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Telekomunikacijsko upravljavno omrežje (TMN)) - Vmesnik Q3 dostopovnega omrežja (AN) za upravljanje konfiguracije vmesnikov V5 in pridruženih uporabniških priključkov - 1. del: Specifikacija vmesnika Q3

Telecommunications Management Network (TMN); Q3 interface at the Access Network (AN) for configuration management of V5 interfaces and associated user ports; Part 1: Q3 interface specification

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Q3 interface at the Access Network (AN)
for configuration management of V5 interfaces
and associated user ports;
Part 1: Q3 interface specification**

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Foreword

This European Standard (Telecommunications series) has been produced by ETSI Technical Committee Telecommunications Management Network (TMN).

The present document is part 1 of a multi-part European Standard (Telecommunications series) covering the Q3 interface specification at the Access Network (AN) for configuration management of V5 interfaces and associated user ports, as identified below:

Part 1: "Q3 interface specification";

Part 2: "Managed Object Conformance Statement (MOCS) proforma specification".

(standards.iteh.ai) National transposition dates

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Introduction

V5 interfaces, as described in EN 300 324-1 [3] and EN 300 347-1[4], operate between an exchange and an Access Network (AN) to support various narrowband services. These interfaces and their associated user ports have to be managed by the Operations Systems (OSs) within the Telecommunications Management Network (TMN).

ITU-T Recommendation G.803 [1] provides an abstracted view of telecommunications equipment, based on the essential functions that such equipment needs to perform. These functional components are modelled by objects, which represent the implementation-independent aspects of the equipment.

The following assumptions relating to the scope of the present document were to be considered:

- existing protocols should be used where possible, and the focus of the present document should be on defining the object models;
- the interface should not involve objects specific to the control of a leased line network which is not connected to the LE or of an external line test system;

- a model of the AN appears necessary. The model relevant to the present standards on the V5 interface and ports will be developed if it does not already exist elsewhere. Other object models outside the scope of the present document may share the same physical Q3 interface;
- the definition of OS functionality is outside the scope of the present document;
- security management is excluded from the present document, but aspects of security relating to configuration management are included;
- configuration management includes provisioning and the provisioning activity may include testing, but this testing is not included in the present document. It will be included in the specification relating to fault and performance management;
- the specification should cover the provisioning of national variants and type variants of lines. Existing modelling, such as the customer administration model, should be used for this, if possible;
- the specification should not cover general functions within the AN, such as multiplexing, cross-connection and transmission functions, unless some aspect impacts the configuration management of V5 interfaces and related ports;
- configuration management related to redundancy of V5 interfaces is within the scope of the present document, both for multiple V5 interfaces and for the individual links within a V5.2 interface;
- the definition of an object model for a transparent channel on the V5 interface which supports the synchronization of OSs is outside the scope of the present document;
- it is assumed that the relationship between directory numbers and equipment is kept in the OSs of the AN, so that the Q3 interface of the AN does not need to handle directory numbers.

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1 Scope

The present document specifies the Q3 interface between an Access Network (AN) and the Telecommunications Management Network (TMN) for the support of configuration management functions for V5 interfaces, as described in EN 300 324-1 [3] and EN 300 347-1 [4], and their associated user ports. The management of transmission, media and services which are not related to V5 interfaces is outside the scope of the present document.

The Q3 interface is the TMN interface between network elements or Q-adapters which interface to Operations Systems (OSs) without mediation and between OSs and mediation devices. The location of the Q3 interface is illustrated in annex G.

Generic modelling of leased line ports which are associated with a V5 interface is within the scope of the present document, but the traffic from these ports can only be associated with 64 kbit/s bearer channels on the V5 interface.

The definition of OS functionality, and the specification of Qx interfaces and proprietary interfaces are outside the scope of the present document.

The present document does not constrain the logical or physical size of the AN or its geographical dispersion. The definition of the managed object class which represents an AN is outside the scope of the present document.

Existing protocols are used where possible, and the focus of the present document is on defining the object models.

NOTE: Configuration management includes provisioning and the provisioning activity may include testing, but this testing is not included in the present document. It is included in the specification relating to fault and performance management, EN 300 378-1 [6].

