



**SLOVENSKI STANDARD**  
**kSIST-TS FprCEN/TS 16157-13:2024**  
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**Inteligentni transportni sistemi - Specifikacije za izmenjavo podatkov DATEX II pri upravljanju prometa in informiranju - 13. del: Zahteve glede stanja, napak in kakovosti**

Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 13: Status, fault and quality requirements

Intelligente Verkehrssysteme - Verkehrsmanagementsysteme - Status-, Fehler- und Qualitätsanforderungen

Systèmes de transport intelligents - systèmes de gestion du trafic - Exigences en matière d'état, de défauts et de qualité

**Ta slovenski standard je istoveten z: EN FprCEN/TS 16157-13**

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**ICS:**

35.240.60	Uporabniške rešitve IT v prometu	IT applications in transport
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SPÉCIFICATION TECHNIQUE  
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**FINAL DRAFT**  
**FprCEN/TS 16157-13**

October 2024

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ICS

English Version

Intelligent transport systems - DATEX II data exchange  
specifications for traffic management and information -  
Part 13: Status, fault and quality requirements

Systèmes de transport intelligents - systèmes de  
gestion du trafic - Exigences en matière d'état, de  
défauts et de qualité

Intelligente Verkehrssysteme -  
Verkehrsmanagementsysteme - Status-, Fehler- und  
Qualitätsanforderungen

This draft Technical Specification is submitted to CEN members for Vote. It has been drawn up by the Technical Committee CEN/TC 278.

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Recipients of this draft are invited to submit, with their comments, notification of any relevant patent rights of which they are aware and to provide supporting documentation.

**Warning** : This document is not a Technical Specification. It is distributed for review and comments. It is subject to change without notice and shall not be referred to as a Technical Specification.

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EUROPEAN COMMITTEE FOR STANDARDIZATION  
COMITÉ EUROPÉEN DE NORMALISATION  
EUROPÄISCHES KOMITEE FÜR NORMUNG

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## European foreword

This document (FprCEN/TS 16157-13:2024) has been prepared by Technical Committee CEN/TC 278 “Intelligent transport systems”, the secretariat of which is held by NEN.

This document is currently submitted to the Vote on TS.

The CEN 16157 series consists of several parts under the general title “Intelligent transport systems — DATEX II data exchange specifications for traffic management and information”.

This document will supersede CEN/TS 17241:2019.

CEN/TS 16157-13:2024 includes the following significant technical changes with respect to CEN/TS 17241:2019:

- The status and faults model has been upgraded to improve fit with other parts in the CEN 16157 series, avoiding duplication, to add further functionality, and to clarify concepts.
- The illustration of quality and performance criteria included in CEN/TS 17241:2019 (as Clause 5) is not included here.
- The explicit ASN.1 specifications of CEN/TS 17241 are not included here (equivalent ASN.1 specifications can be derived from this CEN/TS).
- The annex on management of electronic traffic regulations is not included here.

## Document Preview

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## FprCEN/TS 16157-13:2024 (E)

### Introduction

This document defines a common set of data exchange specifications to support the vision of a seamless interoperable exchange of road traffic and travel information across boundaries, including national, urban, interurban, road administrations, infrastructure providers and service providers. Standardization in this context is a vital constituent to ensure interoperability, reduction of risk, reduction of the cost base, promotion of open marketplaces and many social, economic and community benefits to be gained from more informed travellers, network managers and transport operators.

Deploying intelligent transport systems in line with European Sustainable and Smart Mobility Strategy as issued by the European Commission requires co-ordination of traffic management operation and development of seamless pan-European information services. These jointly aim at contributing to the transformation of the European transport system for the objectives of efficient, safe, sustainable, smart and resilient mobility.

In this context the European Commission has been supporting the development of information exchange between the actors of road traffic management and related services for several years. In the road sector, DATEX II has been long in fruition, with the European Commission being fundamental to its development through an initial contract and subsequent co-funding of the further evolution of the standard and user support ecosystem. With this standardization of DATEX II, there is a real basis for common exchange between the actors of the traffic and travel information sector both in the collaboration between traffic management organisations and their systems, as well as in coherent information provision to service providers. DATEX II supports the requirements of the stakeholder organisations involved in the road traffic and travel domain in compliance with the EU policy and legal frameworks aimed at the sector.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

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## 1 Scope

This document specifies a data model for the status and faults of components of traffic management systems.

