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Technical Specification

Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN); Equipment Information in the Management Information Base (MIB)



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Foreword

This Technical Specification (TS) has been produced by ETSI Technical Committee Telecommunications and Internet converged Services and Protocols for Advanced Networking (TISPAN).

Introduction

More and more Network Operators (NOs) implement auto-discovery type of tools to get an instant picture of their equipment. The use of auto-discovery tools relies on the availability of equipment information in the Management Information Base (MIB).

Many NOs experience difficulties in linking the data provided by the MIB to their inventory systems which give the full picture of working/spare equipment. Therefore there can be differences between the search given by the auto-discovery tools and the Inventory System (IS). The lack of a common data structure and content stops NOs from having flowthrough from the MIB up to the inventory system or other relevant systems.

Purchasers of Network Equipment should use the present document to specify minimum requirements to their equipment suppliers. Equipment Manufacturers should use the present document as a reference base for data elements to include in the MIB, whenever possible.

1 Scope

The present document specifies equipment identity and location data that should be included, when relevant, in the equipment Management Information Base (MIB) to support inventory processes amongst for example Service Providers and Manufacturers.

This work item extends the equipment information work i.e. TR 102 214 [2] and TS 102 209 [1].

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication and/or edition number or version number) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.

Referenced documents which are not found to be publicly available in the expected location might be found at <http://docbox.etsi.org/Reference>.

- [1] ETSI TS 102 209: "Telecommunications and Internet converged Services and Protocols for Advancing Networks (TISPAN); Telecommunication Equipment Identification".
- [2] ETSI TR 102 214: "Services and Protocols for Advanced Networks (SPAN); Result of the PNOs and Equipment Manufacturers questionnaires for identification of Equipment Unit".
- [3] ETSI TS 132 692: "Digital cellular telecommunications system (Phase 2+); Universal Mobile Telecommunications System (UMTS); Network Resource Model for Inventory Management (3GPP TS 32.692 version 5.0.0 Release 5)".
- [4] ISO 8601: "Data elements and interchange formats - Information interchange - Representation of dates and times".
- [5] ISO/IEC 15418: "Information technology - EAN/UCC Application Identifiers and Fact Data Identifiers and Maintenance".
- [6] ISO/IEC 15459-1: "Information technology - Unique identification of transport units - Part 1: General".
- [7] ISO/IEC 15459-2: "Information technology - Unique identification of transport units - Part 2: Registration procedures".
- [8] IETF RFC 4133: "Entity MIB (Version 3)".
- [9] ETSI TS 132 101: "Universal Mobile Telecommunications System (UMTS); Telecommunication management; Principles and high level requirements (3GPP TS 32.101)".
- [10] ETSI TS 132 102: "Universal Mobile Telecommunications System (UMTS); Telecommunication management; Architecture (3GPP TS 32.102)".
- [11] ITU-T Recommendation M.1400: "Designations for interconnections among operators' networks".
- [12] ITU-T Recommendation M.3320: "Management requirements framework for the TMN X-Interface".
- [13] ITU-T Recommendation M.3208.1: "Leased circuit services".
- [14] ISO/IEC 646: "Information technology - ISO 7-bit coded character set for information interchange".

- [15] ITU-T Recommendation M.1401: "Formalization of interconnection designations among operators' networks" .

3 Definitions and abbreviations

3.1 Definitions

For the purposes of the present document, the following terms and definitions apply:

auto-discovery: ability to perform an inventory and asset verification from a Network Management Station

Equipment Identity (EI): (as defined in TS 102 209 [1], clause 7.1) provides information in a uniform, concise and function-oriented format about each equipment unit within its particular network application or environment

operator equipment name: equipment name given by the operator for internal purposes

geographic location: information on the location of the equipment

NOTE 1: This information is specific to each operator and is used for internal purposes e.g. inventory.