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2 References (standards.iteh.ai)

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

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- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies.
- A non-specific reference to an ETS shall also be taken to refer to later versions published as an EN with the same number.

- [1] ITU-T Recommendation G.803 (1997): "Architecture of transport networks based on the synchronous digital hierarchy (SDH)".
- [2] ETS 300 297: "Integrated Services Digital Network (ISDN); Access digital section for ISDN basic access".
- [3] EN 300 324-1: "V interfaces at the digital Local Exchange (LE); V5.1 interface for the support of Access Network (AN); Part 1: V5.1 interface specification".
- [4] EN 300 347-1: "V interfaces at the digital Local Exchange (LE); V5.2 interface for the support of Access Network (AN); Part 1: V5.2 interface specification".
- [5] EN 300 377-1: "Q3 interface at the Local Exchange (LE) for configuration management of V5 interfaces and associated customer profiles; Part 1: Q3 interface specification".
- [6] EN 300 378-1: "Q3 interface at the Access Network (AN) for fault and performance management of V5 interfaces and associated user ports; Part 1: Q3 interface specification".

- [7] EN 300 379-1: "Q3 interface at the Local Exchange (LE) for fault and performance management of V5 interfaces and associated customer profiles; Part 1: Q3 interface specification".
- [8] ITU-T Recommendation G.773 (1993): "Protocol suites for Q-interfaces for management of transmission systems".
- [9] ITU-T Recommendation G.784 (1994): "Synchronous Digital Hierarchy (SDH) management".
- [10] ITU-T Recommendation M.3010 (1996): "Principles for a telecommunications management network".
- [11] ITU-T Recommendation M.3100 (1995): "Generic network information model".
- [12] ITU-T Recommendation Q.811 (1997): "Lower layer protocol profiles for the Q3 and X interfaces".
- [13] ITU-T Recommendation Q.812 (1997): "Upper layer protocol profiles for the Q3 and X interfaces".
- [14] CCITT Recommendation X.208 (1988): "Specification of Abstract Syntax Notation One (ASN.1)".
- [15] Void.
- [16] ITU-T Recommendation X.721 | ISO/IEC 10165-2 (1992): "Information technology - Open systems interconnection - Structure of management information: Definition of management information".
- [17] ITU-T Recommendation X.731 | ISO/IEC 10164-2 (1992): "Information technology - Open systems interconnection - Systems management: State management function".
- [18] Void.
- [19] ITU-T Recommendation Q.824.5 (1997): "Stage 2 and stage 3 description for the Q3 interface - Customer administration: Configuration management of V5 interface environments and associated customer profiles".
- [20] ITU-T Recommendation G.960 (1993): "Access digital section for ISDN basic rate access".

3 Definitions and abbreviations

3.1 Definitions

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

Access Network (AN): see EN 300 324-1 [3].

bearer channel: see EN 300 324-1 [3].

Bearer Channel Connection (BCC): see EN 300 347-1 [4].

Communication channel (C-channel): see EN 300 324-1 [3].

Communication path (C-path): see EN 300 324-1 [3].

control protocol: see EN 300 324-1 [3].

D-channel signalling type (Ds-type) data: ISDN D-channel signalling type data with Service Access Point Identifier (SAPI) not equal to 16, and not equal to 32 to 62 (see EN 300 324-1 [3]).

envelope function address: see EN 300 324-1 [3].

frame type (f-type) data: ISDN D-channel data with SAPI in the range from 32 to 62 (see EN 300 324-1 [3]).

Local Exchange (LE): see EN 300 324-1 [3].

Operations System (OS): see ITU-T Recommendation M.3010 [10].

packet type (p-type) data: ISDN D-channel data with SAPI equal to 16 (see EN 300 324-1 [3]).

Permanent Line (PL): see EN 300 324-1 [3].

protection protocol: see EN 300 347-1 [4].

provisioning variant: see EN 300 324-1 [3].

semi-permanent leased line: see EN 300 324-1 [3].

time slot number: see EN 300 324-1 [3].

V5 interface: see EN 300 324-1 [3].

V5 time slot: object class representing a 64 kbit/s channel of a V5 interface that is used as bearer or communication channel. It is a subclass of "ITU-T Recommendation M.3100 [11]":connectionTerminationPointBidirectional.