The data model is intended for use in system-to-system data exchanges for device status and fault management purposes.

## 2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 16157-1:2018, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 1: Context and framework*

EN 16157-2:2019, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 2: Location referencing*

EN 16157-7:2018, *Intelligent transport systems - DATEX II data exchange specifications for traffic management and information - Part 7: Common data elements*

ISO/IEC 8824-1, *Information technology — Abstract Syntax Notation One (ASN.1) — Part 1: Specification of basic notation*

ISO/IEC 9834-1, *Information technology — Procedures for the operation of object identifier registration authorities — Part 1: General procedures and top arcs of the international object identifier tree*

## 3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 16157-1:2018, EN 16157-2:2019, EN 16157-7:2018, ISO/IEC 8824-1, ISO/IEC 9834-1 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

- ISO Online browsing platform: available at <https://www.iso.org/obp/>
- IEC Electropedia: available at <https://www.electropedia.org/>

### 3.1

#### **device**

logical object, realised by physical equipment, at a known location, that is desired to deliver a service

Note 1 to entry: the definition does not apply in the context of the term “physical device”.

Note 2 to entry: in the context of this document a device is a logical object which could be realized by different physical objects at different points in time, for example if a faulty item is replaced by a spare of the same type.

### 3.2

#### **status**

capability of a device or system to perform its functions at a given point in time, considering its inherent technical condition, the externally determined operational setting, and the state of any essential support systems

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### 3.3 fault

failure or deficiency in a device or system that indicates a potential or actual change of status in which the capability to perform functions is reduced

## 4 Symbols and abbreviated terms

UML Unified Modelling Language

XML eXtensible Markup Language

## 5 UML notation

This document includes diagrams using the UML notation as defined in ISO / IEC 19505-1 [1].

NOTE Some introductory guides to UML 2 are provided in the Bibliography of EN 16157-1:2018

## 6 The FaultAndStatus namespace

### 6.1 Overview of the FaultAndStatus namespace

The <<D2Namespace>> named FaultAndStatus shall be as defined in this Clause 6 and the Annex A.

The namespace shall reside in the PayloadPublication package defined in EN 16157-1:2018.

The short namespace prefix that may be used in platform-specific realizations is “fst”.

The namespace relies on elements from both the Common namespace defined in EN 16157-7:2018 and the LocationReferencing namespace defined in EN 16157-2:2019, as illustrated in Figure 1.