NOTE 2: For example, the TeleManagement Forum Shared Information/Data (SID) Model, GB922 (see Bibliography) Addendum 1L - Common Business Entity Definitions - Location, defines the Geographic Location as follow: "A defined place on or near the earth's surface. It is an abstract modeling concept that provides a linking point to other parts of the SID model. It holds attributes common to all Geographic Location subclasses. Sources Cross- References Synonyms / Aliases Related Business Entities Geographic Location Name Business".

NOTE 3: For example, the structure of geographic location could correspond to the location of a site (country/region/geographic area/site or property) and include "sub urban, locality, city, town, building".

NOTE 4: Network Operators or Manufacturers may have additional information requirements.

physical location: this information is specific for the equipment unit and is used for internal purposes e.g. inventory, assurance

NOTE 1: Information can be specified by the Network Operator and/or the Manufacturer based on when equipment configuration is maintained, e.g. during manufacturing or handling at site.

NOTE 2: For example IETF specifies (see annex C):

- in chassis (hierarchy structure) entPhysicalContainedIn;
- entPhysicalParentRelPos.

NOTE 3: For example, TS 132 692 [3] specifies (see annex A):

- unitPosition: Position of inventory unit (Rack, shelf, slot).

NOTE 4: Network Operators or Manufacturers may have additional information requirements.

manufacturer name: name of the business entity that is responsible for the manufacturing and assembly of the equipment unit

manufacturer part number: proprietary character string of information that is assigned to each equipment unit by its manufacturer

manufacturer software version: manufacturer specified version of the software, defined and maintained by the manufacturer

manufacture date: date of manufacture of the product in format YYYYMMDD

Management Information Base (MIB): database of configuration management information that is stored on a Network Agent for access by a Network Management Station or local user interface device

NOTE: MIB consists of a repository of characteristics and parameters managed in a network device such as a NIC, hub, switch or router.

Network Agent (NA): device, such as a workstation, a router or a plug-in card, that is equipped to gather network performance information to send to the network management station

Network Management Station (NMS): is a dedicated workstation that gathers and stores network performance data, obtaining that data from network nodes running network agent software that enables them to collect the data

operator equipment name: equipment name given by the operator for internal purposes

manufacturer product name: equipment name given by the equipment manufacturer (refer to "Product Name" as defined in TS 102 209 [1], clause 7.2)

operator: organization responsible for identification and management of telecommunication resources

NOTE: An operator must be legally recognized by the telecommunication administration of the Country, or delegation thereof. An Operator may or may not correspond to a trading partner.

Network Operator (NO): operator that manages a telecommunications network. A Network Operator may be a Service Provider and vice versa

NOTE: A Network Operator may or may not provide particular telecommunications services. See ITU-T Recommendations M.3208.1 [13], clause 1.4.2.3 and M.3320 [12], clause 1.4.4.

service provider: general reference to an operator that provides telecommunication services to Customers and other users either on a tariff or contract basis

NOTE: A Service Provider may or may not operate a network. A Service Provider may or may not be a Customer of another Service provider. See ITU-T Recommendation M.3320 [12], clause 1.4.6.

Unique Item Identification (UID): As defined in the ISO/IEC 15459-1 [6] (refers to ISO/IEC 646 [14]).

NOTE: ISO/IEC 15459-1 [6] states that the characters in the UID must be strictly Alpha Numeric All Caps. The present document extends the set of allowed chars in the UID such that it would include the slashes and dashes as defined in the U.S. "Department of Defense Guide to Uniquely Identifying Items; Assuring Valuation, Accountability and Control of Government Property" (see Bibliography). When constructing the UID:

- Any spaces contained in the component data elements will be deleted.
- All special characters will be deleted from the enterprise identifier.
- All special characters, except for dashes (-) and forward slashes (/) will be deleted from the original part number and serial number.
- The UID may only contain uppercase English alphabet characters A through Z, numeric characters 0 through 9, and the special characters "-" and "/".

