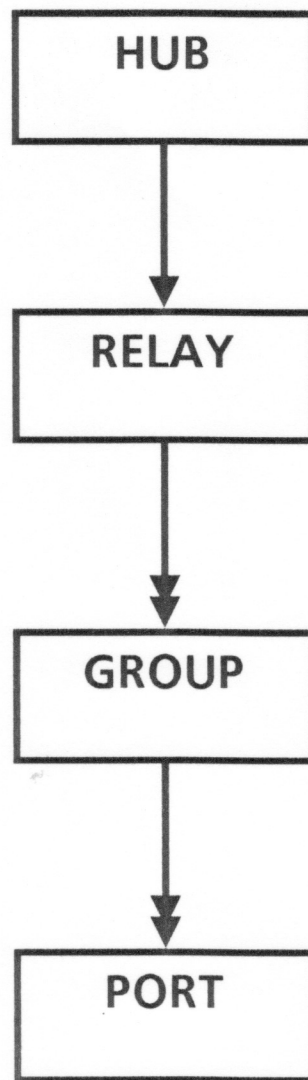
CONTAINMENT SCHEMA



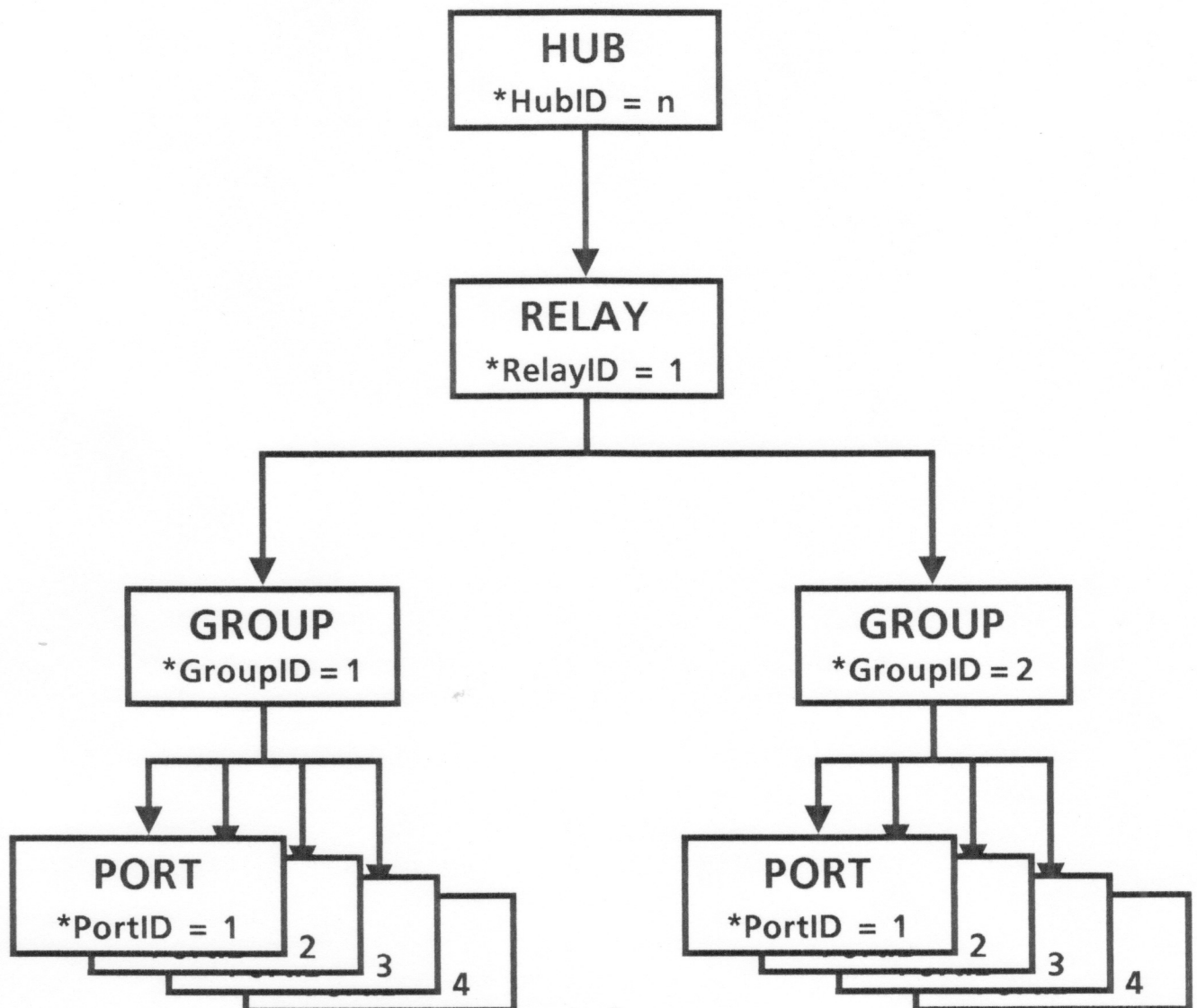
CONTAINMENT TREE



HUB MANAGEMENT CONTAINMENT SCHEMA



HUB MANAGEMENT CONTAINMENT EXAMPLE



HUB

- * HubID
- ElapsedTimeSinceReset



RELAY

- * RelayID
- NumberOfGroups
- TotalCollisions



GROUP

- * GroupID
- NumberOfPorts



PORT

- * PortID
- PortType
- PortAdminState
- AutoPartitionState
- FramesReceivedOK
- OctetsReceivedOK
- Collisions
- LateCollisions
- FrameCheckSequence
- SQETestNotDisabled
- Runt
- Pygmy
- OutOfRangeLengthField
- FramesTooLong
- AlignmentErrors
- AutoPartitionLog
- OutOfSpecBitRate
- LastSourceAddress
- SourceAddressChanges

1.1 Introduction

1.1.1 Scope

1.1.2 References

1.1.3 Definitions

1.1.4 Symbols and Abbreviations

1.1.5 Systems Management Overview

1.1.6 Management Model

1.2 Objects

1.2.1 Introduction

1.2.2 Overview of Objects

1.2.3 Hub Object Class

1.2.4 Relay object class

1.2.5 Group object class

1.2.6 Port object class

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- 1.1.6 Management Model**

1.2 Objects

- 1.2.1 Introduction**
- 1.2.2 Overview of Objects**