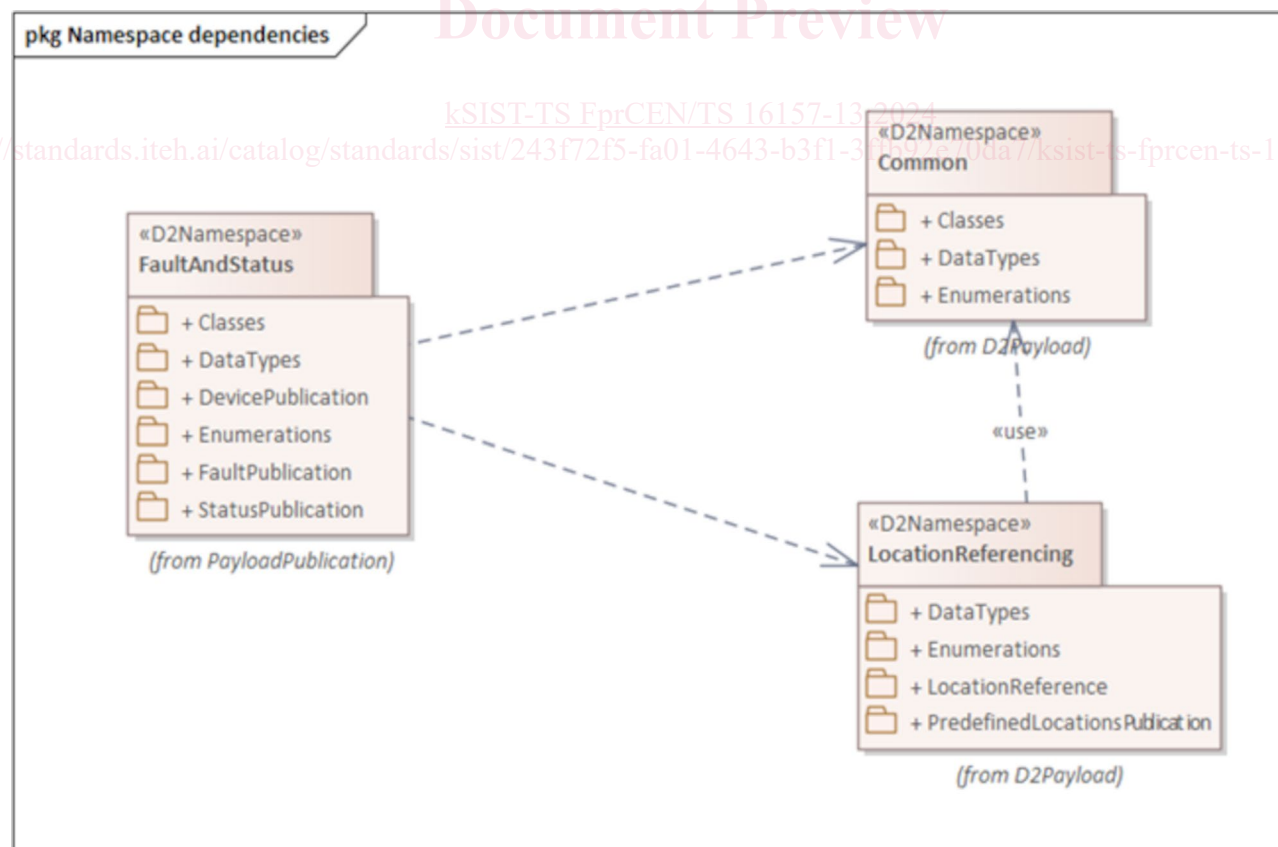


Figure 1 — Namespace dependencies of the FaultAndStatus namespace



The FaultAndStatus namespace contains the following sub-packages:

- “Classes” package, defining classes that may be used in other sub-packages,
- “DataTypes” package, defining new datatypes,
- “DevicePublication”, defining the structure of device publications,
- “Enumerations”, defining enumerated types,
- “FaultPublication”, defining the structure of device fault publications,
- “StatusPublication”, defining the structure of device status publications.

## 6.2 Device publication

### 6.2.1 Overview

The DevicePublication package contains classes defined in this subclause 6.2, as illustrated in Figure 2. The DevicePublication constructs are designed for use when no more specific kind of device publication (such as a VmsPublication as defined in EN 16157-4) is needed.