3.2 Abbreviations

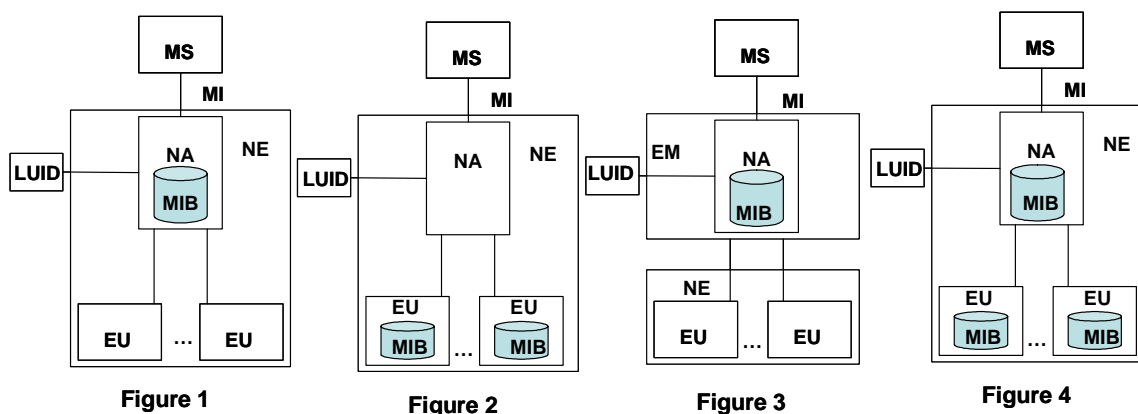
For the purposes of the present document, the following abbreviations apply:

CPU	Central Processing Unit
CRUD	Create Read Update and Delete
DWDM	Dense Wave Division Multiplexing
EI	Equipment Identity
EM	Equipment Manager
EU	Equipment Units
IS	Inventory System
LUID	Local User Interface Device
MI	Management Interface
MIB	Management Information Base
MS	Management System
NA	Network Agent
NE	Network Element
NIC	Network Interface Card
NMS	Network Management Station
NO	Network Operator
PN	Part Number
PSU	Power Supply Unit
RDN	Relative Distinguished Name
SID	Shared Information/Data
UID	Unique item IDentification
USI	Unique Serial Identification

4 Context of application

Figures 1 to 4 provide some possible overviews of the architectural components and the relations between them which are relevant for the present document.

NOTE: These are typical views; other architectures may exist. However, most architectures can be mapped to these generic views.



The central component is the Network Element (NE). From a functional point of view, an NE provides telecommunication functions. These functions are usually closely related such that an NE can be considered to be a building block for a telecommunication network. Examples of NEs are: a router, a voice switch, an optical line system.

From a physical point of view, an NE is an aggregate of one or more equipment mountings, and one or more Equipment Units, EU. Dimension wise, an NE can be very compact, like an ADSL modem, or very large, like an multi thousand kilometer long DWDM optical transport system.

The normal day-to-day management of an NE is done via a Management System, MS.

The MS communicates with the NE or the EM through a management interface, MI, which usually terminates on an Network Agent, NA. This NA is an EU, designated to handle system management functions. The other EUs in the NE communicate with the NA through communication channels which are not visible from outside the NE. The NA can reside in an Equipment Manager (EM) (for definition see TS 132 101 [9]) or in a NE (see TS 132 102 [10], clause 8).

To support local interaction, e.g. in case of physical repair, most NEs and EMs are equipped with a Local User Interface Device, LUID. This is a built-in or a handheld device which communicates with the NE or EM over a local interface, using a proprietary protocol.

In order to provide the MS with a way to exercise management operations on the manageable parts of the NE, a database is present on the EU which represents the management information towards the MS in a structured way. This database is named Management Information Base, MIB. Next to information about manageable aspects of the telecommunication functions of the NE, like port characteristics, etc, the MIB contains also information on the identity of the constituent parts of the NE. This information may be used by a number of agents, e.g. network auditing applications, network testing systems, network inventory systems, network operations center staff and local maintenance staff. For the latter, the equipment identity information can usually be retrieved via the LUID.