V5 Trail Termination Point (TTP): object class representing a 2 Mbit/s interface that is used as V5.1 interface or as part of a V5.2 interface. It is a subclass of "ITU-T Recommendation M.3100 [11]": trailTerminationPointBidirectional.

X interface: see ITU-T Recommendation M.3010 [10].

3.2 Abbreviations

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

AN	Access Network
ASN.1	Abstract Syntax Notation One (see CCITT Recommendation X.208 [14])
BA	Basic Access
BCC	Bearer Channel Connection
C-channel	Communication channel
C-path	Communication path
CTP	Connection Termination Point
DCC	Data Communications Channel
Ds-type	D-channel signalling type
f-type	frame type
FSM	Finite State Machine
ID	Identity, Identifier
ISDN	Integrated Services Digital Network
LE	Local Exchange
M/O	Mandatory/Optional
MPH	primitive between Physical layer and layer 2 Management
NE	Network Element
OS	Operations System
p-type	packet type
PL	Permanent Line
PRA	Primary Rate Access
PSTN	Public Switched Telephone Network
RDN	Relative Distinguished Name
SAPI	Service Access Point Identifier
TIB	Task Information Base
TMN	Telecommunications Management Network
TTP	Trail Termination Point

4 Information model diagrams

The entity relationship diagram is given in subclause 4.1 and the inheritance hierarchy (is a relationships) and naming hierarchy (containment relationships) are given in subclauses 4.2 and 4.3, respectively.

4.1 Entity relationship diagram

Figures 1 to 4 show the overall relationships between the various entities. These correspond to the managed objects which are manipulated at the Q3 interface.

For V5.1 interfaces, bearer channels on user ports are associated with bearer time slots on a V5.1 interface by configuration over the Q3 interface of the AN. For V5.2, bearer channels on user ports are associated with bearer time slots on a V5.2 interface by the V5.2 Bearer Channel Connection (BCC) protocol. For both V5.1 and V5.2, the association of user signalling with communication paths and the association between communication paths and logical communication channels on the V5 interface is by configuration over the Q3 interface of the AN. The association of logical communication channels with physical communication time slots on the V5 interface is initially established over the Q3 interface, but can be changed for V5.2 interfaces by the V5.2 protection protocol.

The AN treats time slots on the V5.2 interface which are used for semi-permanent connections like any other bearer time slot on a V5.2 interface.

Signalling protocols and their associated communication are modelled using various objects which represent the communication paths and the communication time slots. There are six classes of communication path objects. There is a single class for all Integrated Services Digital Network (ISDN) signalling with an attribute to distinguish between Ds-type, p-type, and f-type data. There are classes for Public Switched Telephone Network (PSTN) signalling, the control protocol, the BCC protocol, link control protocol, and the protection protocol. In addition to these six communication path object classes, there is also an object class which represents communication channels.

There is one instance of the appropriate object class per communication path and per communication channel. These are contained in instances of v5Interface.

V5 control messages relating to provisioning are managed by an optional object on the Q3 interface. These messages may not be required once a TMN X interface or an integrated OS is available.

If control messages relating to provisioning are not supported on the Q3 interface then a default value for provisioning variant will be automatically used on the V5 interface. All V5 interfaces will use this default value unless actively changed via the Q3 interface. The value of this default is all zeroes.

Protection group 1 and its contained protection unit(s) are to be instantiated for the V5.2 case only if there is more than one 2,048 Mbit/s link.

A Trail Termination Point (TTP) contains the Connection Termination Points (CTPs) at the higher network layer which it serves. This relationship allows the entity relationship diagram to be mapped onto the functional architecture (see annex D).

4.1.1 Overview

A single managedElement can contain a number of userPortTtps, a number of v5Interfaces, and a number of v5Ttps (which each represent a 2,048 Mbit/s link). There is a bi-directional association between each v5Interface and all of its related userPorts. Likewise there is a bi-directional relationship between each v5Interface and all of its related v5Ttps (2,048 Mbit/s links).

