
**Health informatics — Personal health
device communication —**

Part 10207:

**Domain information and service
model for service-oriented point-of-
care medical device communication**

*Informatique de santé — Communication entre dispositifs de santé
personnels —*

*Partie 10207: Informations de domaine et modèle de services pour la
communication orientée services entre dispositifs médicaux sur le site
des soins*

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Abstract: Within the context of the ISO/IEEE 11073™ family of standards for point-of-care medical device communication, a Participant Model derived from the ISO/IEEE11073-10201 Domain Information Model is provided in this standard. The Participant Model specifies the structure of medical information objects. This standard also defines an abstract Communication Model to support the exchange of medical information objects. All elements of the Participant Model and Communication Model are specified using XML Schema. Core subjects of the Participant Model comprise modelling of medical device-related data, e.g., measurements and settings, alert systems, contextual information (e.g., patient demographics and location information), remote control, and archival information. Model extensibility is provided inherently through the use of XML Schema.

Keywords: alert systems, IEEE 11073-10207™, medical device communication, patient, point-of-care, remote control, service-oriented architecture, XML Schema

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PDF: ISBN 978-1-5044-4627-3 STD22961
Print: ISBN 978-1-5044-4628-0 STDPD22961

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Introduction

This introduction is not part of IEEE Std 11073-10207-2017, Health informatics—Point-of-care medical device communication—Part 10207: Domain Information and Service Model for Service-Oriented Point-of-Care Medical Device Communication.

ISO/IEEE 11073 standards enable communication between medical devices and external computer systems. They provide automatic and detailed electronic data capture of patient vital signs information and device operational data. The primary goals of these standards are to

- Provide real-time, plug-and-play interoperability for patient-connected medical devices.
- Facilitate the efficient exchange of vital signs and medical device data, acquired at the point of care, in all health care environments.

“Real-time” means that data from multiple devices can be retrieved, time correlated, and displayed or processed in fractions of a second. “Plug-and-play” means that all the clinician has to do is make the connection—the systems automatically detect, configure, and communicate without any other human interaction.

“Efficient exchange of medical device data” means that information that is captured at the point of care (e.g., patient vital signs data) can be archived, retrieved, and processed by many different types of applications without extensive software and equipment support and without needless loss of information. The standards are especially targeted at acute and continuing care devices, such as patient monitors, ventilators, infusion pumps, and electrocardiogram (EKG) devices. This family of standards can be layered together to provide connectivity optimized for the specific devices being interfaced.

Note that normative statements of requirements are presented in this standard in the following manner:

Rnnnn: Statement text here.

where "nnnn" is replaced by a number that is unique among the requirements in this standard and thereby forms a unique requirement identifier, for example,

R0007: All HANDLES SHALL be unique within one MDIB sequence of a SERVICE PROVIDER.

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Health informatics—Point-of-care medical device communication

Part 10207: Domain Information and Service Model for Service-Oriented Point-of-Care Medical Device Communication

1. Overview

1.1 Scope

The scope of this standard is the definition and structuring of information that is communicated in a distributed system of point-of-care medical devices and medical information technology (IT) systems in which medical data needs to be exchanged or networked point-of-care medical devices need to be controlled. The standard provides a Participant Model and Communication Model derived from the IEEE 11073™ Domain Information Model (IEEE 11073-10201™ DIM). Furthermore, it utilizes the IEEE 11073 Nomenclature (IEEE 11073-10101™) and supports other coding systems to convey the semantics of any information elements.¹

The definition of network transport mechanisms is outside the scope of this standard.

1.2 Purpose

The purpose of this standard is to enable vendors of point-of-care medical devices and medical IT systems to constitute networked medical device applications from the perspective of domain experts. Therefore, this standard provides tools to virtually model point-of-care medical devices. Moreover, it defines a service-oriented architecture to access those networked-based point-of-care medical devices.

¹ Information on normative references can be found in Clause 2.

2. Normative references

The following referenced documents are indispensable for the application of this document (i.e., they must be understood and used; therefore, each referenced document is cited in text, and its relationship to this document is explained). For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments or corrigenda) applies.

IEC 60050-482:2004, International Electrotechnical Vocabulary – Part 482: Primary and secondary cells and batteries.²

IEEE Std 11073-10101a™-2015, Health informatics—Point-of-care medical device communication—Part 10101: Nomenclature, Amendment 1: Additional Definitions.^{3,4}

ISO/IEEE 11073-10101:2004, Health informatics — Point-of-care medical device communication — Part 10101: Nomenclature.⁵

ISO/IEEE 11073-10201:2004, Health informatics — Point-of-care medical device communication — Part 10201: Domain information model.

² IEC publications are available from the International Electrotechnical Commission (<http://www.iec.ch>) and the American National Standards Institute (<http://www.ansi.org/>).

³ The IEEE standards or products referred to in Clause 2 are trademarks owned by The Institute of Electrical and Electronics Engineers, Incorporated.

⁴ IEEE publications are available from The Institute of Electrical and Electronics Engineers (<http://standards.ieee.org/>).

⁵ ISO publications are available from the International Organization for Standardization (<http://www.iso.org/>) and the American National Standards Institute (<http://www.ansi.org/>).

3. Definitions and notational conventions

3.1 Definitions

For the purposes of this document, the following terms and definitions apply. The *IEEE Standards Dictionary Online* should be consulted for terms not defined in this clause.⁶ Any word in capital letters refers to the technical use defined in this clause. In any other case, no special spelling is given.

ALERT CONDITION: State of the ALERT SYSTEM when it has determined that a potential or actual HAZARDOUS SITUATION exists for which OPERATOR awareness or response is required.

NOTE—See also IEC 60601-1-8 (2014) [B1].^{7,8}

ALERT SIGNAL DELEGATION: Capability of a POC MEDICAL DEVICE to let another PARTICIPANT generate a POC MEDICAL DEVICE's ALERT SIGNAL as primary ALERT SIGNAL in order to indicate the presence of an ALERT CONDITION on the POC MEDICAL DEVICE.

ALERT SIGNAL: Type of signal generated by the ALERT SYSTEM to indicate the presence (or occurrence) of an ALERT CONDITION.

NOTE—See also IEC 60601-1-8 (2014) [B1].

ALERT SYSTEM: Part of a POC MEDICAL DEVICE that detects ALERT CONDITIONS and, as appropriate, generates ALERT SIGNALS.

NOTE—See also IEC 60601-1-8 (2014) [B1].

ALERT: Synonym for the combination of patient-related physiological alarms, technical alarms, and equipment user advisory signals.

ATTRIBUTE: XML attribute as defined in eXtensible Markup Language .

NOTE—See XML [B5].

BASIC INTEGRATED CLINICAL ENVIRONMENT PROTOCOL SPECIFICATION (BICEPS): Non-normative name of IEEE Std 11073-10207.

BICEPS BINDING: Specification that defines how to connect BICEPS to a transport protocol layer.

CHANNEL: Abstraction for a logical or physical grouping of METRICs that allows hierarchical information organization.

CODE: Identifier used to semantically describe an entity within a CODING SYSTEM.

CODED VALUE: Value that utilizes a CODING SYSTEM and a CODE to semantically describe a certain object within the MEDICAL DATA INFORMATION BASE (MDIB). In general, CODED VALUES are based on standardized terminologies to increase interoperability.

CODING SYSTEM: Set of CODEs.

⁶ *IEEE Standards Dictionary Online* is available at <http://dictionary.ieee.org>.

⁷ The numbers in brackets correspond to the numbers of the bibliography in Annex E.

⁸ Notes in text, tables, and figures of a standard are given for information only and do not contain requirements needed to implement this standard.

CONTAINMENT TREE ENTRY: Node of the CONTAINMENT TREE that encloses descriptive and state information.

CONTAINMENT TREE: Device configuration and capability description of an MEDICAL DEVICE SYSTEM (MDS) that represents a POC MEDICAL DEVICE and is conceivable as a four-layered tree.

CONTEXT: Abstraction of a component of a POC MEDICAL DEVICE that defines the relationship of a POC MEDICAL DEVICE with its usage environment. Technically, a CONTEXT can be understood as a token that is shared between two or more POC MEDICAL DEVICES to let them know they are “talking about the same things.”

DELEGABLE ALERT SIGNAL: ALERT SIGNAL that takes part in the ALERT SIGNAL DELEGATION process. It is controlled by a PARTICIPANT.

DEVICE COMPONENT: Term used to describe the characteristics of a medical-related component of a POC MEDICAL DEVICE. A DEVICE COMPONENT can be a physical component that is integrated inside the device, a removable physical component, or a nonphysical component that allows physiological measurement data and its derived data to be grouped in a hierarchical information organization.

NOTE—See also pm:AbstractDeviceComponentDescriptor and pm:AbstractComplexDeviceComponentDescriptor.

ELEMENT: XML element as defined in eXtensible Markup Language.

NOTE—See XML [B5].

FALLBACK ALERT SIGNAL: ALERT SIGNAL that is emitted by a POC MEDICAL DEVICE when a DELEGABLE ALERT SIGNAL is not confirmed by the generating PARTICIPANT in time, i.e., it exceeds a confirmation timeout.

HANDLE: Term used to uniquely identify a certain object within the MEDICAL DATA INFORMATION BASE (MDIB) without designating any semantics.

HAZARDOUS SITUATION: Situation when people are exposed to a hazard or when property or the environment is threatened. A HAZARDOUS SITUATION exists when a vulnerable entity is exposed to a hazard.

NOTE—See also ISO 14971:2007 [B2].

MEDICAL DATA INFORMATION BASE (MDIB): Structured collection of any data objects that are provided by a particular POC MEDICAL DEVICE. MDIB includes descriptive and state information.

MEDICAL DEVICE SYSTEM (MDS): Abstraction of a system comprising one or more medical functions. In the context of IEEE Std 11073-10207, the term is specifically used as an object-oriented abstraction of a POC MEDICAL DEVICE that provides medical information in the form of information objects that are defined in IEEE Std 11073-10207.

MESSAGE: Set of data in a specific format that is exchanged between two PARTICIPANTS.

METRIC: Abstraction of a component of a POC MEDICAL DEVICE that is able to generate or store direct and derived, quantitative and qualitative biosignal measurements, settings, and status values.

PARTICIPANT: Any network node that is part of a SERVICE-ORIENTED MEDICAL DEVICE SYSTEM (SOMDS) and exchanges information by means of a service-oriented architecture. A PARTICIPANT can be either a SERVICE PROVIDER or a SERVICE CONSUMER.

POC ENVIRONMENT: Environment encompassing a particular diagnostic, bed, or treatment area that is specific to one patient and usually including the systems and personnel that are involved in the acute monitoring and treatment of the patient.

POC MEDICAL DEVICE: Point of care (POC) medical device that directly interacts with, monitors, provides treatment to, or is in some way associated with a single patient. For IEEE Std 11073-10207, the scope of POC MEDICAL DEVICES is further limited to patient-connected medical devices that provide support for electronic communication.

RESPONSIBLE ORGANIZATION: Entity that is accountable for the use and maintenance of a POC MEDICAL DEVICE.

SERVICE CONSUMER: Participant that utilizes at least one SERVICE.

SERVICE INTERFACE: Set of SERVICE OPERATIONS that is provided by a SERVICE to describe its capabilities.

SERVICE OPERATION: Single operation that can be executed remotely at a SERVICE PROVIDER.

SERVICE PERSONNEL: Individuals or entity accountable to the RESPONSIBLE ORGANIZATION for installing, assembling, maintaining, or repairing a POC MEDICAL DEVICE.

SERVICE PROVIDER: Participant that provides at least one SERVICE. A SERVICE PROVIDER can be hosted on the POC MEDICAL DEVICE itself or on an external appliance (e.g., converter box) or information technology (IT) system (e.g., aggregator).

SERVICE: Part of a software system in a SERVICE-ORIENTED MEDICAL DEVICE SYSTEM (SOMDS) that exposes functional capabilities on a communication backbone.

SERVICE-ORIENTED MEDICAL DEVICE SYSTEM (SOMDS): Instance of a distributed system that implements a service-oriented architecture composed of SERVICE PROVIDERS and SERVICE CONSUMERS as defined for IEEE Std 11073-10207.

TYPE: Complex or simple type definition as defined in eXtensible Markup Language Schema.

NOTE—See XML Schema [B8].

VIRTUAL MEDICAL DEVICE (VMD): Abstraction for a medical-related subsystem (e.g., hardware or even pure software) of a POC MEDICAL DEVICE.

3.2 Notational conventions

3.2.1 General

This standard defines a Participant Model and a Communication Model that comprises a Message Model, Service Model, and Discovery Model. Both the Participant Model and Communication Model can be extended using the mechanisms defined in the Extension Model.

Class diagrams, sequence diagrams, component diagrams, and state machine diagrams follow the Unified Modeling Language (UML) notation. Beyond UML diagrams, the following subclauses describe notational conventions used to describe and reference XML Schema types.

3.2.2 XML Schema namespaces

Annex A, Annex B, and Annex C include an XML Schema [B8] to describe an Extension Model, the object hierarchy, and ATTRIBUTES of an MDIB instance as well as a set of MESSAGE structures that is used to request MDIB objects. The MDIB object hierarchy and ATTRIBUTES are also known as the Participant Model. The set of MESSAGE structures is also known as the Message Model. All models possess dedicated XML namespaces (see XML Namespaces [B6]). These are defined in Table 1.

Table 1—Namespace mapping of Extension, Participant, and Message Models

Namespace prefix	URI	Model part
ext	http://standards.ieee.org/downloads/11073/11073-10207-2017/extension	Extension Model
pm	http://standards.ieee.org/downloads/11073/11073-10207-2017/participant	Participant Model
msg	http://standards.ieee.org/downloads/11073/11073-10207-2017/message	Message Model

This standard also uses the XML namespace prefix “xsd” to point to the XML Schema namespace specified in XML Schema [B8]:

`http://www.w3.org/2001/XMLSchema`

3.2.3 XML Schema referencing

References to TYPE or ELEMENT definitions of the XML Schema are made by using the corresponding QName (see XML Namespaces [B6]). To reference a nested TYPE definition, the QName is enhanced with a chain of QNames and unqualified ATTRIBUTE names, each separated by XPath delimiters (see XPath [B7]). Examples:

- pm:Handle points to the *Handle* TYPE defined in the Participant Model.
- msg:OperationInvokedReport/msg:ReportPart/@OperationTarget points to the ATTRIBUTE *OperationTarget* that is defined as part of the *ReportPart*, which is included in the *OperationInvokedReport*. Since the QName prefix is msg, the referenced TYPE refers to the Message Model.
- ./@ActivationDuration refers to an ATTRIBUTE within an arbitrary TYPE definition.

Throughout the XML Schema, a camel case notation is used:

- Every artifact begins with a capital letter (e.g., “Handle”)
- Names are separated by a capital letter (e.g., “ActivationState”)
- Abbreviations are denoted in camel case (e.g., “VmdDescriptor”)

3.2.4 XML Schema type description

Any XML Schema type that is defined in Annex A, Annex B, and Annex C, follows a certain layout. The subclause title corresponds to the type name. Beneath the title the XML Schema type is defined, which is in accordance to XML Schema either “element,” “attribute,” “simpleType,” or “complexType.” Every type is explained in more detail by a properties table (see Table 2).

Table 2—Description of XML Schema type properties

Property name	Description
Type	Type name, including inheritance information if applicable.
Children	List of child elements of the XML Schema type.
Used by	A list of elements and complex types in which the XML Schema type is used.
Attributes	List of attributes defined by the XML Schema type.
Documentation	General description of the data type.
Constraints	Special restrictions to contents, e.g., valid values for enumerations.
Properties	If given, the minimum and maximum occurrence of the XML Schema type.
Use	Usage: “opt” for optional, “req” for required.

Beyond those properties, element and complex type definitions include a picture that describes the structure of the data type graphically. An example is given in Figure 1. The box on the left side describes the data type name and its cardinality. Connected by a solid line are the super types in a yellow box, followed by the attributes and child elements. There are two kinds of boxes. Solid lined boxes are required data fields and dotted lined boxes are optional data fields. If a child element count has a particular range, this range is noted as a cardinality at the bottom right of the box. A plus sign at the right of a solid-lined or dotted box signalizes the existence of child element or attribute definitions that are not shown for sake of brevity.

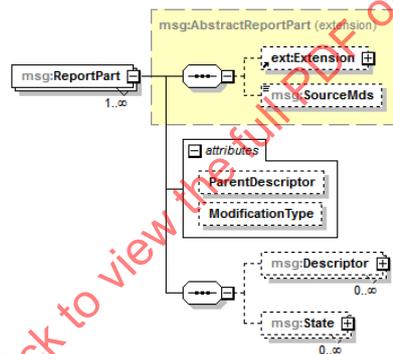


Figure 1—Example XML Schema element type structure

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4. Introduction to BICEPS

BICEPS comprises three major parts: a Participant Model, a Communication Model, a Discovery Model as well as nonfunctional requirements. Altogether, these parts are also known as BICEPS. Figure 2 illustrates a decomposition of BICEPS and brings them into logical relation. The diagram shows two perspectives: from the medical domain, known as “Domain Perspective,” and from the IT network, known as “Network Perspective.” The Domain Perspective deals with modeling of medical device systems from a domain point of view, whereas the Network Perspective deals with exchanging medical device information in an abstract communication backbone.