5 Type of equipment data elements in the MIB

The present part specifies the type of information and the structure for the equipment information in the MIB.

The equipment information in the MIB is comprised of the ten following mandatory or optional data elements:

- Equipment Identity (EI);
- Unique item IDentification (UID);
- manufacturer software part number and version;
- manufacturer product name;
- manufacture date;
- operator equipment name;
- geographic location;
- physical location;
- manufacturer name;
- manufacturer part number and version.

NOTE 1: The maximum length of each data element, with the exception of Geographic Location and Physical Location should follow ISO/IEC 15459-1 [6]. ISO/IEC 15459-1 [6] specifies that the field shall not contain more than 35 characters.

NOTE 2: For efficient use within bar coding systems, it is recommended that wherever possible the number of characters be maximum 20. However, any data processing system shall be capable of processing numbers of 35 characters (i.e. the maximum allowable in EDIFACT).

NOTE 3: The lengths of the data elements Geographic Location and Physical Location require further study.

NOTE 4: The character set for all data elements is printable 7-bit ASCII.

6 Information model

This clause presents the information that are listed in clause 5 and defines:

- the mandatory and optional data elements;
- the Create Read Update and Delete (CRUD model) rights of the equipment manufacturers and NOs to access and manage the information.

NOTE 1: In table 1: M stands for Mandatory; O stands for Optional.

Table 1

Information Element	Mandatory/ Optional	Manufacturer	Network Operator
EI	M	Create/Update	Read
UID	M	Create	Read
Manufacturer Software Part Number and version	M	Create/Update	Read
Manufacturer Product name	M	Create/Update	Read
Manufacture Date	O	Create	Read
Operator Equipment name	O	Read	Create/Update/Delete
Geographic Location	O	Read	Create/Update/Delete
Physical Location	O	Create/Update/Delete	Create/Update/Delete
Manufacturer Name	O	Create	Read
Manufacturer Part Number and Version	O	Create/Update	Read

NOTE 2: This clause defines the equipment information which is to be included in the MIB. There may be other data elements that the manufacturer may need to include or the customer may require.

NOTE 3: No information structure is recommended for the Geographic Location and the Operator Equipment Name data elements as these data elements are created by the Network Operators for their own internal processes.

NOTE 4: The position in which the information elements appear in the table above does not imply an ordering.

7 Mapping with other bodies and fora recommendations

The equipment information specified in the present document result from the screening and analysis of the relevant recommendations written by other international Fora/Bodies.

When possible the present document provides, in the annexes, mapping against the equipment information recommended in the core of the present document.

Mappings available:

- ETSI 3GPP (see annex A):
 - TS 132 692 [3].
- ATIS (see annex B):
 - ATIS0300040: "Guidelines for data elements included in the Management Information Base" (see Bibliography).
- IETF (see annex C):
 - RFC 4133 [8].

- TM Forum (see annex D):
 - TM Forum, MTMN (see Bibliography).
 - TM Forum, MTOSI (see Bibliography).
- ITU-T SG4 (see annex E):
 - ITU-T Recommendation M.1401 [15].

NOTE: Annex F refers to other possible mappings that are not provided.

Annex A (informative): Mapping with TS 132 692 V5.0.0 (3GPP TS 32.692 v5)

Source document: TS 132 692 [3].