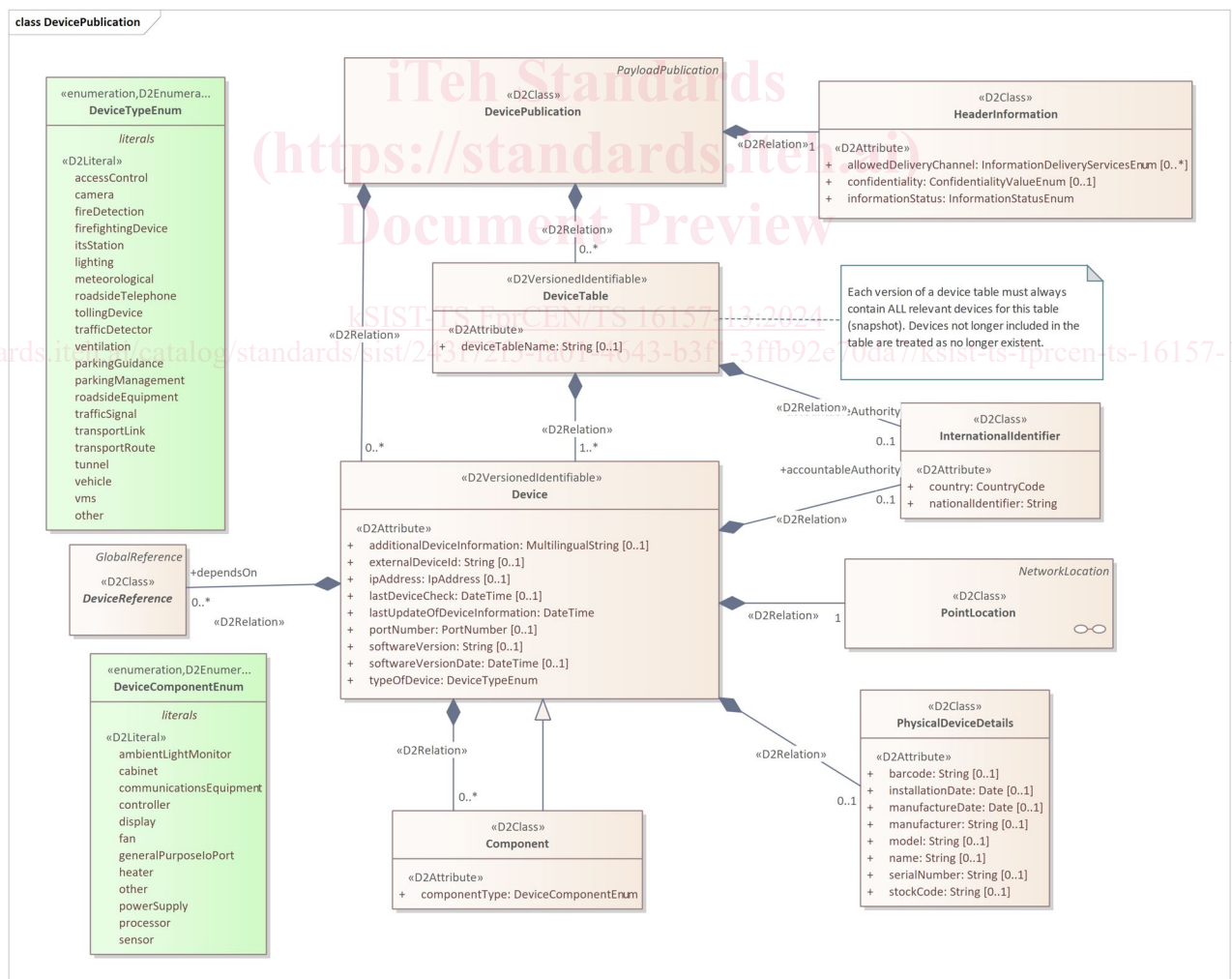


Figure 2 — DevicePublication

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### 6.2.2 DevicePublication

A DevicePublication contains information on a collection of devices, either directly or via one or more DeviceTable objects. The DevicePublication identifies devices that exist and provides their location and optionally further static (or infrequently changing) information.

A single device may use this structure to transmit information about itself to a central system by a DevicePublication containing exactly one Device object.

In a centre-to-centre communication use case, one or more DeviceTable objects may be used to group device information along with metadata. Each version of a DeviceTable shall always contain a snapshot of all relevant devices for this table. Devices no longer included in the DeviceTable are treated as no longer existent.

A single DevicePublication object should contain either DeviceTable objects or Device objects directly without DeviceTables, not both.

A DevicePublication inherits the properties of the PayloadPublication class defined in EN 16157-7:2018 and shall include header information in the format defined in that document.

### 6.2.3 DeviceTable

A DeviceTable contains one or more objects describing devices. It may also include a name for the table, and it may include identification of the authority accountable for the table, if different from the information manager identified within the PayloadPublication.

The class DeviceTable is < <D2VersionedIdentifiable> > as defined in EN 16157-1:2018.

### 6.2.4 Device

A Device object contains static (or infrequently changing) information about a **logical device that delivers a service**. For example, if one physical device fails and is replaced at the same location by another physical device of the same kind that had been held as a spare, then these are not two separate Device objects, they are only physical devices that are at different times associated with the same single logical Device. A Device object may include one PhysicalDeviceDetails object to describe the physical device that currently realizes the logical service.