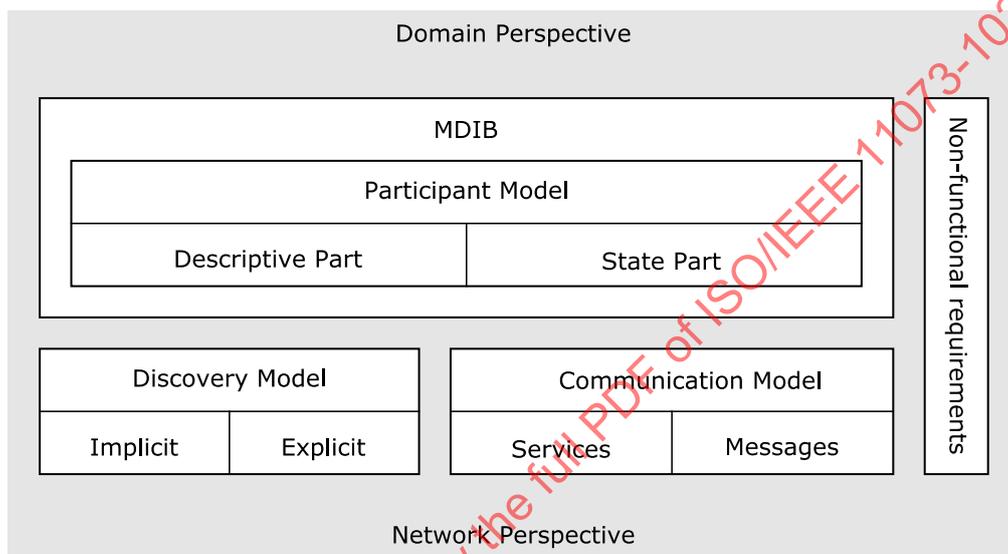


Figure 2—BICEPS component decomposition

The domain perspective pertains to the MDIB, which includes the Participant Model (see Clause 5). The Participant Model consists of a descriptive (mainly static) and a state part (volatile). By defining the MDIB, a SERVICE PROVIDER is able to define a virtual representation of its measurements, settings, alert systems, and contextual information. The Participant Model does not define a communication MESSAGE or ELEMENT for every possible kind of measurement data, setting data, contextual information or remote invocation command, but rather provides an extensibility mechanism that makes it possible for a PARTICIPANT to convey additional data in a MESSAGE or to transmit a completely new type of MESSAGE.

The Participant Model is closely related to the 11073 Domain Information Model (IEEE 11073-10201 DIM), but it is not an exact copy of it. As the Participant Model has been designed with the idea in mind to specify only the essential data structures and MESSAGES that are needed in a distributed system of medical devices in a POC ENVIRONMENT, only a subset of the packages of the IEEE 11073-10201 DIM are used to be included in the Participant Model. Those packages as well as those that have not been included into BICEPS are shown in Table 3. Whenever this specification reuses a term from IEEE 11073-10201, it is considered semantically the same, though described in another notation than, e.g., ASN.1.

Table 3—IEEE 11073-10201 DIM packages that are in scope and out of scope of BICEPS

IEEE 11073-10201 DIM packages	Covered by BICEPS?
Medical	yes
Alert	yes
Control	yes
System	yes
Patient	yes
Archival	yes
Extended Services	no
Communication	no

The network perspective pertains to the Communication Model (see Clause 7) and Discovery Model (see Clause 9). Both conflate into a SOMDS to provide service discovery, data exchange and remote control between PARTICIPANTS.

Access to the MDIB is established by using a set of SERVICE OPERATIONS. These operations can be used by SERVICE CONSUMERS to exchange MESSAGES with SERVICE PROVIDERS by either requesting them explicitly or subscribing to events that occur on a SERVICE PROVIDER side.

In order to support plug-and-play in a SOMDS, the SERVICES of a SERVICE PROVIDER have to be discovered by potential SERVICE CONSUMERS. The BICEPS Discovery Model defines two discovery modes:

- Explicit discovery
- Implicit discovery

Explicit discovery is based on search messages that are sent to a group of network nodes and that might contain matching criteria of what a SERVICE CONSUMER is interested in. Moreover, plug-and-play is only possible if a suitable data transport foundation is defined. The discovery elements in this standard shape the requirements to a transport layer, only.

In contrast to this, implicit discovery is based on messages that are communicated by a SERVICE PROVIDER when it enters or leaves the network or if something in its context has changed substantially.

BICEPS also defines a set of nonfunctional requirements that can be used to specify the SERVICE PROVIDER's requirements with regard to patient safety, cybersecurity, and clinical effectiveness as well as regulatory requirements (see Clause 10).

5. Participant Model

5.1 Overview

The scope of this clause is the definition of a model that allows the description of the capabilities as well as the expression of the current state of a POC MEDICAL DEVICE, which acts as a PARTICIPANT in a SOMDS. The complete model is defined in Annex B.

5.2 Background

5.2.1 General

BICEPS makes use of the MDIB concept as defined in IEEE 11073-10201 (Clause 6). The MDIB represents a structured collection of instances of managed medical objects representing, e.g., the vital signs information provided by a particular medical device. BICEPS defines the MDIB as a twofold database: the descriptive part and the state part (see Figure 3). The descriptive part comprises a hierarchy of descriptors to establish relationships between managed medical objects. Moreover, it includes the mostly static attributes that are expressed by a POC MEDICAL DEVICE. The state part is the dynamic counterpart of the descriptive part in the MDIB hierarchy. It includes volatile information (like observed measurement values) in form of a flat list of elements corresponding to the objects in the description.

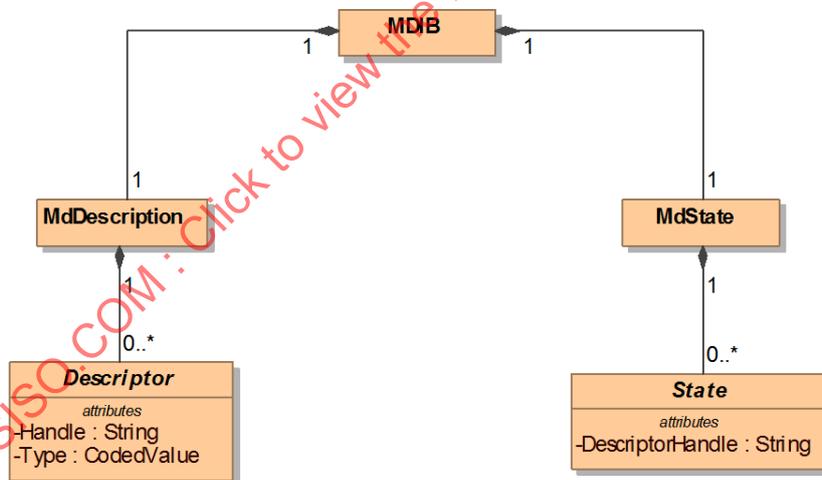


Figure 3—Descriptive and state part of the MDIB
(Every descriptor is referenced by DescriptorHandle in State.)

5.2.2 Handle

Any pm:AbstractDescriptor or pm:AbstractState that is included in an MDIB instance, is identifiable by a HANDLE (also see pm:Handle) or reference to an object with a HANDLE (see pm:HandleRef). It allows for explicit identification.

R0007: All HANDLEs SHALL be unique within one MDIB sequence of a SERVICE PROVIDER.

NOTE—The MDIB sequence is defined in 5.2.5.6.

R0105: A HANDLE SHALL consist of characters that match only valid Unicode codes greater than U+0020, except for U+FFFD (replacement character).

R0098: If a SERVICE PROVIDER removes and reinserts a CONTAINMENT TREE ENTRY from / into the CONTAINMENT TREE within one MDIB sequence, and the CONTAINMENT TREE ENTRY has the same HANDLE, it SHALL be of the same XML Schema datatype.

R0137: A SERVICE PROVIDER SHALL NOT change the HANDLE of a CONTAINMENT TREE ENTRY within one MDIB sequence.

R0138: If a SERVICE PROVIDER removes a CONTAINMENT TREE ENTRY from the CONTAINMENT TREE and reinserts the same CONTAINMENT TREE ENTRY into the CONTAINMENT TREE within one MDIB sequence, the CONTAINMENT TREE ENTRY SHALL have the same handle.

NOTE—From R0098 it follows that a CONTAINMENT TREE ENTRY that disappears and appears again can change any of its ATTRIBUTES and ELEMENTs except for the XML Schema datatype.

R0099: If a SERVICE PROVIDER removes and reinserts the same CONTAINMENT TREE ENTRY of an element in the CONTAINMENT TREE beyond one MDIB sequence, it SHOULD use the same HANDLE for that CONTAINMENT TREE ENTRY.

NOTE—R0099 implies that with a new MDIB sequence a handle might be assigned to another element in the CONTAINMENT TREE. Therefore, after an MDIB sequence has changed, a SERVICE CONSUMER cannot make any assumptions regarding the previous relation between a HANDLE and an element in the CONTAINMENT TREE.

R0102: If a SERVICE CONSUMER detects that an MDIB sequence has changed, it SHALL not combine current CONTAINMENT TREE information with prior CONTAINMENT TREE information based on the HANDLE.

NOTE—As stated in R0099, a SERVICE PROVIDER might have reassigned a HANDLE during an MDIB sequence change. Nevertheless, a SERVICE CONSUMER is allowed to combine the information with prior information based on other metadata. However, to make sure that no obsolete information is utilized, it is strongly encouraged to re-request the whole MDIB after a MDIB sequence change.

5.2.3 Coded value

A HANDLE does not convey any semantical information. To semantically describe objects within the MDIB, this standard introduces CODED VALUEs (see pm:CodedValue). A CODED VALUE consists of a CODING SYSTEM (see pm:CodedValue/@CodingSystem) and a CODE (see pm:CodedValue/@Code).

R0008: A SERVICE PROVIDER SHOULD use standardized values for CODE and CODING SYSTEM in order to specialize a CONTAINMENT TREE ENTRY if available.

R0128: A SERVICE PROVIDER SHOULD use the ISO/IEEE 11073-10101 and IEEE 11073-10101a-2015 nomenclature whenever there is an appropriate CODE available.

NOTE—The pm:CodedValue ELEMENT defines the ISO/IEEE 11073-10101 nomenclature as the default CODING SYSTEM.

5.2.4 Instance identifier

5.2.4.1 General

Instance identifiers are defined in `pm:InstanceIdentifier`. Every instance identifier is associated with a single object or entity within a given virtual or physical system and is constituted from a root and an extension. The root value references a system, in which the extension values are unique and valid.

5.2.4.2 Encoding of unknown elements

In situations where an extension is known, but the root is not known, the implied value of a nonexistent root is a null-flavor “unknown.”

R0135: A PARTICIPANT SHALL encode the instance identifier root by the URI “biceps.uri.unk” if and only if its value is unknown.

5.2.5 MDIB versioning

5.2.5.1 General

The MDIB provides various version ATTRIBUTES to allow detection of outdated data and to allow provision of a CONTAINMENT TREE history (accessible through the ARCHIVE SERVICE).

NOTE—An informative example for change tracking can be found in D.2.

5.2.5.2 Descriptor version

Any TYPE that is derived from `pm:AbstractDescriptor`, possesses the `pm:AbstractDescriptor/@DescriptorVersion` ATTRIBUTE. The following requirements describe in which cases a descriptor version change is applied.

R0033: A SERVICE PROVIDER SHALL increment `pm:AbstractDescriptor/@DescriptorVersion` by 1 if a direct child descriptor is added or deleted.

NOTE—From R0033 follows that adding or deleting of a descriptor only increments the descriptor version of its direct parent. The version increment does not propagate upwards to other ancestors in the CONTAINMENT TREE.

R0034: A SERVICE PROVIDER SHALL increment `pm:AbstractDescriptor/@DescriptorVersion` by 1 if the content of a child ELEMENT or an ATTRIBUTE of the descriptor have changed and if the child ELEMENT itself is not derived from `pm:AbstractDescriptor`.

NOTE 1—A child ELEMENT refers to the child in an XML document tree.

NOTE 2—`pm:AbstractDescriptor` is exempted from R0034 because every parent descriptor owns a dedicated descriptor version that is not meant to be affected by updates in any child descriptor. If `pm:AbstractDescriptor` would not be exempted from R0034, then any update of a child descriptor would propagate changes up to the root descriptor of the MDIB.

5.2.5.3 State version

Any TYPE that is derived from pm:AbstractState, possesses the pm:AbstractState/@StateVersion ATTRIBUTE. The following requirements describe in which cases a state version change is applied.

R0038: A SERVICE PROVIDER SHALL increment pm:AbstractState/@StateVersion by 1 if the content of a child ELEMENT or an ATTRIBUTE of the state has changed.

NOTE—A child ELEMENT refers to the child in an XML document tree.

5.2.5.4 MdDescription version

The descriptive part of the MDIB possesses the pm:MdDescription/@DescriptionVersion ATTRIBUTE.

R0043: A SERVICE PROVIDER SHALL increment pm:MdDescription/@DescriptionVersion every time any descendent descriptor of pm:MdDescription is added or removed, and every time pm:AbstractDescriptor/@DescriptorVersion of a descendent descriptor changes.

5.2.5.5 MdState version

The state part of the MDIB possesses the pm:MdState/@StateVersion ATTRIBUTE.

R0045: A SERVICE PROVIDER SHALL increment the pm:MdState/@StateVersion every time pm:AbstractState/@StateVersion of a descendent state in pm:MdState changes.

5.2.5.6 MDIB version

The MDIB version follows the concept of WS-Discovery's AppSequence ELEMENT (see 5.3 in WS-Discovery [B3]) and is described in pm:MdibVersionGroup. The sequence identifier defined in pm:MdibVersionGroup is used to discriminate different sequences of versions. In addition to that, the instance identifier can be used to establish an order between different sequences.

R0046: A SERVICE PROVIDER SHALL increment pm:MdibVersionGroup/@MdibVersion by 1 every time pm:MdDescription/@DescriptionVersion or pm:MdState/@StateVersion have changed.

NOTE—Devices that are not capable of maintaining the pm:MdibVersionGroup/@MdibVersion number can reset it after each power cycle.

R0047: If a SERVICE PROVIDER resets pm:MdibVersionGroup/@MdibVersion, all other pm:VersionCounter instances SHALL also be reset.

R0117: A SERVICE PROVIDER SHALL assign a new MDIB sequence identifier after it has reset pm:MdibVersionGroup/@MdibVersion.

NOTE 1—A new MDIB sequence identifier is defined as a unique identifier that has never been used before by a SERVICE PROVIDER.

NOTE 2—The MDIB sequence identifier and instance identifier are explained in pm:MdibVersionGroup.

5.3 Descriptive part

5.3.1 General

The descriptive part of the MDIB describes the capabilities a POC MEDICAL DEVICE possesses. Any TYPE that constitutes a part of the hierarchy in the MDIB, is derived from a descriptor TYPE (see pm:AbstractDescriptor). The descriptor concept facilitates interoperable communication between PARTICIPANTS by introducing typed device information based on standardized nomenclatures. A minimum set of descriptive ELEMENTs and ATTRIBUTEs is declared as mandatory to help ensure interoperability and compliance of medical issues. Derived descriptor TYPEs possess some optional ELEMENTs and ATTRIBUTEs, which are included to describe the system and its capabilities in more detail.

R0010: A SERVICE PROVIDER SHALL describe the information provisioning and remote control capabilities of its represented POC MEDICAL DEVICES using the pm:MdDescription structure.

NOTE—The set of MDS CONTAINMENT TREES in pm:MdDescription might be empty at a certain point in time. This is the case if, e.g., the SERVICE PROVIDER acts as an aggregator of POC MEDICAL DEVICES and none of the devices it manages are available at that point in time.

Figure 4 shows the general structure of a CONTAINMENT TREE as a UML class diagram. It visualizes the hierarchical relationship between the descriptors that are defined in this standard. SystemContext and AlertSystem include further child descriptors. For the sake of simplicity these children are omitted in Figure 4 and moved to Figure 5 and Figure 9.