Table A.1

Equipment Information as defined in the present document	TS 132 692 [3] equivalents	Comparison
Equipment Identity	vendorName (7) + vendorUnitTypeNumber (1)	Compliant
UID	serialNumber (2)	Compliant
Manufacturer Software Part Number and Version	Not specified	Not Applicable
Manufacturer Product name	vendorUnitFamilyType (4)	Compliant
Manufacture Date	dateOfManufacture (5)	Identical
Operator Equipment name	inventoryUnitId (6)	Compliant
Geographic Location	Not specified	Not Applicable
Physical Location	unitPosition (3)	Compliant
Manufacturer Name	vendorName (7)	Identical
Manufacturer Part Number and Version	vendorUnitTypeNumber (1)	Compliant

The TS 132 692 [3] definitions are as follows:

- (1) A vendor/manufacturer defined and assigned number which uniquely identifies the unit type and version (used for replacing HW units, spares).
- (2) Serial number of inventory unit.
- (3) Position of inventory unit (Rack, shelf, slot).
- (4) Mnemonic of inventory unit family type (e.g. Fan, PSU) assigned by vendor.
- (5) Date of Manufacture of inventory unit.
- (6) An attribute whose "name+value" can be used as an RDN when naming an instance of this object class. This RDN uniquely identifies the object instance within the scope of its containing (parent) object instance.
- (7) Name of inventory unit vendor.

RDN = Relative Distinguished Name (see TS 132 300 - see Bibliography).

Annex B (informative): Mapping with ATIS0300040

Source document: ATIS0300040 (see Bibliography).

Table B.1

Equipment Information as defined in the present document	ATIS0300040 equivalent	Comparison
Equipment Identity	CLEI Code (1)	Compliant
UID	Unique Serial Identification (2)	Identical
Manufacture Software Part Number and Version	Software version (3)	Compliant
Manufacturer Product name	Manufacturer Product Name (7)	Compliant
Manufacture Date	Manufacture Date (4)	Compliant
Operator Equipment name	Not specified	Not Applicable
Geographic Location	Not Specified	Not Applicable
Physical Location System/Hierarchy	Not Specified	Not Applicable
Manufacturer Name	Manufacturer Identification (5)	Identical
Manufacturer Part Number and Version	Manufacturer Product Identifier (6)	Identical

The ATIS definitions are as follows:

- (1) CLEI Code: the CLEI Code of the hardware per ANSI T1.213 (see Bibliography). This is the same CLEI Code that is included in the bar code or 2D symbol and in the human readable on the label placed on the plug-in card. COMMON LANGUAGE is a registered trademark and CLEI is a trademark of Telcordia Technologies.
- (2) Unique Serial Identification (USI): The Unique Serial Identification of the hardware as defined in TCIF-98-005, Product Serialization Guideline. This ATIS recommendation is following ISO/IEC 15418 [5] and 15459 Parts 1 [6] and 2 [7].
- (3) Software Version: The manufacturer specified version of the software. The Software Version defines a set of features or functions to a software product announced and available to the service provider. This Software Version should indicate the most detailed release level specified by the manufacturer (i.e. lowest "dot" release).
- (4) Manufacture Date: The date of manufacture of the product in the format of YYYYMMDD where YYYY = the 4-digit year of manufacture, MM is the 2-digit Month, and DD is the 2-digit date.
- (5) The name of the manufacturer for this plug-in card.
- (6) Manufacturer Product Identifier: The product identifier (also called a Product ID) is what singularly identifies and is normally stamped on the product. It is basically made up of a part number and a manufacturing version or release number. For manufacturers that use equipment drawings, the product identifier will consist of the equipment drawing along with the associated list or group combinations.
- (7) Manufacturer Product Name: Product name given by the equipment manufacturer (sometimes stencilled on the product).

Annex C (informative): Mapping with RFC 4133

Source document: RFC 4133 [8].

RFC 4133 [8] was being reviewed with the parameters agreed as being of interest for the "Information in the MIB" as a comparing measure. In addition of the identified equivalents additional parameters exists which is being judged as interesting and useful.

Version 3 of this MIB addresses new requirements that have emerged since the publication of the second Entity MIB (RFC 4133 [8]). There is a need for identifying physical entities which are Central Processing Units (CPUs) and a need to provide a textual convention which identifies an entPhysicalIndex value or zero, where the value zero has application-specific semantics. Two new objects have been added to the entPhysicalTable to identify the manufacturing date and provide additional URIs for a particular physical entity.