Where this document says “device” without saying “physical device”, it intends to signify the logical device that delivers the service.

The class Device is < <D2VersionedIdentifiable> > as defined in EN 16157-1:2018, which allows device objects to be referenced in fault publications and in status publications.

A Device object may identify one or more other Devices upon which it depends to deliver its service.

A Device object may identify an accountable authority, if different from that specified for the table or publication.

A Device object shall provide its location as a PointLocation as defined in EN 16157-2:2019.

A Device object shall identify the type of Device, which shall be selected from the list defined for DeviceTypeEnum in Annex A.

A Device object may provide one or more Component objects that each describes a component of the device.

A Device object may identify an IP address and port number, using datatypes defined in Annex C.

### 6.2.5 PhysicalDeviceDetails

A PhysicalDeviceDetails object contains information that is specific to the physical device that realizes a logical device service. The information aids identification and may include dates of manufacture and installation.

### 6.2.6 Component

A Component is a part of a Device, and is itself a kind of Device, so it is possible to express multiple levels of composition. A Component object shall identify the type of component, which shall be selected from the list defined for ComponentTypeEnum in Annex A. Since a Component object is a kind of Device it can include the same kinds of information as can be expressed for a Device. Its typeOfDevice will typically be “other”, with the more specific type of component is as expressed in its componentType property.

### 6.3 Device status publication

#### 6.3.1 Overview

The StatusPublication package contains the classes defined in this subclause 6.3, illustrated in Figures 3 and 4, which concern the status of devices.