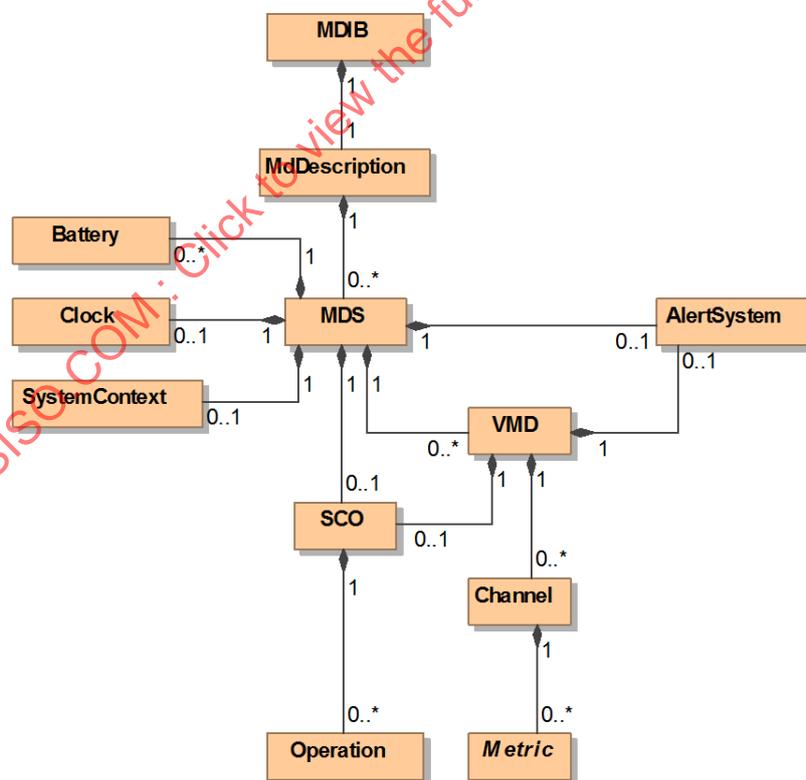


Figure 4—General BICEPS CONTAINMENT TREE overview

5.3.2 MDIB

The MDIB is the top level ELEMENT that includes the structural descriptor information. Beyond the structural descriptor information, the MDIB also includes corresponding states (omitted in Figure 4).

5.3.3 MdDescription

MdDescription is a container to group MDS descriptors, see pm:MdDescription.

5.3.4 MDS

A pm:MdDescription MAY possess zero or more pm:MdsDescriptor objects. The pm:MdsDescriptor object is depicted in Figure 3 as MDS.

NOTE—In contrast to ISO/IEEE 11073-10201, there exists no dedicated CompositeMDS. A CompositeMDS can be modeled by adding multiple MDSs to the MDIB. The compositional relationship between the MDS instances is maintained by the system context information of each MDS.

5.3.5 Clock

An MDS MAY support a clock object to provide timestamp and time synchronization information (see pm:MdsDescriptor/pm:Clock).

NOTE—In general, POC MEDICAL DEVICES will possess a clock object; otherwise, they will not be able to keep or provide time information.

5.3.6 Battery

An MDS MAY support zero or more battery objects to provide battery-related information (see pm:MdsDescriptor/pm:Battery).

5.3.7 SystemContext

A POC MEDICAL DEVICE MAY provide contextual information to let SERVICE CONSUMERS verify if a requested SERVICE PROVIDER share the same working context in terms of, e.g., a location or patient that the POC MEDICAL DEVICE is associated with. Figure 5 shows an overview of available contexts and their relationship.

NOTE—Except for the patient and location context, all context descriptors can be present multiple times. Thereby it is possible to represent, for example, different perspectives on a workflow (multiple descriptors), each of which can contain multiple workflow steps (multiple states). An example is one pm:WorkflowContextDescriptor with pm:WorkflowContextDescriptor/pm:Type representing a hospital stay with one pm:WorkflowContextState where pm:WorkflowContextState/pm:Category represents an emergency care procedure and one pm:WorkflowContextState where pm:WorkflowContextState/pm:Category represents an Surgical Procedure. In this example, the first pm:WorkflowContextState has a pm:WorkflowContextState/@ContextAssociation of “Dis” as this workflow state has been finished already and the later has a pm:WorkflowContextState/@ContextAssociation of “Assoc” as this workflow state is currently executed.

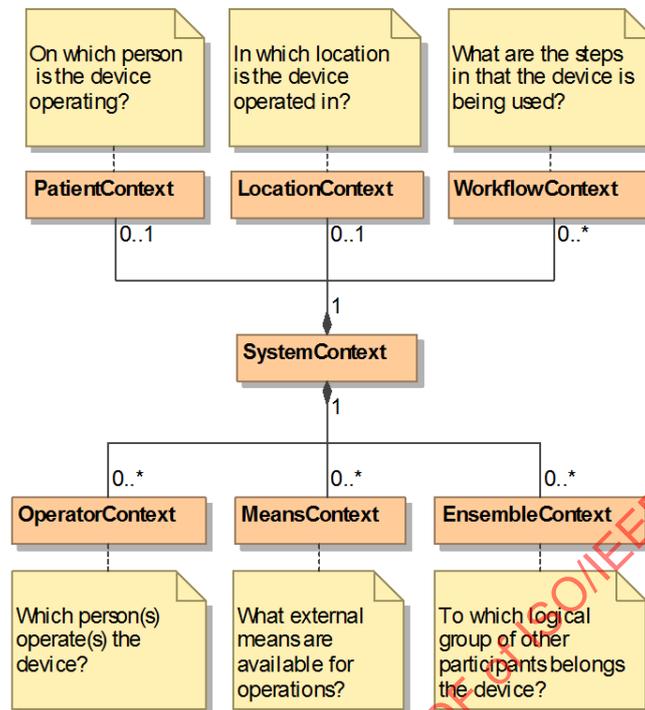


Figure 5—Contextual information that may be handled by a POC MEDICAL DEVICE

BICEPS defines six flavors of contextual information. For each contextual information a dedicated descriptor is included in pm: MdsDescriptor/pm: SystemContext:

- PatientContext (see pm:PatientContextDescriptor)
- LocationContext (see pm:LocationContextDescriptor)
- WorkflowContext (see pm:WorkflowContextDescriptor)
- OperatorContext (see pm:OperatorContextDescriptor)
- MeansContext (see pm:MeansContextDescriptor)
- EnsembleContext (see pm:EnsembleContextDescriptor)

R0013: A SERVICE PROVIDER SHALL NOT express a capability to handle a specific kind of contextual information if it is not able to validate the contextual information either directly or indirectly.

NOTE 1—A context is called being handled, if a POC MEDICAL DEVICE or SERVICE PROVIDER is capable of validating, that it is operated in the context provided by the information accessible in the MDIB. Validation of contextual information may afford operator interaction or may rely solely on information provided by the act of proposing the contextual information. Example: a surgeon (i.e., an operator) has to confirm patient data (provided in the MDIB by a patient context) on the graphical user interface of a POC MEDICAL DEVICE. Confirming the patient data can be considered as a kind of validation.

NOTE 2—As not all POC MEDICAL DEVICES are able to handle all kinds of contextual information, an MDS is able to express which kinds of contextual information can be handled by the POC MEDICAL DEVICE. If a SERVICE PROVIDER is capable of validating the contextual information without the POC MEDICAL DEVICE that the contextual information is related to, this is called direct validation. If the SERVICE PROVIDER utilizes the POC MEDICAL DEVICE for validating contextual information for that medical device, this is called indirect validation.

R0014: If a SERVICE PROVIDER or POC MEDICAL DEVICE is, e.g., capable of determining to which patient the POC MEDICAL DEVICE is currently connected to, this capability SHOULD be expressed in the MDS context with a pm:PatientContextDescriptor.

R0015: If a SERVICE PROVIDER or POC MEDICAL DEVICE is, e.g., capable of determining in which location the POC MEDICAL DEVICE is currently operated, this capability SHOULD be expressed in the MDS context with a pm:LocationContextDescriptor.

R0016: If a SERVICE PROVIDER or POC MEDICAL DEVICE is, e.g., capable of determining in which clinical workflow the POC MEDICAL DEVICE is currently participating, this capability SHOULD be expressed in the MDS context with a pm:WorkflowContextDescriptor.

R0017: If a SERVICE PROVIDER or POC MEDICAL DEVICE is, e.g., capable of determining who is currently operating the POC MEDICAL DEVICE, this capability SHOULD be expressed in the MDS context with a pm:OperatorContextDescriptor.

R0018: If a SERVICE PROVIDER or POC MEDICAL DEVICE is, e.g., capable of determining which virtual or physical means the POC MEDICAL DEVICE is using, this capability SHOULD be expressed in the MDS context with a pm:MeansContextDescriptor.

NOTE—An example for a virtual means is a license from a pool of licenses. An example for a physical means could be a docking station that the POC MEDICAL DEVICE is connected to.

R0019: If a SERVICE PROVIDER or POC MEDICAL DEVICE is, e.g., capable of determining in which logical group the POC MEDICAL DEVICE is currently operated, this capability SHOULD be expressed in the MDS context with a pm:EnsembleContextDescriptor.

NOTE—A logical group is, e.g., a temporal group based on a treatment session or spatial group that is not affixed to one location.

R0106: Any context descriptor SHALL NOT be removed from or added to the MDIB during runtime, except if the hosting MDS is removed or added to the MDIB.

NOTE 1—The existence of context descriptors defines whether a SERVICE PROVIDER supports processing a particular kind of contexts. Either a SERVICE PROVIDER is able to process a kind of context or it is not. Therefore, it makes no sense to remove or add context descriptors during runtime, except in the case when a whole MDS is removed or added to the MDIB.

NOTE 2—By not allowing context descriptors to appear or disappear during runtime, an implementation can make assumptions on the availability of contexts. This can ease implementation.

5.3.8 SCO

A POC MEDICAL DEVICE allows SERVICE CONSUMERS to request remote control commands by means of the service control object (SCO). The SCO MAY possess a set of operations that the SERVICE PROVIDER offers to SERVICE CONSUMERS to allow modification of MDIB objects. The class diagram of remote control commands is given in 5.3.9.

5.3.9 Operation

The SCO includes zero or more operations. The underlying Operation types are depicted in Figure 6, whereby

- Operation is the base type, defined in pm:AbstractOperationDescriptor
- SetValue is defined in pm:SetValueOperationDescriptor
- SetString is defined in see pm:SetStringOperationDescriptor

- Activate is defined in pm:ActivateOperationDescriptor
- SetContextState is defined in see pm: SetContextStateOperationDescriptor
- SetMetricState is defined in pm:SetMetricStateOperationDescriptor
- SetComponentState is defined in see pm:SetComponentStateOperationDescriptor
- SetAlertState is defined in see pm:SetAlertStateOperationDescriptor

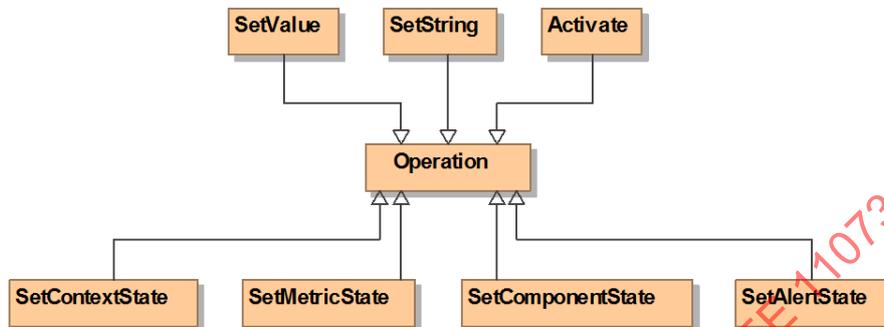


Figure 6—Operation specializations used to remote control a POC MEDICAL DEVICE

R0011: A SERVICE PROVIDER SHOULD describe all offered remote invocation capabilities using the pm:SCODescriptor structure in pm:MdsDescriptor/pm:SCO.

5.3.10 VMD

As defined in ISO/IEEE 11073-10201, the VMD is an abstraction for a medical-related subsystem (e.g., hardware or even pure software) of a POC MEDICAL DEVICE (see pm:VmdDescriptor). The VMD MAY capture zero or more pm:ChannelDescriptor objects.

NOTE—As defined by the XML Schema, BICEPS allows a fixed CONTAINMENT TREE only, i.e., an MDIB always provides a fixed MDS to VMD to channel structure. Metrics can only be appended in channels.

5.3.11 Channel

Channel is defined in pm:ChannelDescriptor and is used to group metric objects. A channel MAY contain zero or more pm:AbstractMetricDescriptor objects.

NOTE—Since only channels are able to possess metrics, at least one channel is required to include metrics in the MDIB. This is in contrast to ISO/IEEE 11073-10201, in which the “Channel object is not mandatory for representation of Metric objects in a VMD.”

5.3.12 Metric

5.3.12.1 General

Metric is a generalized type for all objects representing direct and derived biosignal measurements and settings. The set of Metric types is illustrated in Figure 7, whereby

- Metric is the base type, defined in pm:AbstractMetricDescriptor
- StringMetric is defined in pm:StringMetricDescriptor

- EnumMetric is a subtype of StringMetric and defined in pm:EnumStringMetricDescriptor
- NumericMetric is defined in pm:NumericMetricDescriptor
- RealTimeSampleArrayMetric is defined in pm:RealTimeSampleArrayMetricDescriptor

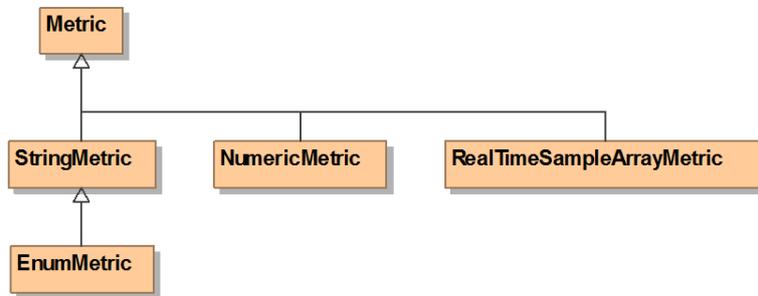


Figure 7—Metric specializations used to constitute biosignal measurements and settings

5.3.12.2 Time-related attributes

Metric values come with different time-related ATTRIBUTES to derive different temporal relationships between sequences of measurement. In Figure 8, vertical lines that are connected with horizontal lines, illustrate time periods. Single vertical lines illustrate points in time. DeterminationPeriod is the maximum time distance between two consecutive measured metric values (expressed by time points t and $t+1$, with $t < t+1$). In between DeterminationPeriod, there are time points and periods that designate specific parts of the determination process. A normative outline is given in Annex B:

- pm:AbstractMetricDescriptor/@DeterminationPeriod
- pm:AbstractMetricValue/@StartTime
- pm:AbstractMetricValue/@StopTime
- pm:AbstractMetricValue/@DeterminationTime
- pm:AbstractMetricDescriptor/@MaxMeasurementTime
- pm:AbstractMetricDescriptor/@MaxDelayTime

Beyond those ATTRIBUTES, pm:AbstractMetricState/@ActiveDeterminationPeriod designates a temporary or more-frequent changing determination period. The pm:AbstractMetricState/@ActiveDeterminationPeriod ATTRIBUTE overrides the pm:AbstractMetricDescriptor/@DeterminationPeriod period.

LifeTimePeriod is defined in pm:AbstractMetricDescriptor/@LifeTimePeriod. It designates the time period until a measured metric value is not usable anymore and can be overwritten by pm:AbstractMetricState/@LifeTimePeriod.

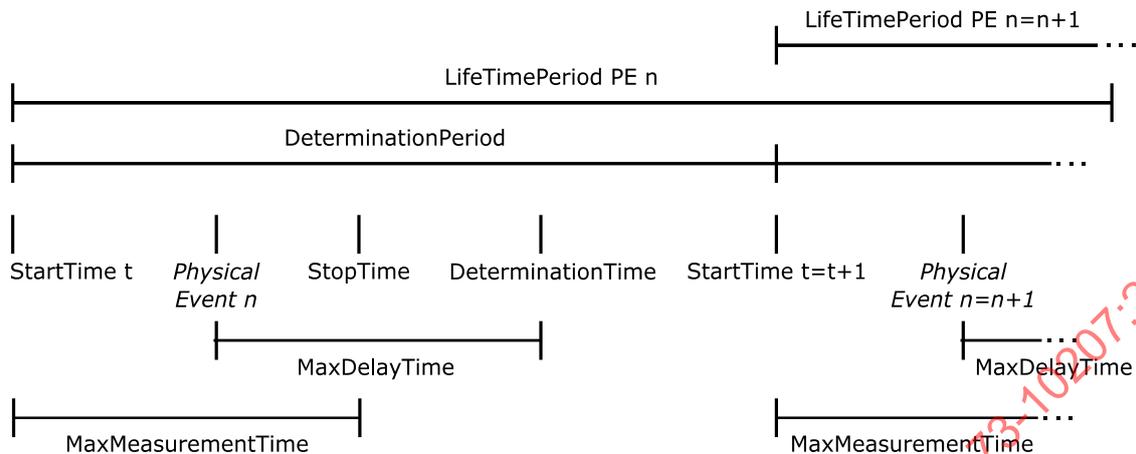


Figure 8—Logical relationship between time points and time periods provided by METRICs
(PE refers to “Physical Event.”)

5.3.12.3 Detect obsolete metric values

A SERVICE CONSUMER MAY check if a METRIC value is outdated based on pm:AbstractMetricDescriptor/@DeterminationPeriod and msg:Retrievability/@UpdatePeriod. Table 4 illustrates in which relation of pm:AbstractMetricDescriptor/pm:Availability and msg:Retrievability the determination period and update period can be used to determine if a METRIC value is outdated.