 - 1.2.2.1 Text Description of Objects**
 - 1.2.2.2 Containment**
 - 1.2.2.3 Naming**
 - 1.2.2.4 Entity Relationship Diagram**
- 1.2.3 Hub Object Class**
 - 1.2.3.1 Hub, Formal Definition**
 - 1.2.3.2 Hub Attributes**
 - 1.2.3.3 Hub Actions**
 - 1.2.3.4 Hub Notifications**
 - 1.2.3.5 Hub Behaviors**
 - 1.2.3.6 Hub ASN.1 modules**
 - 1.2.3.7 Hub Name Bindings**
- 1.2.4 Relay object class**
 - 1.2.4.1 Relay, Formal Definition**
 - 1.2.4.2 Relay Attributes**
 - 1.2.4.3 Relay Actions**
 - 1.2.4.4 Relay Notifications**
 - 1.2.4.5 Relay Behaviors**
 - 1.2.4.6 Relay ASN.1 modules**
 - 1.2.4.7 Relay Name Bindings**
- 1.2.5 Group object class**
 - 1.2.5.1 Group, Formal Definition**
 - 1.2.5.2 Group Attributes**
 - 1.2.5.3 Group Actions**
 - 1.2.5.4 Group Notifications**
 - 1.2.5.5 Group Behaviors**
 - 1.2.5.6 Group ASN.1 modules**
 - 1.2.5.7 Group Name Bindings**
- 1.2.6 Port object class**
 - 1.2.6.1 Port, Formal Definition**
 - 1.2.6.2 Port Attributes**
 - 1.2.6.3 Port Actions**
 - 1.2.6.4 Port Notifications**
 - 1.2.6.5 Port Behaviors**
 - 1.2.6.6 Port ASN.1 encodings**
 - 1.2.6.7 Port Name Bindings**