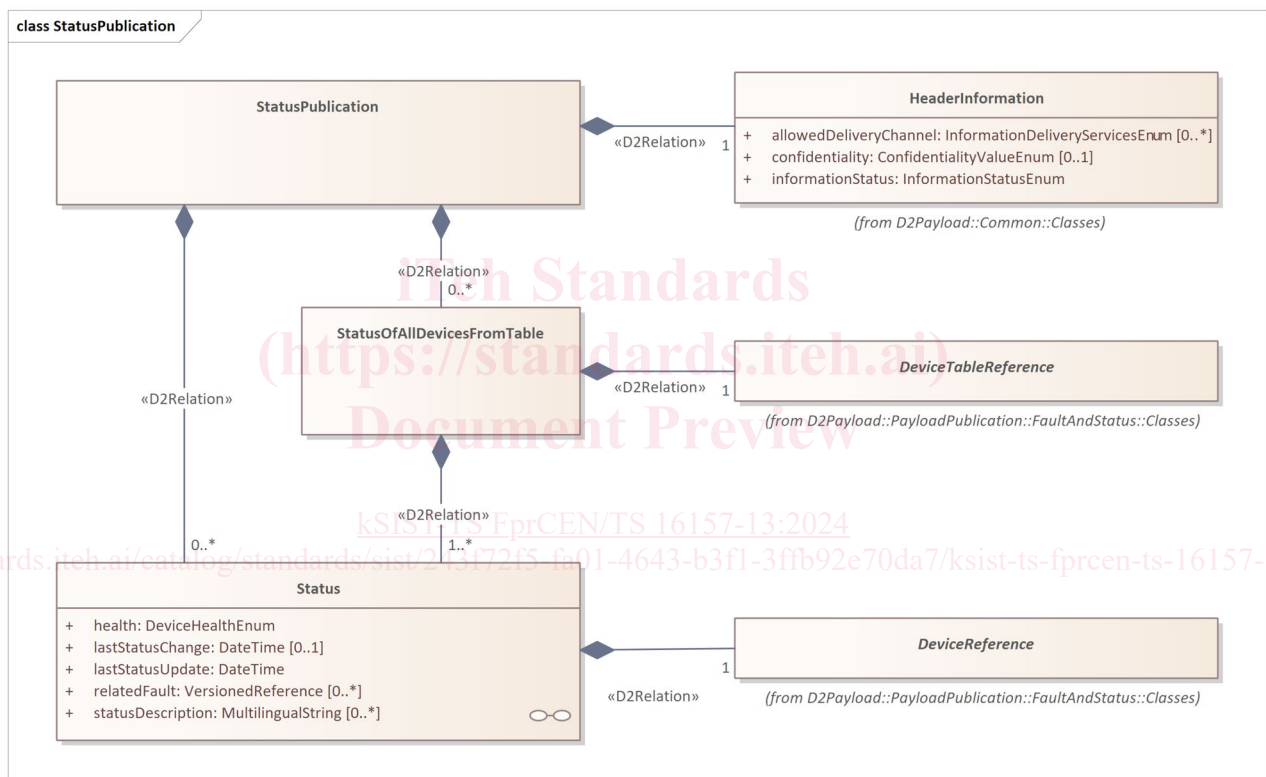


Figure 3 — StatusPublication

#### 6.3.2 StatusPublication

A StatusPublication contains information on the status of one or more devices. It may do this either by providing one or more Status objects directly or by providing a collection of status for one or more whole tables of devices using the StatusOfAllDevicesFromTable class.

Each object conveying dynamic status shall include a reference to a static information counterpart: a Status object refers to a Device via a DeviceReference, while a StatusOfAllDevicesFromTable object refers to a DeviceTable via a DeviceTableReference.

A StatusPublication inherits the properties of the PayloadPublication class defined in EN 16157-7:2018 and shall include header information in the format defined in that document.

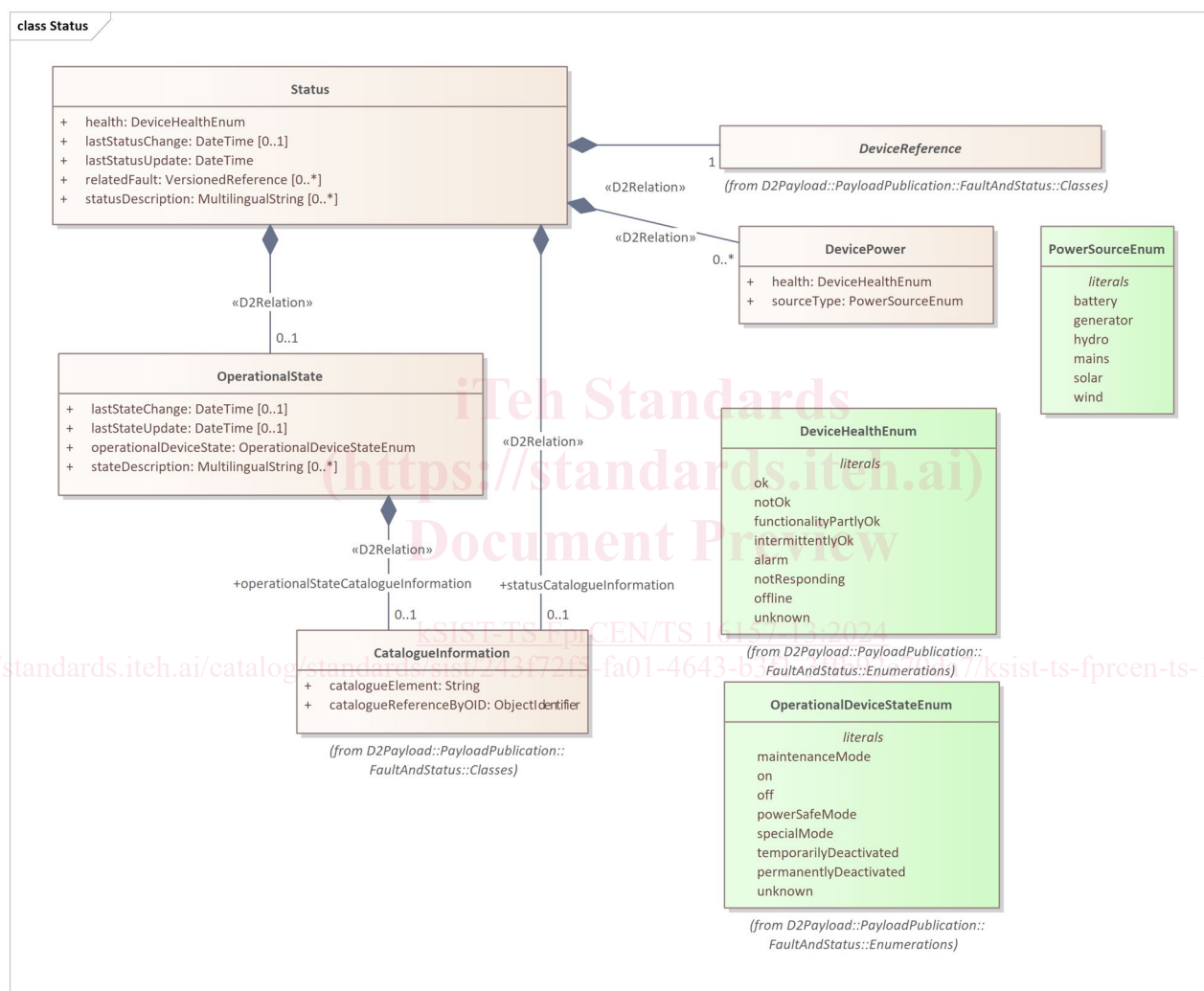
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### 6.3.3 StatusOfAllDevicesFromTable