NOTE—It is not sensible for a SERVICE CONSUMER to use LifeTimePeriod to determine if a METRIC value update has not been received. LifeTimePeriod is used only to determine if a METRIC is not useful anymore in terms of the physiological measure (also see pm:AbstractMetricDescriptor/@LifeTimePeriod).

Table 4—Metric availability and retrievability matrix to detect outdated METRICs

Retrievability	Availability	
	Continuous	Intermittent
Periodic	The full set of all periodic METRICs is sent via msg:PeriodicMetricReport, based on msg:Retrievability/@UpdatePeriod.	The full set of all periodic METRICs is sent via msg:PeriodicMetricReport, based on msg:Retrievability/@UpdatePeriod.
Episodic	A METRIC update is expected every time its determination period ends. The update is receivable by msg:EpisodicMetricReport.	The determination period is not an indicator for expected updates. It is up to the SERVICE CONSUMER how to react on unexpectedly missing METRIC updates.

5.3.13 AlertSystem

MDS and VMD objects MAY include an alert system, which in turn detects alert conditions and generates alert signals. Figure 9 shows the relation of alert systems, alert conditions and alert signals, whereby

- AlertSystem is defined in pm:AlertSystemDescriptor
- AlertCondition is defined in pm:AlertConditionDescriptor
- LimitAlertCondition is a subtype of AlertCondition and defined in pm:LimitAlertConditionDescriptor
- AlertSignal is defined in pm:AlertSignalDescriptor

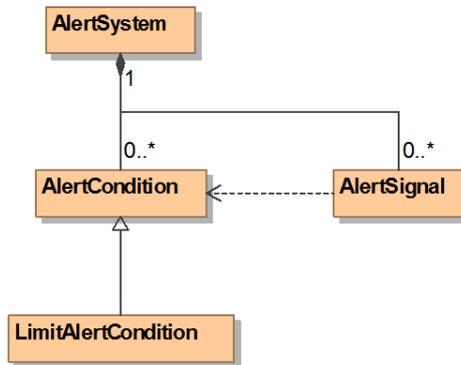


Figure 9—Alert system entities and their relationships

5.4 State part

5.4.1 General

The state part of the MDIB describes the current state of a POC MEDICAL DEVICE at a given point in time. Any TYPE that constitutes such volatile information is derived from a common state TYPE (see pm:AbstractState).

R0021: A SERVICE PROVIDER SHALL describe the state of a POC MEDICAL DEVICE at a given point in time using the pm:MdState structure.

5.4.2 Mapping between descriptor and state

R0023: For each state in pm:MdState a SERVICE PROVIDER SHALL provide a descriptor in pm:MdDescription. Every state in pm:MdState SHALL reference its descriptor by using the pm:AbstractState/@DescriptorHandle ATTRIBUTE.

In general, every concrete descriptor/state pair matches the following naming scheme to establish a relationship: [Object Name]State is related to [Object Name]Descriptor. Examples:

- pm:NumericMetricState is related to pm:NumericMetricDescriptor.
- pm:ChannelState is related to pm:ChannelDescriptor.
- pm:PatientContextState is related to pm:PatientContextDescriptor.

5.4.3 Single state vs. multi-state

Descriptors are allowed to possess either exactly one state (i.e., a single state, see pm:AbstractState), or zero or more states. In the latter case, a state is called a multi-state (see pm:AbstractMultiState). Figure 10 depicts the single state relationship at the top and the multi-state relationship the bottom of the image. It also shows that multi-states are a specialization of single states.

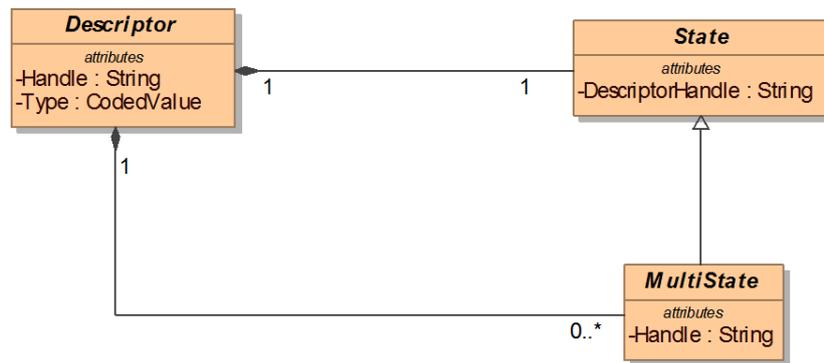


Figure 10—Relationship between descriptors, states, and multi-states

R0097: Any state that is derived from pm:AbstractMultiState SHALL possess a HANDLE that uniquely identifies the state.

NOTE 1—This is equivalent to descriptors, whereby descriptor and state HANDLES are disjunctive due to R0007.

NOTE 2—BICEPS introduces context states as the only multi-states (see pm:AbstractContextState).

NOTE 3—Single states need no HANDLE because they are uniquely identifiable by their corresponding descriptor (see pm:AbstractState/@DescriptorHandle).

5.4.4 Context state

R0125: A SERVICE PROVIDER SHALL use pm:AbstractContextState/@ContextAssociation to announce which context state it is currently associated with.

R0124: A SERVICE PROVIDER SHALL be associated with a maximum of one patient context state of a particular patient context descriptor at a time.

R0133: A SERVICE PROVIDER SHALL be associated with a maximum of one location context state of a particular location context descriptor at a time.

NOTE—This allows a SERVICE PROVIDER to be associated with multiple workflow steps, ensembles, means or operators. In contrast, a device can only be in one location and associated with only one patient.

5.4.5 BindingMdibVersion and UnbindingMdibVersion

Context states enclose the ATTRIBUTES pm:AbstractContextState/@BindingMdibVersion and pm:AbstractContextState/@UnbindingMdibVersion, which provide version information on when a context state was associated and disassociated (see pm:AbstractContextState). These referenced version numbers SHOULD be used to gain contextual information of any other states in the MDIB by comparing pm:AbstractContextState/@BindingMdibVersion and pm:AbstractContextState/@UnbindingMdibVersion.

A state S can be considered as bounded to a specific context state CS, if

$$\text{BindingMdibVersion}(\text{CS}) \leq \text{MdibVersion}(\text{S}) < \text{UnbindingMdibVersion}(\text{CS})$$

5.4.6 Device component and metric activation

DEVICE COMPONENTs and METRICs come with an activation state (see pm:ComponentActivation) to describe the current operating status of a CONTAINMENT TREE ENTRY within the MDIB. Figure 11 illustrates the finite state machine that SHOULD be adopted for pm:ComponentActivation. This state machine is only a recommendation of how transitions between states can be modeled.

NOTE—Devices can decide to not provide every state of pm:ComponentActivation and will therefore support only a subset of the finite state machine given in Figure 11.

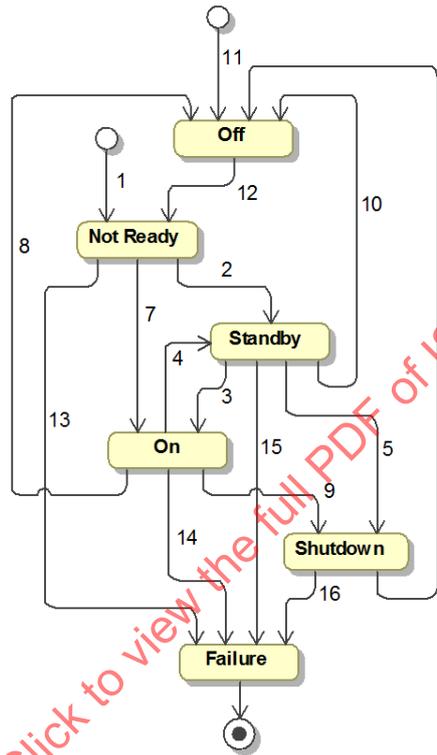


Figure 11—Finite state machine of pm:ComponentActivation

The following semantics are applied to the transition numbers in Figure 11: the DEVICE COMPONENT or METRIC

- 1) Is made available, but needs initialization.
- 2) Has completed initialization and does not operate at the moment.
- 3) Has been activated and is operating now.
- 4) Does not operate, but is available for operation.
- 5) Is intended to be unavailable for operation and needs a shutdown phase.
- 6) Has been made unavailable for operation.
- 7) Has completed initialization and is operating.
- 8) Has been made unavailable for operation.
- 9) Is intended to be unavailable for operation and needs a shutdown phase.
- 10) Has been made unavailable for operation.
- 11) Is intended to be unavailable for its intended use, e.g., turned off or not plugged in.
- 12) Is made available, but needs initialization.
- 13) Has detected a failure during initialization.
- 14) Has detected a failure during operation.

- 15) Has detected a failure during standby.
- 16) Has detected a failure during shutdown.

NOTE—A shutdown phase could be for example a monitoring device that is about to be turned off, but still exposes its SERVICES on the network.

R0025: If pm:AbstractDeviceComponentState/@ActivationState is intended to be switched to “Off,” then every activation state of the component’s children SHALL be made inactive in advance. Inactive means that any pm:AbstractDeviceComponentState/@ActivationState is “Off,” any pm:AbstractAlertState/@ActivationState is “Off,” and any pm:AbstractOperationState/@OperationMode is “NA” (not available).

NOTE—From this it follows that any child component cannot be activated if a parent component is in state “Off”.

R0110: A pm:ComponentActivation MAY start in another state than the initial ones defined in Figure 11.

NOTE—This depends on which state is observed by a SERVICE PROVIDER the first time it builds the MDIB.

R0131: If a component is recovered from a failure, its activation state is REQUIRED to start in an initial state as depicted in Figure 11.

R0132: If a component is recovered from a failure, the MDIB is REQUIRED to have a new MDIB sequence identifier assigned.

5.4.7 Metric activation state

Some METRIC categories (pm:AbstractMetricDescriptor/pm:MetricCategory) enclose a specific interpretation of the pm:ComponentActivation states and SHALL be applied according to Table 5, Table 6, and Table 7.

NOTE—METRIC categories that are not listed in Table 5, Table 6, and Table 7 are not affected by special interpretation. In that case the description in pm:ComponentActivation applies.

Table 5—Component activation of measurement METRICs

pm:AbstractMetricDescriptor/pm:MetricCategory equals “Msrmt”	
pm:AbstractMetricDescriptor/ pm:ActivationState is	Interpretation
On	The measurement is performed according to pm:AbstractMetricDescriptor/@DeterminationPeriod.
NotRdy	The measurement is currently initializing. As no measurement is performed during that phase, there is no determined value available.
StndBy	The measurement has been initialized, but is not being performed. Examples: the whole MDS is in standby mode or the current configuration, e.g., ventilation mode, does not include the determination of the measurement. As no measurement is performed during that phase, there is no new determined value available, but the last determined value could be present.
Shtdn	The measurement is currently de-initializing. As no measurement is performed during that phase, there is no determined value available.
Off	The measurement is not performed and is de-initialized. As no measurement is performed during that phase, there is no determined value available.
Fail	The measurement sensor has failed. As no measurement can be performed during that phase, there is no determined value available.

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Table 6—Component activation of setting METRICS

pm:AbstractMetricDescriptor/pm:MetricCategory equals “Set”	
pm:AbstractMetricDescriptor/ pm:ActivationState is	Interpretation
On	The setting is applied and according to pm:AbstractMetricDescriptor/@DeterminationPeriod reapplied.
NotRdy	The setting is currently initializing. As the setting is not applied during that phase, there is no value available.
StndBy	The setting has been initialized, but it is not being applied. Examples: the whole MDS is in standby mode or the current configuration does not include the application of the setting. If the setting has been initialized, there is a value that is applied if the encompassing METRIC is activated.
Shtdn	The setting is currently de-initializing. As the setting is not applied during that phase, there is not value available.
Off	The setting is not applied and is de-initialized. As the setting is not applied during that phase, there is no value available.
Fail	The setting cannot be applied due to a failure. As the setting cannot be applied during that phase, there is no value available.

Table 7—Component activation of calculation METRICS

pm:AbstractMetricDescriptor/pm:MetricCategory equals “Clc”	
pm:AbstractMetricDescriptor/ pm:ActivationState is	Interpretation
On	The calculation is performed according to pm:AbstractMetricDescriptor/@DeterminationPeriod.
NotRdy	The calculation is currently initializing. As no calculation is performed during that phase, there is no determined value available.
StndBy	The calculation has been initialized, but is not being performed. Examples: the whole MDS is in standby mode or that the current configuration does not include the determination of the calculation. As no calculation is performed during that phase, there is no a new determined value available, but the last determined value could be present.
Shtdn	The calculation is currently de-initializing. As no calculation is performed during that phase, there is no determined value available.
Off	The calculation is not performed and is de-initialized. As no calculation is performed during that phase, there is no determined value available.
Fail	The calculation algorithm has failed. As no calculation can be performed during that phase, there is no determined value available.

5.4.8 SCO operation activation state

Any state that is derived from pm:AbstractOperationState, has a mandatory ATTRIBUTE pm:AbstractOperationState/@OperatingMode of TYPE pm:OperatingMode to control the accessibility of a service operation.

R0026: A SERVICE PROVIDER SHALL use pm:AbstractOperationState/@OperatingMode to enable or disable the accessibility of the referenced operation according to the description in pm:OperatingMode.

R0027: A SERVICE PROVIDER SHALL ensure that a disabled operation is not accessible for remote invocation.

R0028: A SERVICE PROVIDER MAY enable a referenced operation even if the activation state of the CONTAINMENT TREE ENTRY that is referenced by pm:AbstractOperationDescriptor/@OperationTarget, is indicating a nonoperating mode.

NOTE—R0028 is defined in accordance to R0025. From R0025 it follows that an operation is not necessarily not available even if the targeted object’s activation state is off.

5.4.9 Alert state

5.4.9.1 General

Alert related states (i.e., derived from pm:AbstractAlertState) provide an alert activation (see pm:AlertActivation) to define if an alert component is operating (“On”), paused (“Psd”) or not operating (“Off”).

R0116: The activation state of pm:AlertSystemState SHALL result in an activation state of pm:AlertConditionState and pm:AlertSignalState according to Table 8.

Table 8—Relationship between alert activation states
(Read as <left column> implies <right column>.)

pm:AlertSystemState/@ActivationState	pm:AlertConditionState/@ActivationState pm:AlertSignalState/@ActivationState
“Off”	- Condition activation is “off” - Signal activation is “off”
“On”	- Condition activation accepts any value - Signal activation accepts any value
“Psd”	- Condition activation is “Psd” - Signal activation is “Psd”

5.4.9.2 Alert condition presence

A pm:AlertConditionState/@Presence indicates that an alert condition is fulfilled (“true”) or not (“false”).

R0029: If pm:AlertConditionState/@Presence switches to “true,” a SERVICE PROVIDER SHALL ensure that the state’s ActivationState and the parent pm:AlertSystemState/@ActivationState ATTRIBUTES are “On.”

5.4.9.3 Present alarm conditions

The pm:AlertSystemState ELEMENT includes a list of HANDLE references to active physiological and technical alarm conditions.

R0113: If pm:AlertConditionState/@Presence is "true" for any physiological alarm condition or technical alarm condition, then the HANDLE of the corresponding ALERT CONDITION SHALL be added to pm:AlertSystemState/@PresentPhysiologicalAlarmConditions or pm:AlertSystemState/@PresentTechnicalAlarmConditions, respectively.

NOTE—Some SERVICE CONSUMER might not need to read and understand the details of the pm:AlertCondition-State element, but to only have an overview of all present alarm conditions. Hence, the physiological and technical alarm condition lists might be used as a shortcut to not read pm:AlertConditionState/@Presence of every single alert condition by those SERVICE CONSUMERS.

R0139: A change to pm:AlertConditionState/@Presence of an ALERT CONDITION SHALL always be delivered together with an ALERT SYSTEM state update within one msg:AbstractAlertReport MESSAGE.

NOTE—R0139 guarantees that the states tracked by a SERVICE CONSUMER are not going to be out of synchronization.

5.4.9.4 Valid alert attribute combinations

The alert signal generation is affected by many conditions and is strongly use-case dependent. Table 9 shows a list of valid combinations of alert activation states, ALERT CONDITION presence, and ALERT SIGNAL presence.

Table 9—Valid combinations of alert activation states, alert condition presence, and alert signal presence

ALERT SYSTEM ActivationState	ALERT CONDITION ActivationState	ALERT CONDITION Presence	ALERT SIGNAL ActivationState	ALERT SIGNAL Presence	Valid? (yes/no)
Off	any	any	any	any	yes
On	Off	any	any	any	yes
On	On	false	Off	Off	yes
On	On	false	Off	Latch	no
On	On	false	Off	Ack	no
On	On	false	Off	On	no
On	On	false	On	Off	yes
On	On	false	On	On	no
On	On	false	On	Latch	yes
On	On	false	On	Ack	no
On	On	false	Psd	On	no
On	On	false	Psd	Off	yes
On	On	false	Psd	Latch	no
On	On	false	Psd	Ack	no
On	On	true	Off	any	yes
On	On	true	On	Off	no ^a
On	On	true	On	On	yes
On	On	true	On	Latch	no ^b
On	On	true	On	Ack	yes
On	On	true	Psd	On	no
On	On	true	Psd	Off	yes
On	On	true	Psd	Latch	no
On	On	true	Psd	Ack	no
On	Psd	any	any	any	yes
Psd	any	any	any	any	yes

^a The combination is valid while the ALERT SIGNAL generation delay is not expired.