Each userPortTtp can contain a number of userPortBearerChannelCtps, one for each of its 64 kbit/s bearer channels. Each v5Ttp contains 31 v5TimeSlots which represent the CTPs corresponding to each of the 31 physical time slots which may be configured. Each userPortBearerChannelCtp can be associated with a unique v5TimeSlot for a V5.1 interface, but for the V5.2 case there is no corresponding association because the relationship is controlled by the V5.2 BCC protocol.

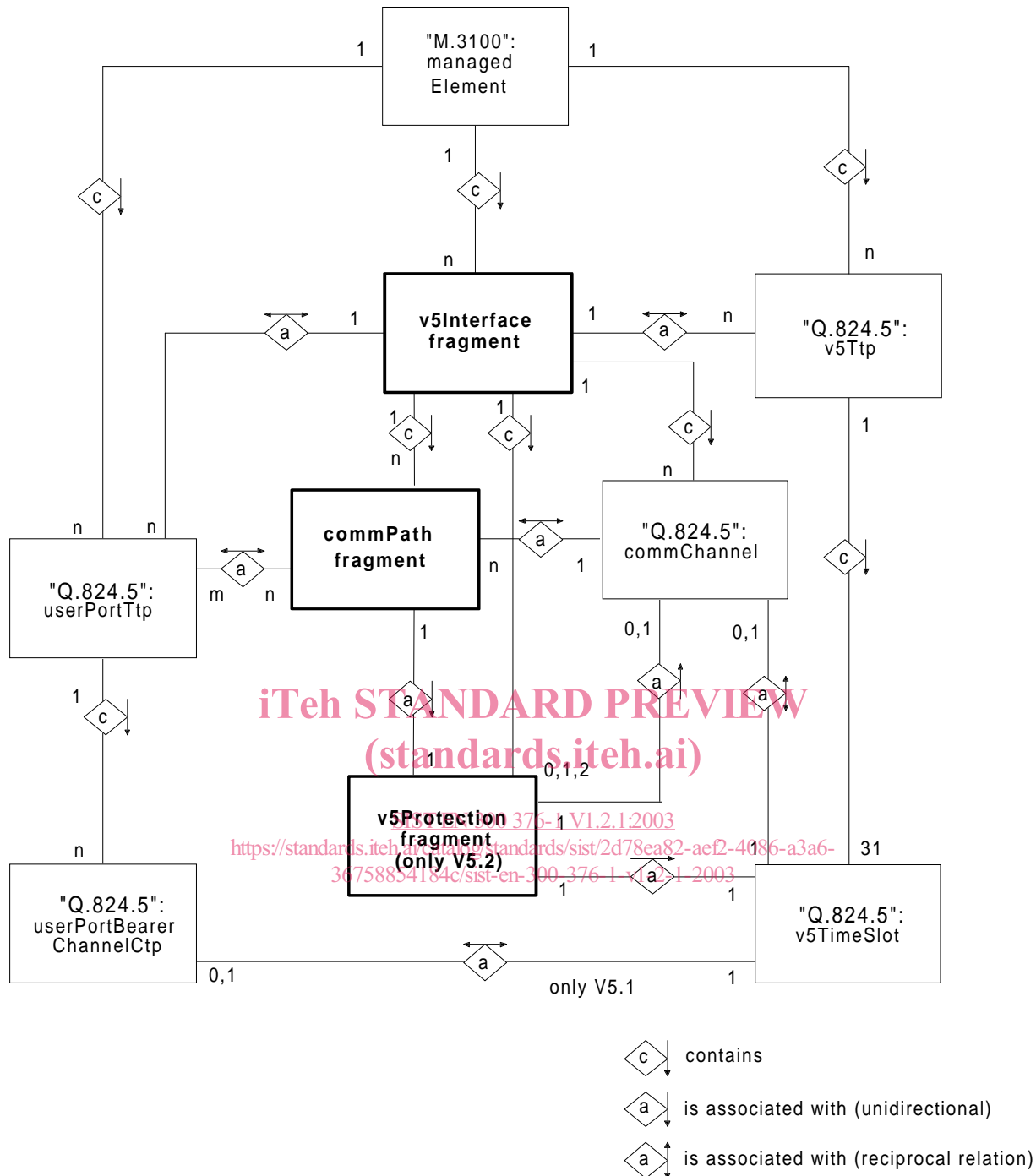


Figure 1: Entity relationship diagram - overview

Link blocking requests on the Link control protocol are generated by setting the administrative state attribute of the relevant instance of v5Ttp to shutting down. Only deferred blocking requests can be generated in this way. Deferred blocking requests on the Link control protocol cannot be generated by manipulating the object model. Port blocking requests for the Control protocol are generated by setting the administrative state attribute of the relevant instance of the subclass of userPortTtp to shutting down.