- 1.2.3 Hub object class
 - 1.2.3.2 Hub Attributes
 - HubID ATTRIBUTE
 - ElapsedTimeSinceSystemReset ATTRIBUTE
 - ElapsedTimeSinceHubReset ATTRIBUTE
 - 1.2.3.3 Hub Actions
 - ResetSystemAction ACTION
 - ResetHubAction ACTION
 - ExecuteSelfTest1Action ACTION
 - ExecuteSelfTest2Action ACTION
 - 1.2.3.4 Hub Notifications
- 1.2.4 Relay object class
 - 1.2.4.1 Relay, Formal Definition
 - 1.2.4.2 Relay Attributes
 - NumberOfGroups ATTRIBUTE
 - TotalCollisions ATTRIBUTE
 - 1.2.4.3 Relay Actions
 - 1.2.4.4 Relay Notifications
- 1.2.5 Group object class
 - 1.2.5.1 Group, Formal Definition
 - 1.2.5.2 Group Attributes
 - GroupID ATTRIBUTE
 - NumberOfPorts ATTRIBUTE
 - 1.2.5.3 Group Actions
- 1.2.6 Port object class
 - 1.2.6.1 Port, Formal Definition
 - 1.2.6.2 Port Attributes
 - PortType ATTRIBUTE
 - PortID ATTRIBUTE
 - PortAdminState ATTRIBUTE
 - AutoPartitionState ATTRIBUTE
 - FramesReceivedOK ATTRIBUTE
 - OctetsReceivedOK ATTRIBUTE
 - Collisions ATTRIBUTE
 - LateCollisions ATTRIBUTE
 - FrameCheckSequence ATTRIBUTE
 - SQETestNotDisabled ATTRIBUTE
 - Runt ATTRIBUTE
 - Pygmy ATTRIBUTE
 - OutOfRangeLengthField ATTRIBUTE
 - FramesTooLong ATTRIBUTE
 - AlignmentErrors ATTRIBUTE
 - AutoPartitionLog ATTRIBUTE
 - OutOfSpecBitRate ATTRIBUTE
 - LastSourceAddress ATTRIBUTE
 - SourceAddressChanges ATTRIBUTE
 - 1.2.6.3 Port Actions
 - Enable port ACTION
 - Disable port ACTION
 - Execute self-test ACTION
 - 1.2.6.4 Port Notifications
 - Proprietary extension alarm NOTIFICATION

PortAdminState ATTRIBUTE

SINGLE-VALUED
WITH ATTRIBUTE SYNTAX
MATCHES FOR
PERMITTED VALUES

BOOLEAN
Equality
False (Disabled)
True (Enabled)
PortAdminState

BEHAVIOUR

REGISTERED AS AttributeID X

PortAdminState BEHAVIOR

DEFINED AS Indicates whether a port has been administratively disabled or whether it is in the normal, enabled state. This allows a network operator to disable a problem port, or to deny the port access to network resources for administrative reasons.

[Comment from Palo Alto minutes:

- section 1.2.5.2 (PortState): It was noted that SNMP does not support BOOLEAN.other than 0.

AutoPartitionState ATTRIBUTE

SINGLE-VALUED
WITH ATTRIBUTE SYNTAX
MATCHES FOR
PERMITTED VALUES

BOOLEAN
Equality
False (not auto-partitioned)
True (auto-partitioned)
AutoPartitionBehavior

BEHAVIOUR

REGISTERED AS AttributeID X

AutoPartitionBehavior BEHAVIOUR

DEFINED AS The AutoPartition flag indicates whether the port is currently partitioned by the hub's auto-partition protection. (A repeater automatically partitions a port if it is signalling continuous collision, or 32 consecutive collisions.)

- 1.2.3 Hub object class
 - 1.2.3.2 Hub Attributes
 - HubID ATTRIBUTE
 - ElapsedTimeSinceSystemReset ATTRIBUTE
 - ElapsedTimeSinceHubReset ATTRIBUTE
 - 1.2.3.3 Hub Actions
 - ResetSystemAction ACTION
 - ResetHubAction ACTION
 - ExecuteSelfTest1Action ACTION
 - ExecuteSelfTest2Action ACTION
 - 1.2.3.4 Hub Notifications
- 1.2.4 Relay object class
 - 1.2.4.1 Relay, Formal Definition
 - 1.2.4.2 Relay Attributes
 - NumberOfGroups ATTRIBUTE
 - TotalCollisions ATTRIBUTE
 - 1.2.4.3 Relay Actions
 - 1.2.4.4 Relay Notifications
- 1.2.5 Group object class
 - 1.2.5.1 Group, Formal Definition
 - 1.2.5.2 Group Attributes
 - GroupID ATTRIBUTE
 - NumberOfPorts ATTRIBUTE
 - 1.2.5.3 Group Actions
- 1.2.6 Port object class
 - 1.2.6.1 Port, Formal Definition
 - 1.2.6.2 Port Attributes
 - PortType ATTRIBUTE
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NOTE — The remainder of this annex concerns itself only with ISO assignment of values.