^b The combination is valid while the ALERT SIGNAL generation delay is not expired.

R0114: A SERVICE PROVIDER SHALL only produce combinations of pm:AlertSystemState/@ActivationState, pm:AlertConditionState/@ActivationState, pm:AlertSignalState/@ActivationState, pm:AlertConditionState/@Presence, and pm:AlertSignalState/@Presence that are valid according to Table 9.

NOTE 1—A description of the table entries is given in Table 10.

NOTE 2—For the sake of brevity, Table 9 only shows meaningful combinations. Combinations that do not create a meaningful behavior are valid but excluded from the table. Example: if ALERT SYSTEM ActivationState is “Off,” then any other field is allowed to be populated with any value without breaking validity. Nevertheless, it is not sensible to interpret those fields, since the whole ALERT SYSTEM is turned off.

Table 10—Description of table entries of Table 9

Table column entries	Description
On/Off/Psd/Latch/Ack/true/false	Values as defined in pm:AlertActivation, pm:AlertConditionState/@Presence, and pm:AlertSignalState/@Presence
any	Can be any value; no value is sensibly derivable.

Since pm:AlertSignalState/@Presence depends on pm:AlertSignalState/@ActivationState, pm:AlertSignalState/@ActivationState has a higher priority than pm:AlertSignalState/@Presence.

R0129: While pm:AlertConditionState/@ActivationState is “Off,” a SERVICE CONSUMER SHALL NOT interpret pm:AlertConditionState/@Presence.

R0115: While pm:AlertSignalState/@ActivationState is “Off,” a SERVICE CONSUMER SHALL NOT interpret pm:AlertSignalState/@Presence.

R0130: While pm:AlertSystemState/@ActivationState is “Off,” a SERVICE CONSUMER SHALL NOT interpret any properties of any child pm:AlertConditionState and pm:AlertSignalState.

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6. Alert signal delegation

6.1 General

As defined in Clause 3, ALERT SIGNAL DELEGATION is the capability of a POC MEDICAL DEVICE to let another PARTICIPANT generate a POC MEDICAL DEVICE's ALERT SIGNAL as primary ALERT SIGNAL in order to remotely indicate the presence of an ALERT CONDITION on the POC MEDICAL DEVICE. In other words: a POC MEDICAL DEVICE delegates its ALERT SIGNAL generation to another PARTICIPANT, e.g., to facilitate a silent workplace.

When a DELEGABLE ALERT SIGNAL is not properly confirmed by a generating PARTICIPANT, a local FALLBACK ALERT SIGNAL can be emitted from the POC MEDICAL DEVICE.

NOTE 1—A POC MEDICAL DEVICE might define multiple DELEGABLE ALERT SIGNALs for one ALERT CONDITION.

NOTE 2—A PARTICIPANT is generating an ALERT SIGNAL if the PARTICIPANT has the ALERT SIGNAL to be output to the environment, e.g., an audible ALERT SIGNAL might be perceivable.

NOTE 3—A PARTICIPANT is ready to generate an ALERT SIGNAL if the PARTICIPANT has the physical means to start/stop the outputting the ALERT SIGNAL and that the PARTICIPANT is in a mode that the ALERT SIGNAL will be started.

6.2 Delegable alert signals

6.2.1 Advertisement of a delegable alert signal

If a POC MEDICAL DEVICE supports ALERT SIGNAL DELEGATION, then for every ALERT SIGNAL that might be remotely generated the MDIB SHALL contain at least

- a) An ALERT SIGNAL, "AS," which is a DELEGABLE ALERT SIGNAL, where
 - 1) pm:AlertSignalDescriptor/@SignalDelegationSupported is set to "true."
 - 2) pm:AlertSignalState/@Location is set to "Rem."
- b) An SCO SetAlertState operation where
 - 1) pm:SetAlertStateOperationDescriptor/@OperationTarget references "AS."
 - 2) pm:SetAlertStateOperationDescriptor/@Type indicates an operation that allows a PARTICIPANT to provide information on the current state of remote generation of an ALERT SIGNAL to the POC MEDICAL DEVICE.
 - 3) pm:SetAlertStateOperationDescriptor/@ModifiableElement indicates that pm:AlertSignalState/@ActivationState, pm:AlertSignalState/@Presence, and pm:AlertSignalState/@ActualSignalGenerationDelay of "AS" can be modified.
 - 4) pm:SetAlertStateOperationDescriptor/@InvocationEffectiveTimeout is set to a maximum confirmation time "CT" and pm:SetAlertStateOperationDescriptor/@Retriggerable is set to "true."
 - 5) pm:ActivateOperationState/@OperatingMode is set to "En."

NOTE 1—The ALERT SIGNAL is needed to annunciate the delegated ALERT SIGNAL state to the POC MEDICAL DEVICE. On the one hand, this allows the POC MEDICAL DEVICE to check if a PARTICIPANT “P” remotely generates the ALERT SIGNAL. On the other hand, it allows other PARTICIPANTS to track the current remote generation state by only knowing the POC MEDICAL DEVICE, and without being aware of “P.” The current remote generation state can be resolved by using the OperationInvokedReport SERVICE OPERATION (see Table 12).

NOTE 2—The SCO SetAlertState operation is needed to allow a PARTICIPANT to claim control of a DELEGABLE ALERT SIGNAL. The SCO SetAlertState operation’s pm:ActivateOperationDescriptor/@Type is defined by other means, e.g., ISO/IEEE 11073-10101.

NOTE 3—Based on the risk management classification of the POC MEDICAL DEVICE the POC MEDICAL DEVICE might stipulate that a PARTICIPANT confirms the signal generation of a DELEGABLE ALERT SIGNAL periodically. The pm:SetAlertStateOperationDescriptor/@InvocationEffectiveTimeout ATTRIBUTE requests a PARTICIPANT to repeatedly reinvoked the SCO SetAlertState operation.

6.2.2 Generating a delegable alert signal

If a PARTICIPANT is ready to generate or is generating a DELEGABLE ALERT SIGNAL “AS,” then the PARTICIPANT SHALL set pm:AlertSignalState/@ActivationState of “AS” to “On” by using the corresponding SCO SetAlertState operation according to 6.2.1.

6.2.3 Consecutive generation trigger of a delegable alert signal

If a PARTICIPANT is ready to generate or is generating a DELEGABLE ALERT SIGNAL “AS,” then the PARTICIPANT SHALL set pm:AlertSignalState/@ActivationState of “AS” periodically in a period of at most “CT” according to 6.2.1.

NOTE—Subclause 6.2.3 prescribes a heartbeat trigger to ensure that a PARTICIPANT has not quit communication whilst it is ready to generate or is generating a DELEGABLE ALERT SIGNAL.

6.2.4 Invalid delegable alert signal generation

A PARTICIPANT SHALL NOT invoke an SCO SetAlertState operation to set the pm:AlertSignalState/@ActivationState of a DELEGABLE ALERT SIGNAL to “Off” or “Psd.”

NOTE—Instead, a PARTICIPANT can quit the announcement of being ready to generate of a DELEGABLE ALERT SIGNAL by waiting for the DELEGABLE ALERT SIGNAL confirmation timeout “CT” according to 6.2.1.

6.2.5 Exceeding the confirmation timeout

If a POC MEDICAL DEVICE did not receive any confirmation within “CT” (according to 6.2.1) after pm:AlertSignalState/@ActivationState of “AS” has been changed to “On” by a PARTICIPANT, then it SHALL set pm:AlertSignalState/@ActivationState to “Off.”

6.2.6 Mutual exclusion of participants

If a POC MEDICAL DEVICE receives requests from different PARTICIPANTS to set pm:AlertSignalState/@ActivationState of a DELEGABLE ALERT SIGNAL “AS” to “On” within one confirmation timeframe, then the POC MEDICAL DEVICE SHALL respond with an pm:InvocationState of “FinMod” for every PARTICIPANT that could not be served.

NOTE—This indicates that another PARTICIPANT is already ready to generate or is generating a DELEGABLE ALERT SIGNAL. Nevertheless, a PARTICIPANT that received a response with an pm:InvocationState of “FinMod” could still generate the DELEGABLE ALERT SIGNAL and remote control properties of the DELEGABLE ALERT SIGNAL (e.g., acknowledge or pause) if the POC MEDICAL DEVICE provides appropriate remote control mechanisms, according to the requirements and risk management of the POC MEDICAL DEVICE.

6.2.7 Avoiding superfluous SCO operation calls

If a PARTICIPANT sends a request to a POC MEDICAL DEVICE to set pm:AlertSignalState/@ActivationState of a DELEGABLE ALERT SIGNAL “AS” to “On” and receives an pm:InvocationState of “FinMod,” then the PARTICIPANT SHALL stop to send recurring requests to that POC MEDICAL DEVICE until “AS” is no longer being generated.

NOTE 1—A PARTICIPANT can check who is ready to generate or is generating a DELEGABLE ALERT SIGNAL by tracking the msg:OperationInvokedReport MESSAGES, and might retry to set the pm:AlertSignalState/@ActivationState as soon as the DELEGABLE ALERT SIGNAL is exempted from being generated.

NOTE 2—A POC MEDICAL DEVICE is advised to configure the signal generation delay between DELEGABLE ALERT SIGNALS and FALLBACK SIGNALS so that a seamless handover is possible. This is achieved by allowing enough time for a second PARTICIPANT to send a request to set the pm:AlertSignalState/@ActivationState to “On.” The maximum time for a handover might be limited by risk control measures.

6.2.8 Setting the signal generation delay and presence of a delegable alert signal

6.2.8.1 Being ready to generate a delegable alert signal

If a PARTICIPANT is ready to generate an ALERT SIGNAL for a DELEGABLE ALERT SIGNAL “AS” and the following conditions apply:

- a) pm:AlertSignalState/@Presence of AS is set to “Off.”
- b) pm:AlertSignalState/@ActualSignalGenerationDelay of “AS” is greater than the signal generation delay of the PARTICIPANT.

Then the PARTICIPANT SHALL set pm:AlertSignalState/@ActualSignalGenerationDelay of “AS” to its signal generation delay.

6.2.8.2 Generating a delegable alert signal

If a PARTICIPANT is generating an ALERT SIGNAL for a DELEGABLE ALERT SIGNAL “AS” and the pm:AlertSignalState/@Presence of “AS” is set to “Off,” then the PARTICIPANT SHALL set

- a) pm:AlertSignalState/@Presence of “AS” to “On.”
- b) pm:AlertSignalState/@ActualSignalGenerationDelay of “AS” to its signal generation delay.

6.2.8.3 Setting the presence of a delegable alert signal to latched or acknowledged

If a PARTICIPANT is ready to generate a DELEGABLE ALERT SIGNAL and contemplates setting the pm:AlertSignalState/@Presence to “Latch” or “Ack,” then the PARTICIPANT is REQUIRED to have pm:AlertSignalState/@Presence set to “On” before.

6.3 Fallback alert signals

6.3.1 Advertisement of a fallback alert signal

If a POC MEDICAL DEVICE supports ALERT SIGNAL DELEGATION with fallback, then the MDIB SHALL contain in addition to every DELEGABLE ALERT SIGNAL “AS” a FALLBACK ALERT SIGNAL with

- a) An pm:AlertSignalDescriptor where
 - 1) pm:AlertSignalDescriptor/@SignalDelegationSupported is set to "false."
 - 2) pm:AlertSignalDescriptor/@DefaultSignalGenerationDelay is equal or greater than pm:SetAlertStateOperationDescriptor/@InvocationEffectiveTimeout of “AS.”
 - 3) pm:AlertSignalDescriptor/@Manifestation is equal to the pm:AlertSignalDescriptor/@Manifestation of “AS.”
- b) An pm:AlertSignalState where pm:AlertSignalState/@Location is set to “Loc.”

6.3.2 System signal activation

A POC MEDICAL DEVICE SHALL set the pm:AlertSignalState/@ActivationState of a FALLBACK ALERT SIGNAL “FAS” to "Psd" if

- a) There exists a pm:SystemSignalActivation in the corresponding ALERT SYSTEM where
 - 1) pm:AlertSystemState/pm:SystemSignalActivation/@Manifestation is equal to the pm:AlertSignalDescriptor/@Manifestation of “FAS.”
 - 2) pm:AlertSystemState/pm:SystemSignalActivation/@State is not set to “Off.”
- b) The pm:AlertSignalState/@ActivationState of the corresponding DELEGABLE ALERT SIGNAL is set to “On.”

6.3.3 Setting the fallback alert signal when a delegable alert signal is deactivated

If for a DELEGABLE ALERT SIGNAL with fallback the pm:AlertSignalState/@ActivationState is not set to “On,” then the POC MEDICAL DEVICE MAY set the pm:AlertSignalState/@ActivationState of the FALLBACK ALERT SIGNAL to any value following the requirements defined for the pm:SystemSignalActivation of the corresponding ALERT SYSTEM where the ALERT SYSTEM’s pm:SystemSignalActivation/@Manifestation is equal to the DELEGABLE ALERT SIGNAL’s pm:AlertSignalDescriptor/@Manifestation.

7. Communication Model

7.1 General

A SERVICE CONSUMER uses SERVICE OPERATIONS to exchange MESSAGES with a SERVICE PROVIDER. This clause describes the SERVICES and set of MESSAGES used to request information provided by an MDIB, and to invoke remote control commands.

NOTE 1—IEEE 11073-10201 defines the CMDISE (Common Medical Device Information Service Element) that provides an interface for managing the object instances that are part of the MDIB. Analogous to the services of the CMDISE, this standard defines SERVICE OPERATIONS to request data from or to remotely control a POC MEDICAL DEVICE.

NOTE 2—The SERVICES provided by a SERVICE PROVIDER are not comparable to the SCO, which is provided by the MDIB. SERVICES are used to access the MDIB (e.g., GET SERVICE, SET SERVICE) whereas within the SCO operations can be defined to remote control the MDSs. The operations defined within the SCO can be accessed by a SERVICE CONSUMER by using the SET SERVICE and CONTEXT SERVICE, respectively.

7.2 Message exchange patterns

7.2.1 General

BICEPS makes use of three kinds of MESSAGE exchange patterns (MEPs) between SERVICE PROVIDERS and SERVICE CONSUMERS:

- Request-Response (RR)
- Publish-Subscribe (PS)
- Streaming (STRM)

7.2.2 Request-Response

A request-response MESSAGE exchange pattern is given if a SERVICE CONSUMER invokes a SERVICE OPERATION on a SERVICE PROVIDER. The SERVICE CONSUMER sends a request MESSAGE, which encloses input payload, to the SERVICE PROVIDER, and receives a response MESSAGE, which encloses output payload, from the SERVICE PROVIDER.

NOTE—In other words, the SERVICE CONSUMER pulls information from the SERVICE PROVIDER.

7.2.3 Publish-Subscribe

A publish-subscribe MESSAGE exchange pattern is given if a SERVICE PROVIDER uses a SERVICE OPERATION to transmit a MESSAGE to 0 or more SERVICE CONSUMERS on demand (event-based). The SERVICE PROVIDER sends a notification MESSAGE, which encloses event-related data, to the SERVICE CONSUMER(s). In contrast to request-response MESSAGE exchange, the SERVICE PROVIDER receives no response from the SERVICE CONSUMER(s).

NOTE—In other words, the SERVICE PROVIDER pushes information to SERVICE CONSUMER(s).

7.2.4 Streaming

A streaming MESSAGE exchange pattern is given if a SERVICE PROVIDER uses a SERVICE OPERATION to transmit MESSAGES to 0 or more SERVICE CONSUMERS continuously, i.e., data is delivered consecutively in short time periods with an unknown end.

7.3 Service Model

7.3.1 General

Figure 12 shows all SERVICES this standard defines to enable MDIB access and remote control. The SERVICE OPERATIONS are sorted according to functional SERVICE INTERFACE groups. The MESSAGES that are conveyed by the SERVICE OPERATIONS are described in 7.4.