4.1.2 V5 interface fragment

Each v5Interface contains a number of communication path objects in its commPath fragment, a number of commChannels, and one or two v5ProtectionGroup objects if it represents a V5.2 interface. Each instance of v5Interface may contain an instance of v5Provision to support the V5 pre-provisioning messages.

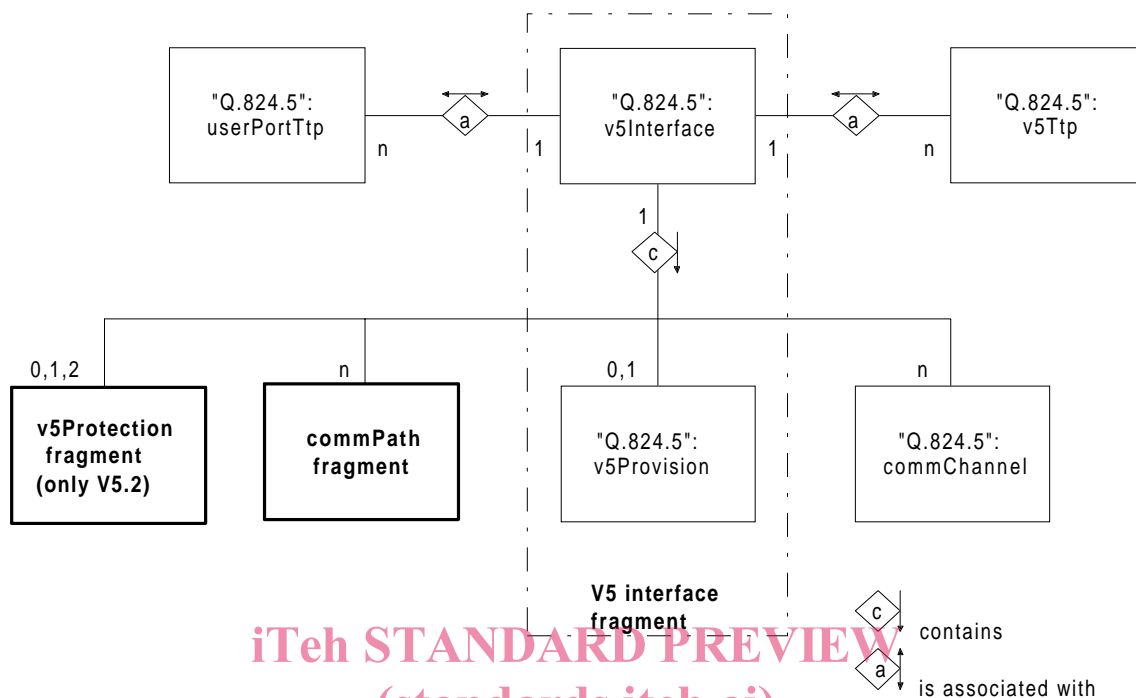


Figure 2: Entity relationship diagram - V5 interface fragment

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4.1.3 Communication path fragment

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Each ISDN userPortTtp can be associated with up to three isdnCommPaths, one for each type of ISDN signalling. Each isdnCommPath handles a certain type of ISDN signalling for a number of userPortTtps, and is associated with these. There may be more than one isdnCommPath contained in the v5Interface for each type of ISDN signalling.

The v5Interface contains a single controlCommPath. It contains a single pstnCommPath, but only if there are any PSTN userPortTtps associated with it. It also contains a single bccCommPath, a single protCommPath, and a single linkControlCommPath if it represents a V5.2 interface.

Each commChannel can be associated with up to three isdnCommPaths representing three different types of ISDN signalling. It can also be associated with the pstnCommPath. The commChannel which is associated with controlCommPath shall also be associated with the bccCommPath and with the linkControlCommPath if the v5Interface which contains it represents a V5.2 interface.