A StatusOfAllDevicesFromTable provides the status of all devices in a device table. It refers to the device table via a DeviceTableReference object and should include one Status object for every device in the corresponding device table.

### 6.3.4 Status

A Status object holds dynamic information on the status of a device, as illustrated in Figure 4. This shall include at least a classification of health (ability to provide the service), selected from the list defined for DeviceHealthEnum in Annex A, and the date and time of the last status update.



A Status object shall identify one associated device using a DeviceReference object.

A Status object may also provide an OperationalState object with a classification of operational state, a CatalogueInformation object linking to status information via an external catalogue, and/or one or more DevicePower objects - potentially one for each kind of alternative power source possessed by the associated device.

A Status object may also link to information on faults of the associated device, via one or more versioned references to specific objects of type Fault, using the versioned reference scheme defined in EN 16157-1:2018.

A Status object may also provide textual descriptions of the device status, and/or the time of the last status change.

### 6.3.5 OperationalState

OperationalState concerns the operational state into which a device has been placed, which is distinct from the health of the device. An operational state is typically reached after a decision, whether by a human or a machine, in contrast to device health which may be the result of some unintended and unexpected fault or other occurrence. The operational state classification shall be selected from the list defined for OperationalDeviceStateEnum in Annex A.

An OperationalState object may also provide textual descriptions of the operational state, time metadata, and/or a CatalogueInformation object linking to operational state information via an external catalogue.

### 6.3.6 DevicePower

DevicePower provides a classification of the health of the power source for a Device, for a specified kind of power source. The classification of health shall be selected from the list defined for DeviceHealthEnum, while the classification of kind of source shall be selected from the list defined for PowerSourceEnum, both in Annex A.