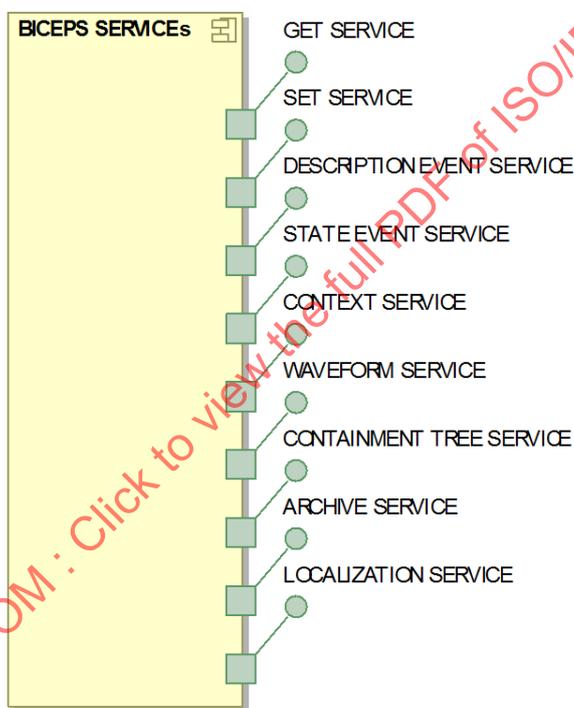


Figure 12—SERVICES defined to let SERVICE CONSUMERS gain access to the MDIB

7.3.2 GET SERVICE

The GET SERVICE defines an interface that allows a SERVICE CONSUMER to retrieve the description and state of an MDIB by using pull SERVICE OPERATIONS. Table 11 lists all SERVICE OPERATIONS of the GET SERVICE.

Table 11—List of SERVICE OPERATIONS exposed on the GET SERVICE

Operation name	MEP	Brief description
GetMdib	RR	Request the whole MDIB
GetMdDescription	RR	Request the descriptive part of the MDIB only
GetMdState	RR	Request the state part of the MDIB only

R0062: A SERVICE PROVIDER SHALL provide a GET SERVICE.

NOTE—The GET SERVICE is the only mandatory SERVICE.

R0121: GetMdibResponse and GetMdStateResponse SHALL NOT contain any pm:Abstract-ContextState ELEMENTS if confidential transmission of this MESSAGES is not established.

NOTE—The GET SERVICE is not necessarily secure, such that confidential information would be exposed to the network. Therefore, context information is only made available through the CONTEXT SERVICE, which has to be secured.

7.3.3 SET SERVICE

The SET SERVICE defines an interface that allows a SERVICE CONSUMER to change the state part of the MDIB, and is therefore a SERVICE to enable remote control of POC MEDICAL DEVICES. Table 12 lists all SERVICE OPERATIONS of the SET SERVICE.

Table 12—List of SERVICE OPERATIONS exposed on the SET SERVICE

Operation name	MEP	Brief description
SetValue	RR	Set the determined value of a numeric metric state (see pm:NumericMetricState/pm:MetricValue/@Value)
SetString	RR	Set the determined value of a string metric state (see pm:StringMetricState/pm:MetricValue/@Value)
Activate	RR	Perform an arbitrary activation on the MDIB
SetAlertState	RR	Set an pm:AbstractAlertState ELEMENT in the MDIB
SetComponentState	RR	Set an pm:AbstractDeviceComponentState ELEMENT in the MDIB
SetMetricState	RR	Set an pm:AbstractMetricState ELEMENT in the MDIB
OperationInvokedReport	PS	Receive information on the processing status of an invoked SERVICE OPERATION

R0068: A SERVICE PROVIDER MAY provide a SET SERVICE.

NOTE 1—If a SERVICE PROVIDER does not allow any SCO operations, it is eligible to omit the SET SERVICE in the SERVICE description.

NOTE 2—There is no special function to allow for atomic modification across multiple SET SERVICE OPERATION invocations. For example, if a SERVICE CONSUMER would like to set multiple settings at the same time, it is only able to do so by imitating an atomic procedure. This procedure has to be explicitly offered by a SERVICE PROVIDER by letting the SERVICE CONSUMER first modify a set of presettings⁹ and then confirm all presettings by a separated SET SERVICE OPERATION invocation. The presetting confirmation will apply all changes to the real settings.

⁹ A presetting is similar to a setting, but will not take any affect when set.

NOTE 3—The SET SERVICE allows the modification of the state part of the MDIB. States can only be modified, if there exist a corresponding pm:AbstractOperationDescriptor.

Remote control is established by invoking a single SERVICE OPERATION that is followed by subsequent progress reports (see msg:OperationInvokedReport). These progress reports underlie a state machine that forms an order on the different steps of a SET SERVICE OPERATION transaction (see 7.4.3).

Subclause D.5 introduces an exemplary MESSAGE flow of a SET SERVICE OPERATION transaction.

7.3.4 DESCRIPTION EVENT SERVICE

The DESCRIPTION EVENT SERVICE defines an interface that allows a SERVICE CONSUMER to listen for any pm:AbstractDescriptor element changes in an MDIB. Table 13 lists all SERVICE OPERATIONS of the DESCRIPTION EVENT SERVICE.

Table 13—List of SERVICE OPERATIONS exposed on the DESCRIPTION EVENT SERVICE

Operation name	MEP	Brief description
DescriptionModificationReport	PS	Receive information on any pm:AbstractDescriptor ELEMENT changes

R0104: A SERVICE PROVIDER MAY provide a DESCRIPTION EVENT SERVICE.

7.3.5 STATE EVENT SERVICE

The STATE EVENT SERVICE defines an interface that allows a SERVICE CONSUMER to listen for any pm:AbstractState element changes in an MDIB. Table 14 lists all SERVICE OPERATIONS of the DESCRIPTION EVENT SERVICE.

Table 14—List of SERVICE OPERATIONS exposed on the STATE EVENT SERVICE

Operation name	MEP	Brief description
EpisodicAlertReport / PeriodicAlertReport	PS	Receive information on any pm:AbstractAlertState ELEMENT changes
EpisodicComponentReport / PeriodicComponentReport	PS	Receive information on any pm:AbstractDeviceComponentState ELEMENT changes
EpisodicMetricReport / PeriodicMetricReport	PS	Receive information on any pm:AbstractMetricState ELEMENT changes
EpisodicOperationalStateReport / PeriodicOperationalStateReport	PS	Receive information on any pm:AbstractOperationState ELEMENT changes
SystemErrorReport	PS	Receive information on occurring system errors

R0064: A SERVICE PROVIDER MAY provide a STATE EVENT SERVICE.

7.3.6 CONTEXT SERVICE

The CONTEXT SERVICE defines an interface that allows a SERVICE CONSUMER to request pm:AbstractContextState ELEMENTs by pull or push SERVICE OPERATIONS. Table 15 lists all SERVICE OPERATIONS of the CONTEXT SERVICE.

Table 15—List of SERVICE OPERATIONS exposed on the CONTEXT SERVICE

Operation name	MEP	Brief description
GetContextStates	RR	Request pm:AbstractContextState ELEMENTs
SetContextState	RR	Set an pm:AbstractContextState ELEMENT in the MDIB
GetContextStatesByIdentification	RR	Retrieve specific context states by using instance identifiers
GetContextStatesByFilter	RR	Retrieve specific context states by using XPath filters
EpisodicContextReport / PeriodicContextReport	PS	Receive information on any pm:AbstractContextState ELEMENT changes

R0069: A SERVICE PROVIDER MAY provide a CONTEXT SERVICE.

R0120: Information that is transmitted through the CONTEXT SERVICE SHALL NOT be made available or disclosed to unauthorized PARTICIPANTS.

NOTE—In accordance to R0083, suitable authorization mechanisms are available through a BICEPS BINDING.

7.3.7 WAVEFORM SERVICE

The WAVEFORM SERVICE defines an interface that allows a SERVICE CONSUMER to listen for any real time sample array metrics (see pm:RealTimeSampleArrayMetricDescriptor) in an MDIB. Table 16 lists all SERVICE OPERATIONS of the DESCRIPTION EVENT SERVICE.

Table 16—List of SERVICE OPERATIONS exposed on the WAVEFORM SERVICE

Operation name	MEP	Brief description
WaveformStream	STRM	A stream source that delivers pm:RealTimeSample-ArrayState ELEMENTs as defined in 7.2.4
ObservedValueStream	STRM	A stream source that delivers pm:SampleArrayValue ELEMENTs as defined in 7.2.4

R0066: A SERVICE PROVIDER MAY provide a WAVEFORM SERVICE.

7.3.8 CONTAINMENT TREE SERVICE

The CONTAINMENT TREE SERVICE defines an interface that allows a SERVICE CONSUMER to navigate through the CONTAINMENT TREE of an MDIB and request specific pm:AbstractDescriptor ELEMENTs. Table 17 lists all SERVICE OPERATIONS of the CONTAINMENT TREE SERVICE.

Table 17—List of SERVICE OPERATIONS exposed on the CONTAINMENT TREE SERVICE

Operation name	MEP	Brief description
GetContainmentTree	RR	Request CONTAINMENT TREE entries
GetDescriptor	RR	Request specific pm:AbstractDescriptor ELEMENTs referenced by GetContainmentTree results

R0119: A SERVICE PROVIDER MAY provide a CONTAINMENT TREE SERVICE.

7.3.9 ARCHIVE SERVICE

The ARCHIVE SERVICE defines an interface that allows a SERVICE CONSUMER to retrieve historical data of an MDIB. Table 18 lists all SERVICE OPERATIONS of the ARCHIVE SERVICE.

Table 18—List of SERVICE OPERATIONS exposed on the ARCHIVE SERVICE

Operation name	MEP	Brief description
GetDescriptorsFromArchive	RR	Request historical pm:AbstractDescriptor ELEMENTs
GetStatesFromArchive	RR	Request historical pm:AbstractState ELEMENTs

R0100: A SERVICE PROVIDER MAY provide the ARCHIVE SERVICE.

R0122: A SERVICE PROVIDER MAY decide to exclude context information from historical data that is acquired through the ARCHIVE SERVICE, if the SERVICE CONSUMER is not authorized appropriately.

NOTE—In accordance to R0083, suitable authorization mechanisms are available through a BICEPS BINDING.

7.3.10 LOCALIZATION SERVICE

The LOCALIZATION SERVICE defines an interface that allows a SERVICE CONSUMER to retrieve human-readable texts in different languages from a translation table. Table 19 lists all SERVICE OPERATIONS of the LOCALIZATION SERVICE.

Table 19—List of SERVICE OPERATIONS exposed on the LOCALIZATION SERVICE

Operation name	MEP	Brief description
GetLocalizedText	RR	Receive localized texts according to given filter
GetSupportedLanguages	RR	Receive a list of all supported languages

R0101: A SERVICE PROVIDER MAY provide a LOCALIZATION SERVICE.

NOTE—The LOCALIZATION SERVICE is intended to be used if an MDIB hosts a lot of human-readable texts that would inflate SERVICE response and notification MESSAGE sizes. However, a SERVICE PROVIDER is allowed to expose any human-readable text in the MDIB by using the pm:LocalizedText ELEMENT.

7.4 Message Model

7.4.1 General

BICEPS defines a set of MESSAGES that is exchanged through SERVICE OPERATIONS defined in 7.3. To identify the relationship between a SERVICE OPERATION and its MESSAGES, BICEPS follows a simple naming convention. Let a SERVICE OPERATION name be X. If X is a pull operation, the request MESSAGE is named msg:X, and the response MESSAGE is named msg:XResponse. If X is a push operation, the notification MESSAGE is named msg:XReport. Furthermore, if the notification MESSAGE X can be pushed episodically or periodically, the MESSAGE names are msg:EpisodicXReport and msg:PeriodicXReport respectively. If X is a streaming operation, no special suffix is added.

Examples:

- The request MESSAGE of the pull SERVICE OPERATION “GetMdib” is msg:GetMdib.
- The response MESSAGE of the pull SERVICE OPERATION “GetMdib” is msg:GetMdibResponse.
- The notification of the push SERVICE OPERATION PeriodicMetricReport is msg:PeriodicMetricReport.
- The waveform stream message is msg:WaveformStream.

The normative outline of the Message Model is defined in Annex C.

7.4.2 Additional requirements

The following requirements constitute additional constraints on the MESSAGES defined in Annex C.

R0055: A SERVICE PROVIDER SHALL include the parent descriptor handle in msg:DescriptionModificationReport/msg:ReportPart/@ParentDescriptor for any pm:AbstractDescriptor that is not derived from pm:AbstractMdsDescriptor, if msg:DescriptionModificationReport/msg:ReportPart/@ModificationType is “Crt” (Created).

NOTE—R0055 expresses that a parent handle has to be given when a descriptor is inserted into the MDIB. This allows the identification of where to insert the descriptor within the CONTAINMENT TREE.

R0056: A SERVICE CONSUMER SHALL subscribe to msg:OperationInvokedReport MESSAGES before invoking request-response SERVICE OPERATIONS of the SET SERVICE.

R0057: A SERVICE PROVIDER SHOULD reject an incoming request-response SERVICE OPERATION call on the SET SERVICE if the SERVICE CONSUMER has not subscribed to msg:OperationInvokedReport MESSAGES in advance.

R0103: A SERVICE CONSUMER SHALL subscribe to any state reports of the STATE EVENT SERVICE that it is intending to modify with a SERVICE OPERATION of the SET SERVICE, in order to receive appropriate state updates.

R0058: A SERVICE PROVIDER MAY reject a SET SERVICE request if the number of potential concurrent SERVICE CONSUMERS, that are allowed to invoke the SET SERVICE request, is greater than an internal threshold.

R0059: A SERVICE PROVIDER MAY allow more than one SERVICE CONSUMERS to modify a state concurrently.

R0060: A SERVICE PROVIDER SHALL ensure that concurrent state modification does not create a HAZARDOUS SITUATION.

NOTE—Since BICEPS is based on a loosely coupled SOMDA, transactions are not a consideration. Therefore, a SERVICE PROVIDER is obliged to avoid hazardous situations by other means than relying on exclusive locks.

7.4.3 Operation-invoked report

Any request-response SERVICE OPERATION of the SET SERVICE invokes a transaction that consists of multiple steps constituted by msg:InvocationState.

R0126: A SERVICE PROVIDER SHALL switch between msg:InvocationState as depicted in Figure 13.

The initial msg:InvocationState information is delivered to a SERVICE CONSUMER through any msg:AbstractSetResponse. Afterwards, msg:InvocationState information is delivered to a SERVICE CONSUMER by means of msg:OperationInvokedReport MESSAGES. Subclause D.5 introduces an exemplary MESSAGE flow of a SET SERVICE OPERATION transaction.

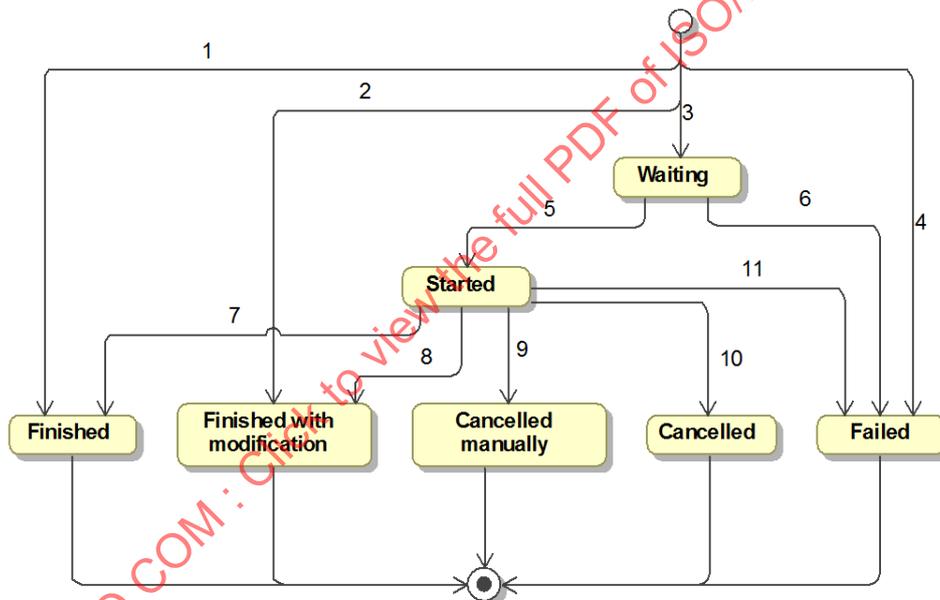


Figure 13—Finite state machine for msg:OperationInvokedReport MESSAGES

The following semantics are applied to the transition numbers in Figure 13: the invoked SET SERVICE operation

- 1) Has immediately completed execution. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 2) Has immediately completed execution, but the requested operation modification (e.g., a targeted setting value) could not be reached. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 3) Is queued for execution. The SERVICE PROVIDER SHALL send msg:OperationInvokedReport to indicate further msg:InvocationState progress.
- 4) Has failed. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.

- 5) Is executed. The SERVICE PROVIDER SHALL send msg:OperationInvokedReport to indicate further msg:InvocationState progress.
- 6) Has failed while waiting to be executed. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 7) Has completed execution. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 8) Has completed execution, but the requested operation modification (e.g., a targeted setting value) could not be reached. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 9) Is aborted due to manual intervention. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 10) Is aborted. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.
- 11) Has failed during execution. The SERVICE PROVIDER SHALL not send further msg:OperationInvokedReport MESSAGES.

NOTE—Depending on the transport binding, msg:AbstractSetResponse as well as msg:OperationInvokedReport MESSAGES could arrive in a different order. A SERVICE CONSUMER might ignore logically older msg:InvocationState states even if they arrive after logically younger msg:InvocationState states.