Table C.1

Equipment Information as defined in the present document	RFC 4133 [8] equivalent	Comparison
Equipment Identity	entPhysicalMfgName (8) + entPhysicalModelName (4) + entPhysicalHardwareRev (9) or entPhysicalUris (12)	Compliant
UID	entPhysicalSerialNum (2)	Compliant
Manufacture Software Part Number and Version	entPhysicalModelName (4) + entPhysicalSoftwareRev (3)	Compliant
Manufacturer Product name	entPhysicalDescr (1)	Compliant
Manufacturer Date	entPhysicalMfgDate (11)	Compliant
Operator Equipment name	entPhysicalAlias (5)	Compliant
Geographic Location	Not Specified	Not Applicable
Physical Location	In chassis (hierarchy structure) entPhysicalContainedIn (6) entPhysicalParentRelPos (7)	Compliant
Manufacturer Name	entPhysicalMfgName (8)	Identical
Manufacturer Part Number and Version	entPhysicalModelName (4) + entPhysicalHardwareRev (9)	Compliant

The RFC 4133 [8] definitions are as follows:

- (1) A textual description of physical entity. This object should contain a string which identifies the manufacturer's name for the physical entity, and should be set to a distinct value for each version or model of the physical entity.
- (2) The vendor-specific serial number string for the physical entity. The preferred value is the serial number string actually printed on the component itself (if present).
- (3) The vendor-specific software revision string for the physical entity.
- (4) The vendor-specific model name identifier string associated with this physical component. The preferred value is the customer-visible part number, which may be printed on the component itself.
- (5) This object is an "alias" name for the physical entity as specified by a network manager, and provides a non-volatile "handle" for the physical entity.
- (6) The value of entPhysicalIndex for the physical entity which "contains" this physical entity. A value of zero indicates this physical entity is not contained in any other physical entity.

- (7) An indication of the relative position of this "child" component among all its "sibling" components. Sibling components are defined as entPhysicalEntries which share the same instance values of each of the entPhysicalContainedIn and entPhysicalClass objects. An NMS can use this object to identify the relative ordering for all sibling components of a particular parent (identified by the entPhysicalContainedIn instance in each sibling entry). This value should match any external labelling of the physical component if possible. For example, for a container (e.g. card slot) labelled as "slot #3", entPhysicalParentRelPos should have the value "3".
- (8) The name of the manufacturer of this physical component. The preferred value is the manufacturer name string actually printed on the component itself (if present).
- (9) The vendor-specific hardware revision string for the physical entity. The preferred value is the hardware revision identifier actually printed on the component itself (if present).
- (10) An indication of the vendor-specific hardware type of the physical entity. Note that this is different from the definition of MIB-II's sysObjectID. An agent should set this object to an enterprise-specific registration identifier value indicating the specific equipment type in detail.

NOTE: Comparisons between instances of the entPhysicalModelName, entPhysicalFirmwareRev, entPhysicalSoftwareRev, and the entPhysicalSerialNum objects, are only meaningful amongst entPhysicalEntries with the same value of entPhysicalMfgName. If the manufacturer name string associated with the physical component is unknown to the agent, then this object will contain a zero-length string.

- (11) "This object contains the date of manufacturing of the managed entity. If the manufacturing date is unknown or not supported the object is not instantiated. The special value '0000000000000000'H may also be returned in this case."

::= { entPhysicalEntry 17 }

entPhysicalMfgDate OBJECT-TYPE

SYNTAX DateAndTime

MAX-ACCESS read-only

STATUS current

DESCRIPTION

'2005050200000000'

- (12) entPhysicalUris.

"This object provides additional identification information about the physical entity.