## 6.4 Device faults publication

### 6.4.1 Overview

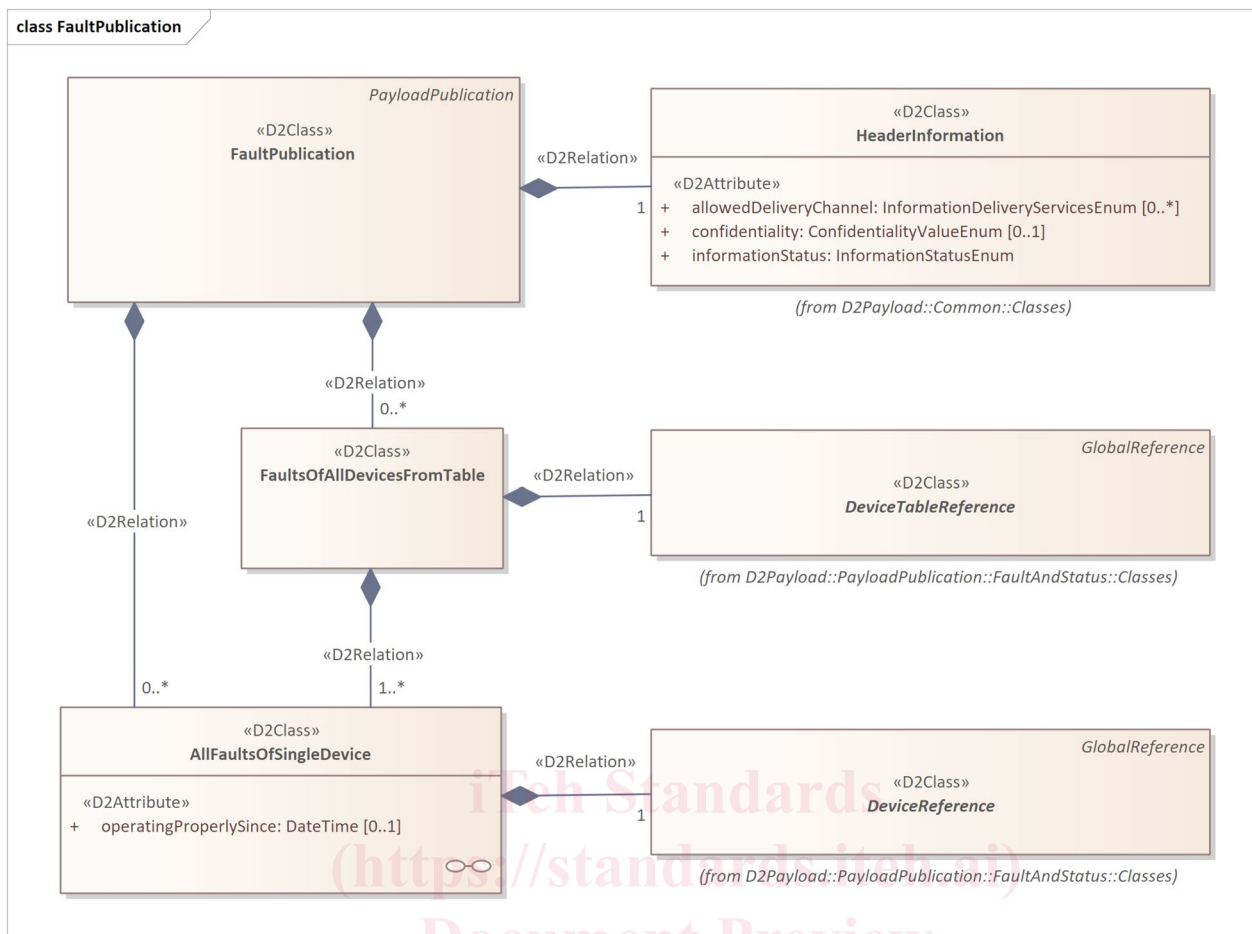
The FaultPublication package contains the classes defined in this subclause 6.4, illustrated in Figures 4 and 6, which concern faults of devices.

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<https://standards.iteh.ai/catalog/standards/sist/243f72f5-fa01-4643-b3f1-3ffb92e70da7/ksist-ts-fprcen-ts-16157-13-2024>

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**Figure 5 — FaultPublication**

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**6.4.2 FaultPublication**

A FaultPublication contains information on faults of one or more devices. It may do this either by providing fault information for a whole DeviceTable, or directly for one or more individual devices. In both cases the fault information is provided via the AllFaultsOfSingleDevice class.

A StatusPublication inherits the properties of the PayloadPublication class defined in EN 16157-7:2018 and shall include header information in the format defined in that document.

**6.4.3 FaultsOfAllDevicesFromTable**

A FaultsOfAllDevicesFromTable provides faults for all devices in one device table. It refers to its device table via a DeviceTableReference object and should include one AllFaultsOfSingleDevice object for every device in the corresponding device table.

**6.4.4 AllFaultsOfSingleDevice**

An AllFaultsOfSingleDevice object shall provide a snapshot of all current fault information for the single device identified via an associated DeviceReference object, as illustrated in Figure 6.