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8. Extension Model

This clause defines a general Extension Model to enhance objects defined in this standard with information that is not representable by this standard.

R0108: A SERVICE PROVIDER SHALL describe any extensions to the information represented in this standard by using the ext:Extension ELEMENT.

R0109: A SERVICE PROVIDER SHALL NOT provide information of a POC MEDICAL DEVICE by using the ext:Extension ELEMENT, if the semantical meaning of that ext:Extension ELEMENT would match ELEMENTs or ATTRIBUTEs that are defined in this standard.

NOTE—Requirement R0109 increases interoperability by not permitting the introduction of noninteroperable extensions that are semantically equal to any definition from this standard.

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9. Discovery Model

9.1 General

The BICEPS Discovery Model fosters plug-and-play by defining requirements for a transport communication protocol that allow a SERVICE CONSUMER to discover SERVICE PROVIDERs and retrieve their MDIB.

An informative example for BICEPS discovery can be found in D.3.

R0123: A BICEPS BINDING SHALL define a discovery type to state compliance with BICEPS.

R0134: A BICEPS BINDING SHALL make MDS types available for discovery.

NOTE—This allows SERVICE CONSUMERs to discover POC MEDICAL DEVICEs by looking for device specialization conformance statements.

9.2 Implicit discovery

Implicit discovery is based on MESSAGEs that are communicated by a SERVICE PROVIDER when it enters or leaves the network or if something in its context has changed substantially.

R0073: A SERVICE PROVIDER SHALL announce its presence if it is ready to exchange MESSAGEs with a SERVICE CONSUMER.

R0074: A SERVICE PROVIDER SHOULD announce its upcoming absence if it is switching to a mode where it is not ready to exchange MESSAGEs with a SERVICE CONSUMER temporarily.

R0075: A SERVICE PROVIDER SHALL include a unique identifier in a discovery MESSAGE that allows a SERVICE CONSUMER to identify the SERVICE PROVIDER.

R0076: A SERVICE PROVIDER SHALL include a discovery type in a discovery MESSAGE that allows a SERVICE CONSUMER to identify if the SERVICE PROVIDER is compliant with BICEPS.

R0078: A BICEPS BINDING SHALL provide means for implicit discovery.

9.3 Explicit discovery

Explicit discovery is based on search MESSAGEs that are sent to a group of PARTICIPANTS and that MAY contain matching criteria of what the SERVICE CONSUMER is interested in.

R0079: A SERVICE PROVIDER SHALL respond to a discovery query with a discovery type that allows a SERVICE CONSUMER to identify if the SERVICE PROVIDER is compliant with BICEPS.

R0080: A BICEPS BINDING SHALL provide means for explicit discovery.

10. Nonfunctional requirements

10.1 General

BICEPS defines a set of nonfunctional requirements to a BICEPS BINDING. For other nonfunctional requirements, R0082 applies.

R0082: An MDIB SHOULD include nonfunctional requirements in its descriptive part.

NOTE—BICEPS does not define any specific data elements to cover nonfunctional requirements, as they are related to the transport communication protocol. Hence, the BICEPS Participant Model and Communication Model rather define extensibility points that allow a BICEPS BINDING to embed such data elements.

10.2 Patient safety considerations

This subclause defines the requirements that a transport communication protocol has to fulfill in order to be able to improve patient safety while conveying MESSAGES, especially focused on trust establishment between PARTICIPANTS and detection of data corruption.

R0083: A BICEPS BINDING SHOULD provide means to enable authorization capabilities between PARTICIPANTS.

R0084: A BICEPS BINDING SHALL provide means to allow the detection of corrupted data in a MESSAGE.

R0127: A BICEPS BINDING SHALL provide means to allow the detection of the loss of connection from one PARTICIPANT to another PARTICIPANT.

10.3 Cybersecurity considerations

This subclause defines cybersecurity requirements that are related to MESSAGE exchange between PARTICIPANTS.

NOTE—Requirements related to general POC MEDICAL DEVICE cybersecurity are out of scope of this specification.

R0087: A BICEPS BINDING SHALL provide means that ensure confidentiality when MESSAGES are exchanged between PARTICIPANTS.

NOTE—As PARTICIPANTS might exchange information that identifies a person or is linkable to a person (e.g., medical record number, patient name, visit id), confidentiality establishment can be applied to verify that a transport complies with national regulations.

R0088: A BICEPS BINDING SHALL provide means that ensure integrity, when MESSAGES are exchanged between PARTICIPANTS.

R0089: A BICEPS BINDING SHALL provide means that ensure accountability, when MESSAGES are exchanged between PARTICIPANTS.

NOTE—Accountability means that all MESSAGES that carried out by a PARTICIPANT, can be identified and retraced. Accountability is used, e.g., for logging purposes or access control to determine the originator of a MESSAGE.

10.4 Clinical effectiveness

This subclause defines the requirements related to the clinical effectiveness of a SOMDS.

R0090: A BICEPS BINDING SHALL provide means that allow to synchronize time in the SOMDS.

NOTE—Data from multiple SERVICE PROVIDERS might be meaningful for clinical purposes only if temporal correlation of data can be established.

R0092: A BICEPS BINDING SHOULD provide means to define Quality-of-Service metrics for communication between two PARTICIPANTS.

NOTE—For clinical purposes, information exchanged between two PARTICIPANTS might have to be transported with certain guarantees regarding the maximum latency and jitter. For this purpose, a BICEPS BINDING has to provide means to define and monitor the fulfillment of these requirements.

10.5 Regulatory considerations

This subclause defines requirements related to regulatory affairs that have not been addressed by the previous subclauses.

In a SOMDS with independent components of different manufactures, logging of data is expected to be required by regulatory bodies. It is not within the scope of this document to define the type of data logging (e.g., distributed vs. central logging), but to help ensure that the transport binding is capable of fulfilling the required information.

R0093: A BICEPS BINDING SHALL provide means that allow to distinguish unique MESSAGES in a sequence of MESSAGES with potential duplicates.

11. Conformance

11.1 Overview

A conformant implementation SHALL satisfy all the SHALL and REQUIRED level requirements defined in this standard.

To support interoperability of applications and systems, an implementation based on this standard SHALL provide specific details about the way that the definitions of this standard are applied. These details have to be provided in form of a set of implementation conformance statements (ICSs). An ICS is a form of data sheet that discloses details of a specific implementation and specifies which features are provided.

NOTE—The ICSs defined in 11.3 provide understanding of the details of an implementation. However, they are not sufficient to guarantee interoperability of applications or systems. For such interoperability, additional specifications like nomenclatures, device specializations, and “Integrating the Healthcare Enterprise” (IHE) profiles have to be taken into account. These specifications are out of scope of this standard.

11.2 General format

The ICSs have to be supplied in the form of tables. Templates for these ICS tables are given in Table 20 through Table 24. The tables have to be filled out and provided as an overall conformance statement document.

Generally the column headers of an ICS table contain the following information:

- Index, which is an identifier of a specific feature
- Feature, which briefly describes the characteristic for which a conformance statement SHALL be made
- Reference, which is a reference to the requirement of the feature (may be empty).
- Status, which specifies the conformance requirement (i.e., the requirements for a conforming implementation regarding the feature). In some cases, this standard does not specify conformance requirements, but still wants a definition of the status of a particular feature.
- Support, which is filled out by the implementer and specifies the characteristics of the feature in the implementation.
- Comment, which contains additional information provided by the implementer.

The value of the Status and Support columns are permitted to range from simple to complex entries. Examples of simple values are as follows:

- **m** mandatory
- **o** optional
- **x** prohibited
- **c** conditional
- **n/a** not applicable

11.3 ICS tables

Table 20—General ICSs

Index	Feature	Reference	Status	Support	Comment
GEN-1	pm:ComponentActivation state	5.4.5	m		Support required to increase interoperability
GEN-2	Authorization capabilities	R0083	n/a		Requirement that addresses authorization binding in another standard that is used by a comprehensive implementation
GEN-3	Quality-of-Service metrics	R0092	n/a		Requirement that addresses authorization binding in another standard that is used by a comprehensive implementation
GEN-4	Wrapped extension elements	ext:Extension	o		Does not affect interoperability.

Table 21—Service provider

Index	Feature	Reference	Status	Support	Comment
PROV-1	Same handle on same object	R0099	o		SERVICE PROVIDERs are not allowed to rely on handle names after MDIB sequence changed.
PROV-2	Only standardized CODED VALUES used	R0008	o		Designates if the implementation makes use of standardized nomenclatures only.
PROV-3	ISO/IEEE 11073-10101 nomenclature	R0128	m		Designates that the implementation makes use of ISO/IEEE 11073-10101 nomenclature where possible.
PROV-4	Provide remote capabilities	R0011	o		See SCO-1.
PROV-5	Reject remote control if reports are not subscribed	R0057	o		SERVICE CONSUMERs are encouraged to deal with that behavior.
PROV-6	Announce absence, i.e., SERVICE PROVIDER does not send MESSAGES for a certain time	R0074	m		Hint: SERVICE CONSUMERs need to handle absence even if the SERVICE PROVIDER does not announce it.
PROV-7	Nonfunctional requirements	R0082	c – only included if present		

Table 21 —Service provider (continued)

Index	Feature	Reference	Status	Support	Comment
PROV-8	Include parent MDS descriptor in result	msg:GetMdDescriptionResponse/ msg:MdDescription	m		Increase ease of implementation.
PROV-9	Include METRIC retrievability as extension	msg:Retrievability	m		Required, otherwise retrievability method is unknown.
PROV-10	Increase of instance identifier	pm:MdibVersionGroup/ pm:InstanceId	c – only if identifier is used		
PROV-11	Slot usage	pm:AlertSignalState/ pm:Slot	c – only if used by implementation		
PROV-12	Body site states	pm:AbstractMetricState/ pm:BodySite	c – only if used by implementation		

Table 22 —Service consumer

Index	Feature	Reference	Status	Support	Comment
CONS-1	Interpretation of pm:AlertSignalState/@Presence	R0115	m		

Table 23 —Remote control

Index	Feature	Reference	Status	Support	Comment
SCO-1	Provide remote capabilities	R0011	m		
SCO-2	Context state create and update.	msg:SetContextState/ msg:ProposedContextState	c – mandatory if the requesting SERVICE CONSUMER is permitted to do so and context processing is provided.		See also CTXT-7.

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Table 24—Context processing

Index	Feature	Reference	Status	Support	Comment
CTXT-1	Patient context	R0014	c – required if MDSs need to process context		
CTXT-2	Location context	R0015	c – required if MDSs need to process context		
CTXT-3	Workflow context	R0016	c – required if MDSs need to process context		
CTXT-4	Operator context	R0017	c – required if MDSs need to process context		
CTXT-5	Means context	R0018	c – required if MDSs need to process context		
CTXT-6	Ensemble context	R0019	c – required if MDSs need to process context		
CTXT-7	Context state create and update.	msg:SetContextState/ msg:ProposedContextState	c – relevant if remote control is provided.		See also SCO-2.
CTXT-8	Express quality of measurements regarding patient context related information	R5012	c – if a SERVICE PROVIDER utilizes METRICs instead of pm:Measurement to express, e.g., height and weight		

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Annex A

(normative)

Extension Model

Elements

Extension

Complex types

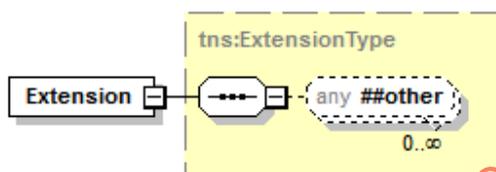
ExtensionType

Attributes

MustUnderstand

A.1 Extension

Type: element



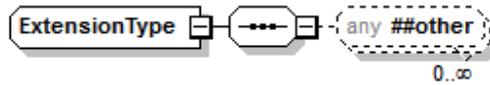
Type `tns:ExtensionType`

Used by

- [Activate/Argument](#)
- [AbstractMetricValue/Annotation](#)
- [MdsDescriptor/MetaData](#)
- [AbstractMetricValue/MetricQuality](#)
- [ScoState/OperationGroup](#)
- [AbstractMetricDescriptor/Relation](#)
- [CodedValue/Translation](#)
- [MdsDescriptor/MetaData/Udi](#)
- [WorkflowContextState/WorkflowDetail](#)
- [AbstractDescriptor](#)
- [AbstractGet](#)
- [AbstractGetResponse](#)
- [AbstractMetricValue](#)
- [AbstractReport](#)
- [AbstractReportPart](#)
- [AbstractSet](#)
- [AbstractSetResponse](#)
- [AbstractState](#)
- [BaseDemographics](#)
- [CalibrationInfo](#)
- [CauseInfo](#)
- [ClinicalInfo](#)
- [CodedValue](#)
- [ContainmentTree](#)
- [ContainmentTreeEntry](#)
- [ImagingProcedure](#)
- [InstanceIdentifier](#)
- [InvocationInfo](#)
- [LocationDetail](#)
- [LocationReference](#)
- [MdDescription](#)
- [Mdib](#)
- [MdState](#)
- [Measurement](#)
- [OrderDetail](#)
- [PersonReference](#)
- [PhysicalConnectorInfo](#)
- [Range](#)
- [RemedyInfo](#)
- [RetrievabilityInfo](#)

A.2 ExtensionType

Type: complexType



Documentation The Extension element is a container to collect extensions of any kind.

For better distinction extensions SHOULD be wrapped into container elements belonging to a namespace where the extension is specified. Example:

```
tns:Extension xmlns:tns="http://extension-point-uri/15/03" xmlns:ext="http://concrete-extension-namespace"
  ext:AdditionalInfo
  ...
```

Here ext:AdditionalInfo is the wrapper element containing the extension's information.

A.3 MustUnderstand

Type: attribute

Type **xsd:boolean**

Documentation In cases where an extension modifies the meaning of the element that contains it, a MustUnderstand attribute is senseful. This means that the data cannot safely be processed unless the application knows the meaning of the extension. A MustUnderstand marked extension could be look like this:

```
tns:Extension xmlns:tns="http://extension-point-uri/15/03" xmlns:ext="http://concrete-extension-namespace"
  ext:AdditionalInfo tns:MustUnderstand="true"
  ...
```

Extensions are not required to provide a MustUnderstand attribute. If no MustUnderstand attribute is present, false is assumed. The MustUnderstand attribute is conceptually borrowed from SOAP header's "mustUnderstand" attribute.

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Annex B

(normative)

Participant Model

Complex types

[AbstractAlertDescriptor](#)
[AbstractAlertState](#)
[AbstractComplexDeviceComponentDescriptor](#)
[AbstractComplexDeviceComponentState](#)
[AbstractContextDescriptor](#)
[AbstractContextState](#)
[AbstractDescriptor](#)
[AbstractDeviceComponentDescriptor](#)
[AbstractDeviceComponentState](#)
[AbstractMetricDescriptor](#)
[AbstractMetricState](#)
[AbstractMetricValue](#)
[AbstractMultiState](#)
[AbstractOperationDescriptor](#)
[AbstractOperationState](#)
[AbstractSetStateOperationDescriptor](#)
[AbstractState](#)
[ActivateOperationDescriptor](#)
[ActivateOperationState](#)
[AlertConditionDescriptor](#)
[AlertConditionState](#)
[AlertSignalDescriptor](#)
[AlertSignalState](#)
[AlertSystemDescriptor](#)
[AlertSystemState](#)
[ApprovedJurisdictions](#)
[BaseDemographics](#)
[BatteryDescriptor](#)
[BatteryState](#)
[CalibrationInfo](#)
[CauseInfo](#)
[ChannelDescriptor](#)
[ChannelState](#)
[ClinicalInfo](#)
[ClockDescriptor](#)
[ClockState](#)
[CodedValue](#)
[ContainmentTree](#)
[ContainmentTreeEntry](#)
[DistributionSampleArrayMetricDescriptor](#)
[DistributionSampleArrayMetricState](#)
[EnsembleContextDescriptor](#)
[EnsembleContextState](#)
[EnumStringMetricDescriptor](#)
[EnumStringMetricState](#)
[ImagingProcedure](#)
[InstanceIdentifier](#)
[LimitAlertConditionDescriptor](#)
[LimitAlertConditionState](#)
[LocalizedText](#)
[LocationContextDescriptor](#)
[LocationContextState](#)
[LocationDetail](#)
[LocationReference](#)
[MdDescription](#)
[Mdib](#)
[MdsDescriptor](#)
[MdsState](#)