The object contains one or more Uniform Resource Identifiers (URIs) and therefore the syntax of this object must conform to RFC 2396, clause 2 (see Bibliography). Uniform Resource Names (URNs), RFC 3406 (see Bibliography) are resource identifiers with the specific requirements for enabling location independent identification of a resource, as well as longevity of reference. URNs are part of the larger URI family with the specific goal of providing persistent naming of resources. URI schemes and URN name spaces are registered by IANA (see <http://www.iana.org/assignments/uri-schemes> and <http://www.iana.org/assignments/urn-namespaces>).

The entPhysicalUris object may be used to encode for example a URI containing a Common Language Equipment Identifier (CLEI) URI for the managed physical entity. The URN name space for CLEIs is defined in [RFC CLEIURN], and the CLEI format is defined in [T1.213][T1.213a]. For example, an entPhysicalUris instance may have the value of [RFC2396] and [RFC CLEIURN] identify this as a URI in the CLEI URN name space, and the specific CLEI code, D4CE18B7AA is based on the example provided in [T1.213a].

Multiple URIs may be present and are separated by white space characters. Leading and trailing white space characters are ignored."

If no additional identification information is known or supported about the physical entity the object is not instantiated.

Annex D (informative): Mapping with MTMN version 3.5 and MTOSI version 1.0

MTMN v3.5 (see Bibliography) and MTOSI v1 (see Bibliography) were reviewed with the parameters agreed as being of interest for the "Information in the MIB" as a comparing measure.

Table D.1

Equipment Information as defined in the present document	TM Forum MTNM Equipment Model	Comment
Equipment Identity	Manufacturer (7) installedPartNumber (4) installedVersion (5)	Compliant
UID	installedSerialNumber (6)	Compliant
Manufacturer Software Part Number and Version	installedVersion (5)	Compliant (see note 1)
Manufacturer Product name	installedEquipmentObjectType (3)	Compliant
Manufacture Date	ManufacturerDate	Compliant
Operator Equipment name	userLabel (2)	Compliant
Geographic Location	Location	Compliant
Physical Location	Name (1)	Compliant (see note 2)
Manufacturer Name	Manufacturer (7)	Compliant
Manufacturer Part Number and Version	installedPartNumber (4)	Compliant (see note 3)
NOTE 1: Under the condition that MTNM installedVersion attribute is overloaded to include the software part number as well as the version.		
NOTE 2: The MTNM name of the equipment should identify the containing equipment hierarchy.		
NOTE 3: Under the condition that MTNM installedPartNumber attribute is overloaded to include the software part number as well as the version.		

The TMF definitions are as follows:

- (1) name: The name represents the name of the Equipment which is assigned by the EMS upon creation. The EMS is responsible for guaranteeing the uniqueness of the name within the context of the ManagedElement. The naming attribute structure follows the containment hierarchy of the equipment model. When the Equipment Holder object is named by the Managed Element, the Equipment Holder objects are named recursively, (Rack, Shelf, Subshelf, Slot, and Subslot) and the Equipment objects are named by the Equipment Holder object directly containing it. For example, the name of an equipment instance in a daughter board could be, for example.

"ManagedElement" "abc"

"EquipmentHolder" "[/rack=<r>]/shelf=<sh>/[sub_shelf=<ssh>]/slot=<sl>/sub_slot=<ssl>"

"Equipment" "1"

NOTE: The MTNM equipment model allows only equipment instance in an equipment holder.

- (2) userLabel: This attribute represents a provisionable, user friendly name for the object. It is initialized to the value in the attribute nativeEMSName by the EMS; however, the userLabel attribute is owned and may be set by the NMS.
- (3) installedEquipmentObjectType: Defines the type of installed equipment. This is an empty string if there is no installed equipment.
- (4) installedPartNumber: This is the resource Part Number (PN) of the installed equipment. If not available (or there is no installed equipment), an empty string shall be used. If the part and serial number are both non-null then the part+serial number together shall be unique.
- (5) installedVersion: Firmware version of the installed equipment. If not available (or there is no installed equipment), an empty string shall be used.