B.2 The identifiers "ccitt", "iso" and "joint-iso-ccitt", assigned above, may each be used as a "NameForm".

B.3 Four arcs are specified from the node identified by "iso". The assignment of values and identifiers is

Value Identifier		Authority for subsequent assignments
0	standard	See B.4
1	registration-authority	See B.5
2	member-body	See B.6
3	identified-organization	See B.7

These identifiers may be used as a "NameForm".

B.4 The arcs below "standard" shall each have the value of the number of an International Standard. Where the International Standard is multi-part, there shall be an additional arc for the part number, unless this is specifically excluded in the text of the International Standard. Further arcs shall have values as defined in that International Standard.

NOTE — If a non-multipart International Standard allocates object identifiers, and subsequently becomes a multipart International Standard, it shall continue to allocate object identifiers as if it were a single part International Standard.

B.5 The arcs below "registration authority" are reserved for an addendum to this International Standard which will be progressed alongside the establishment of procedures for the identification of specific OSI Registration Authorities.

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Annex B

ISO assignment of OBJECT IDENTIFIER component values

(This annex forms part of this standard)

B.1 Three arcs are specified from the root node. The assignment of values and identifiers, and the authority for assignment of subsequent component values, are as follows:

Value	Identifier	Authority for subsequent assignments
0	ccitt	CCITT
1	iso	ISO
2	joint-iso-ccitt	See annex D

NOTE — The remainder of this annex concerns itself only with ISO assignment of values.

B.2 The identifiers "ccitt", "iso" and "joint-iso-ccitt", assigned above, may each be used as a "NameForm".

B.3 Four arcs are specified from the node identified by "iso". The assignment of values and identifiers is

Value	Identifier	Authority for subsequent assignments
0	standard	See B.4
1	registration-authority	See B.5
2	member-body	See B.6
3	identified-organization	See B.7

These identifiers may be used as a "NameForm".

B.4 The arcs below "standard" shall each have the value of the number of an International Standard. Where the International Standard is multi-part, there shall be an additional arc for the part number, unless this is specifically excluded in the text of the International Standard. Further arcs shall have values as defined in that International Standard.

NOTE — If a non-multipart International Standard allocates object identifiers, and subsequently becomes a multipart International Standard, it shall continue to allocate object identifiers as if it were a single part International Standard.

B.5 The arcs below "registration authority" are reserved for an addendum to this International Standard which will be progressed alongside the establishment of procedures for the identification of specific OSI Registration Authorities.

B.6 The arcs immediately below "member-body" shall have values of a three digit numeric country code, as specified in ISO 3166, that identifies the ISO Member Body in that country (see NOTE). The "NameForm" of object identifier component is not permitted with these identifiers. Arcs below the "country code" are not defined in this International Standard.

NOTE — The existence of a country code in ISO 3166 does not necessarily imply that there is an ISO Member Body representing that country or that the ISO Member Body for that country administers a scheme for the allocation of object identifier components.

B.7 The arcs immediately below "identified-organization" shall have values of an International Code Designator (ICD) allocated by the Registration Authority for ISO 6523 that identify an issuing organization specifically registered by that authority as allocating object identifier components (see NOTES 1 and 2). The arcs immediately below the ICD shall have values of an "organization code" allocated by the issuing organization in accordance with ISO 6523. Arcs below "organization code" are not defined by this International Standard (see NOTE 3).

NOTES

1 The requirement that issuing organizations are recorded by the Registration Authority for ISO 6523 as allocating organization codes for the purpose of object identifier components ensures that only numerical values in accordance with this International Standard are allocated.

2 The declaration that an issuing organization allocates organization codes for the purpose of object identifier components does not preclude the use of these codes for other purposes.

3 It is assumed that the organizations identified by the "organization code" will define further arcs in such a way as to ensure allocation of unique values.

4 The effect of B.7 is that any organization can obtain an organization code from an appropriate issuing organization, and can then assign OBJECT IDENTIFIER values for its own purposes, with the assurance that those values will not conflict with values assigned by other organizations. By this means, a manufacturer could, for example, assign an OBJECT IDENTIFIER to its own proprietary information formats.

1.0. 8802.3.18.X