- (6) `installedSerialNumber`: Defines the serial number of the installed equipment. If not available (or there is no installed equipment), an empty string shall be used. At least one `serialNumber` has to be provided.
- (7) `Manufacturer`: Identifies the manufacturer name of the equipment instance.

Annex E (informative): Mapping with revised ITU-T Recommendation M.1401

ITU-T Recommendation M.1401 [15] was reviewed with the parameters agreed as being of interest for the "Information in the MIB" as a comparing measure.

Table E.1

Equipment Information as defined in the present document	Revision of ITU-T Recommendation M.1401 [15]	Comment
Equipment Identity	Equipment Identity (1)	Compliant
UID	UID (2)	Compliant
Manufacturer Software Part Number and Version	Not Specified	Not Applicable
Manufacturer Product name	Not Specified	Not Applicable
Manufacture Date	Not Specified	Not Applicable
Operator Equipment name	Not Specified	Not Applicable
Geographic Location	Address (3)	Compliant
Physical Location	Location (4)	Compliant
Manufacturer Name	Not Specified	Not Applicable
Manufacturer Part Number and Version	Not Specified	Not Applicable

The ITU-T Recommendation M.1401 [15] definitions are as follows:

(1) Equipment identity

A category of equipment instances that may be characterized by a combination of:

- manufacturer name;
- manufacturer part number;
- manufacturer equipment version number;
- equipment category number;
- substitutability (upward/downward compatible replacement).

An Equipment identity may categorize a set of Equipment items, Component items, Port items, or Locations, but an Equipment identity cannot categorize items belonging to more than one of these classes simultaneously.

(2) Unique item identification (UID)

The manufacturer may assign a Unique item identification (UID) to an Equipment item, Component Item, or Location.

(3) Address

An Address identifies a geographic location, which may contain a Cross-coupling site.

(4) Location

A Location is a subdivision of a Cross-coupling site. It is an object in which resources, such as Exchanges, Equipment items and termination points, are placed. It should be noted that the term "Location" is here given a particular meaning local to Cross-coupling site, and that this definition may not apply for the generic term location.

A Location can be a room, a frame, a rack, a block, a shelf or a slot in a shelf, and these may contain subordinate Locations recursively.

Annex F (informative): Other international bodies/Fora

The following international bodies/Fora are doing related work. Currently no mappings are provided.

- DMTF (Distributed Management Task Force, Inc);
- DCML (Data Center Markup Language);
- ITIL (IT Infrastructure Library);
- RosettaNet;
- EDIFICE.

Annex G (informative): Bibliography

American National Standards Institute (ANSI) T1.220: "Manufacturer/Supplier/Related Service Company Code".

DMTF (Distributed Management Task Force, Inc.): "Management information models".

ANSI T1.213: "Coded identification of equipment entities in the North American telecommunication systems for information exchange".

ANSI ANS MH10.8.2 (2002): "Data Identifier and Application Identifier Standard".

ETSI TS 132 300: "Universal Mobile Telecommunications System (UMTS); Telecommunication management; Configuration Management (CM); Name convention for Managed Objects (3GPP TS 32.300)".

TCIF-98-005: " Product Serialization Guideline".

TeleManagement Forum: "Shared Information/Data (SID) Model", GB922 Addendum 1L - Common Business Entity Definitions - Location.

Department of Defense Guide to Uniquely Identifying Items: "Assuring Valuation, Accountability and Control of Government Property", Version 1.4; April 16, 2004.

MTOSI version 1 and MTMN V3.5.

ATIS0300040: "Guidelines for data elements included in the Management Information Base".

TM Forum, MTMN: "Multi Technology Network Management (MTMN)", version 3.5.

IETF RFC 2396: "Uniform Resource Identifiers (URI): Generic Syntax".

IETF RFC 3406: "Uniform Resource Names (URN) Namespace Definition Mechanisms".

History

Document history		
V1.1.1	October 2004	Publication
V1.2.1	September 2005	Publication