Simple types

[AlertActivation](#)
[AlertConditionKind](#)
[AlertConditionMonitoredLimits](#)
[AlertConditionPriority](#)
[AlertConditionReference](#)
[AlertSignalManifestation](#)
[AlertSignalPresence](#)
[AlertSignalPrimaryLocation](#)
[CalibrationState](#)
[CalibrationType](#)
[CodeIdentifier](#)
[ComponentActivation](#)
[ContextAssociation](#)
[DerivationMethod](#)
[EntryRef](#)
[GenerationMode](#)
[Handle](#)
[HandleRef](#)
[LocalizedTextContent](#)
[LocalizedTextRef](#)
[LocalizedTextWidth](#)
[MdsOperatingMode](#)
[MeasurementValidity](#)
[MetricAvailability](#)
[MetricCategory](#)
[OperatingMode](#)
[OperationRef](#)
[PatientType](#)
[QualityIndicator](#)
[RealTimeValueType](#)
[ReferencedVersion](#)
[SafetyClassification](#)
[Sex](#)
[SymbolicCodeName](#)
[Timestamp](#)
[TimeZone](#)
[VersionCounter](#)

Attribute Groups

[ContainmentTreeInfo](#)
[MdibVersionGroup](#)

Complex types

Simple types

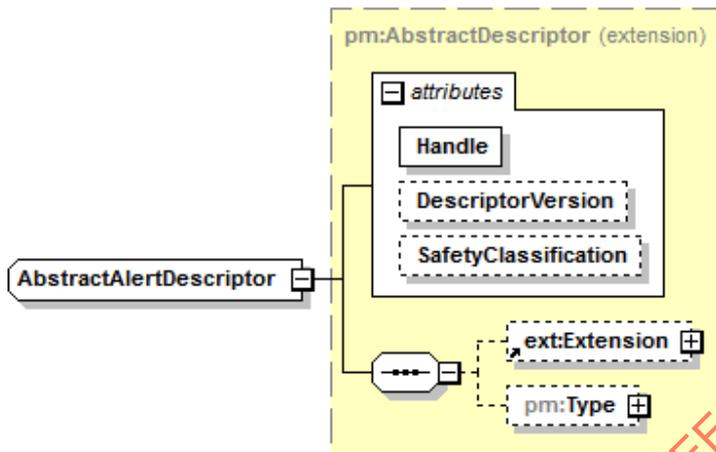
Attribute Groups

- MdState**
- MeansContextDescriptor**
- MeansContextState**
- Measurement**
- NeonatalPatientDemographicsCoreData**
- NumericMetricDescriptor**
- NumericMetricState**
- NumericMetricValue**
- OperatingJurisdiction**
- OperatorContextDescriptor**
- OperatorContextState**
- OrderDetail**
- PatientContextDescriptor**
- PatientContextState**
- PatientDemographicsCoreData**
- PersonParticipation**
- PersonReference**
- PhysicalConnectorInfo**
- Range**
- RealTimeSampleArrayMetricDescriptor**
- RealTimeSampleArrayMetricState**
- RemedyInfo**
- SampleArrayValue**
- ScoDescriptor**
- ScoState**
- SetAlertStateOperationDescriptor**
- SetAlertStateOperationState**
- SetComponentStateOperationDescriptor**
- SetComponentStateOperationState**
- SetContextStateOperationDescriptor**
- SetContextStateOperationState**
- SetMetricStateOperationDescriptor**
- SetMetricStateOperationState**
- SetStringOperationDescriptor**
- SetStringOperationState**
- SetValueOperationDescriptor**
- SetValueOperationState**
- StringMetricDescriptor**
- StringMetricState**
- StringMetricValue**
- SystemContextDescriptor**
- SystemContextState**
- SystemSignalActivation**
- VmdDescriptor**
- VmdState**
- WorkflowContextDescriptor**
- WorkflowContextState**

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B.1 AbstractAlertDescriptor

Type: complexType



Type extension of **pm:AbstractDescriptor**

Children **tns:Extension**
pm:Type

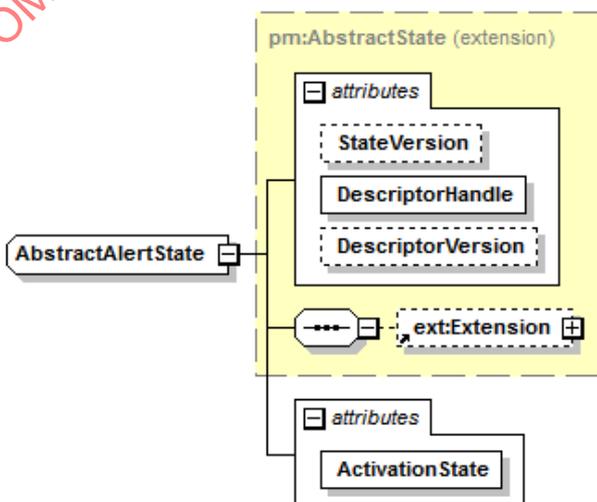
Used by **AlertConditionDescriptor**
AlertSignalDescriptor
AlertSystemDescriptor

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation AbstractAlertDescriptor acts as a base class for all alert descriptors that contain static alert meta information.

B.2 AbstractAlertState

Type: complexType



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Type extension of **pm:AbstractState**

Used by **AbstractAlertReport/ReportPart/AlertState**
SetAlertState/ProposedAlertState
AlertConditionState
AlertSignalState
AlertSystemState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:AlertActivation	required

Documentation AbstractAlertState acts as a base class for all alert states that contain dynamic/volatile alert meta information.

B.3 AbstractAlertState/@ActivationState

Type: attribute

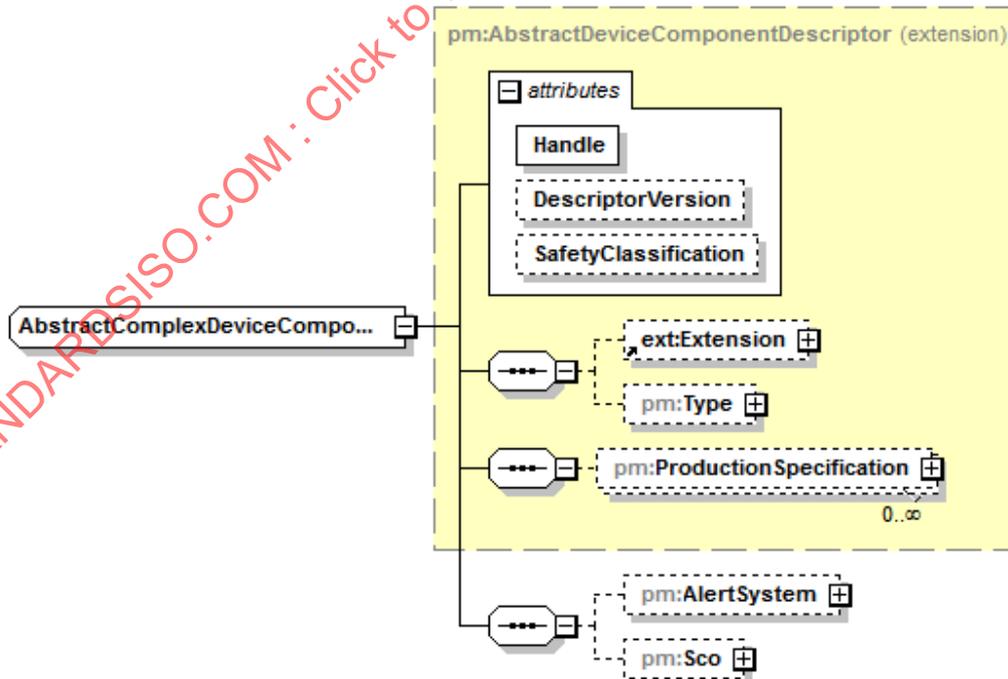
Type **pm:AlertActivation**

Constraints	Kind	Value	Documentation
	enumeration	On	The ALERT SYSTEM ELEMENT is operating.
	enumeration	Off	The ALERT SYSTEM ELEMENT is not operating.
	enumeration	Psd	Psd = Paused. The ALERT SYSTEM ELEMENT is temporarily not operating.

Documentation See pm:AlertActivation.

B.4 AbstractComplexDeviceComponentDescriptor

Type: complexType

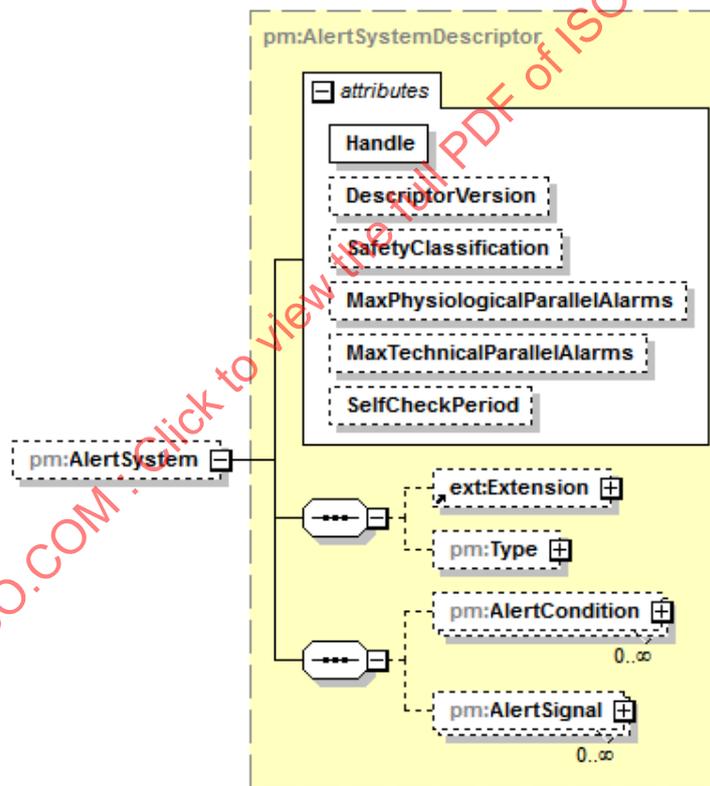


Type extension of **pm:AbstractDeviceComponentDescriptor**

Children	<u>tns:Extension</u> <u>pm:Type</u> <u>pm:ProductionSpecification</u> <u>pm:AlertSystem</u> <u>pm:SCO</u>		
Used by	<u>MdsDescriptor</u> <u>VmdDescriptor</u>		
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
Documentation	AbstractComplexDeviceComponentDescriptor adds an OPTIONAL pm:AlertSystemDescriptor and pm:SCODescriptor to pm:AbstractDeviceComponentDescriptor.		

B.5 AbstractComplexDeviceComponentDescriptor/AlertSystem

Type: element



Type **pm:AlertSystemDescriptor**

Properties	Min. occurrence:	0
	Max. occurrence:	1
Children	<u>tns:Extension</u> <u>pm:Type</u> <u>pm:AlertCondition</u> <u>pm:AlertSignal</u>	

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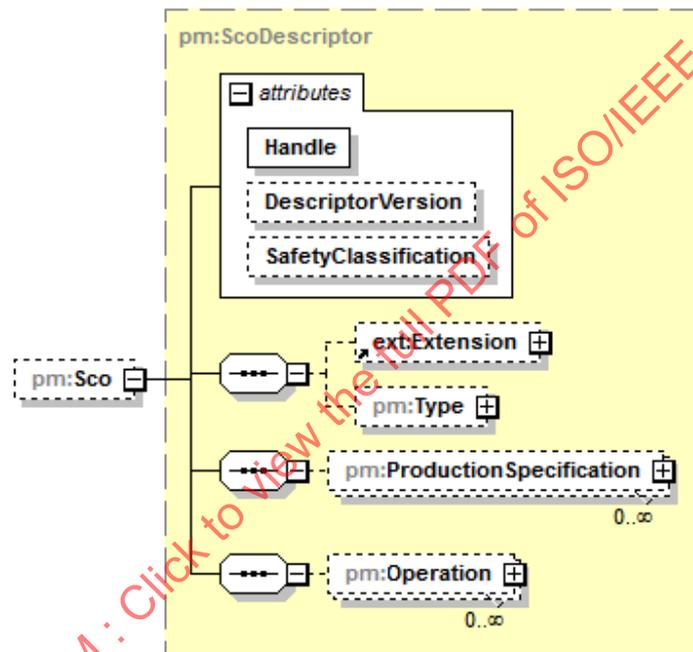
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Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MaxPhysiologicalParallelAlarms</u>	xsd:unsignedInt	optional
	<u>MaxTechnicalParallelAlarms</u>	xsd:unsignedInt	optional
	<u>SelfCheckPeriod</u>	xsd:duration	optional

Documentation An OPTIONAL ALERT SYSTEM that supervises conditions for all sublevels in the hierarchy including the ALERT SYSTEM hosting node itself.

B.6 AbstractComplexDeviceComponentDescriptor/Sco

Type: element



Type **pm:ScoDescriptor**

Properties Min. occurrence: 0
Max. occurrence: 1

Children tns:Extension
pm:Type
pm:ProductionSpecification
pm:Operation

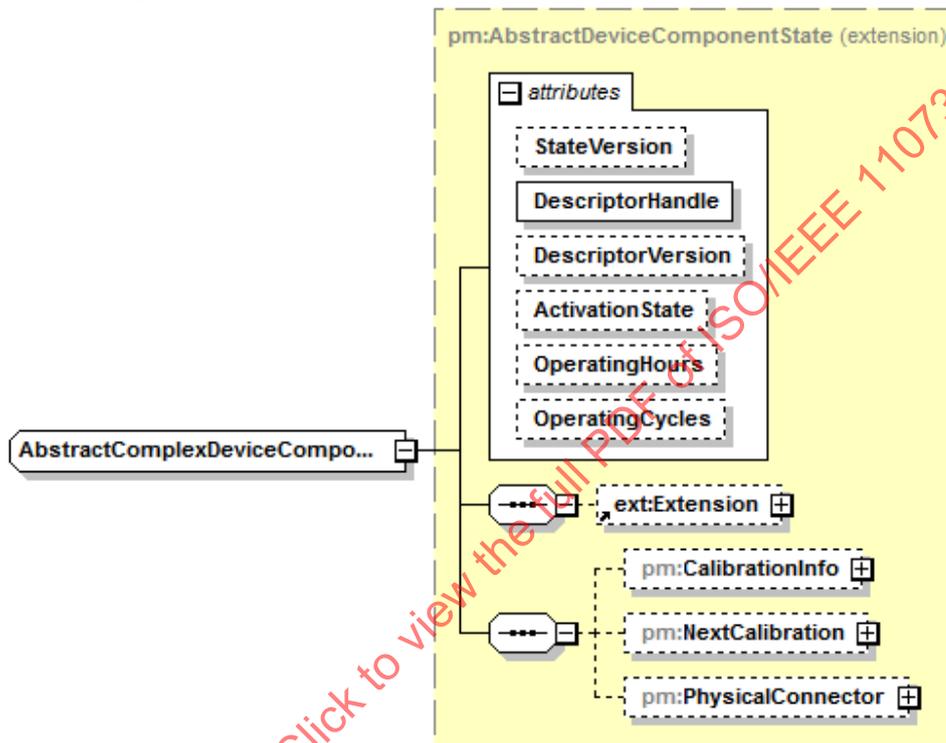
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation A service control object to define remote control operations. Any pm:AbstractOperationDescriptor/@OperationTarget within this SCO SHALL only reference this or child descriptors within the CONTAINMENT TREE.

NOTE—In modular systems, dynamically plugged-in modules would typically be modeled as VMDs. Such VMDs potentially have their own SCO. In every other case, SCO operations are modeled in pm:MdsDescriptor/pm:SCO.

B.7 AbstractComplexDeviceComponentState

Type: complexType



Type extension of **pm:AbstractDeviceComponentState**

Children **tns:Extension**
pm:CalibrationInfo
pm:NextCalibration
pm:PhysicalConnector

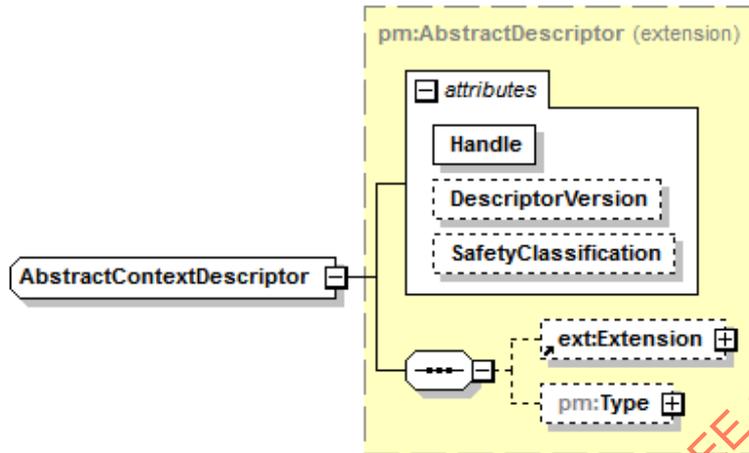
Used by **MdsState**
VmdState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional

Documentation AbstractComplexDeviceComponentState acts as a base class for DEVICE COMPONENT states that have alerting and SCO capabilities.

B.8 AbstractContextDescriptor

Type: complexType



Type extension of **pm:AbstractDescriptor**

Children **tns:Extension**
pm:Type

Used by **EnsembleContextDescriptor**
LocationContextDescriptor
MeansContextDescriptor
OperatorContextDescriptor
PatientContextDescriptor
WorkflowContextDescriptor

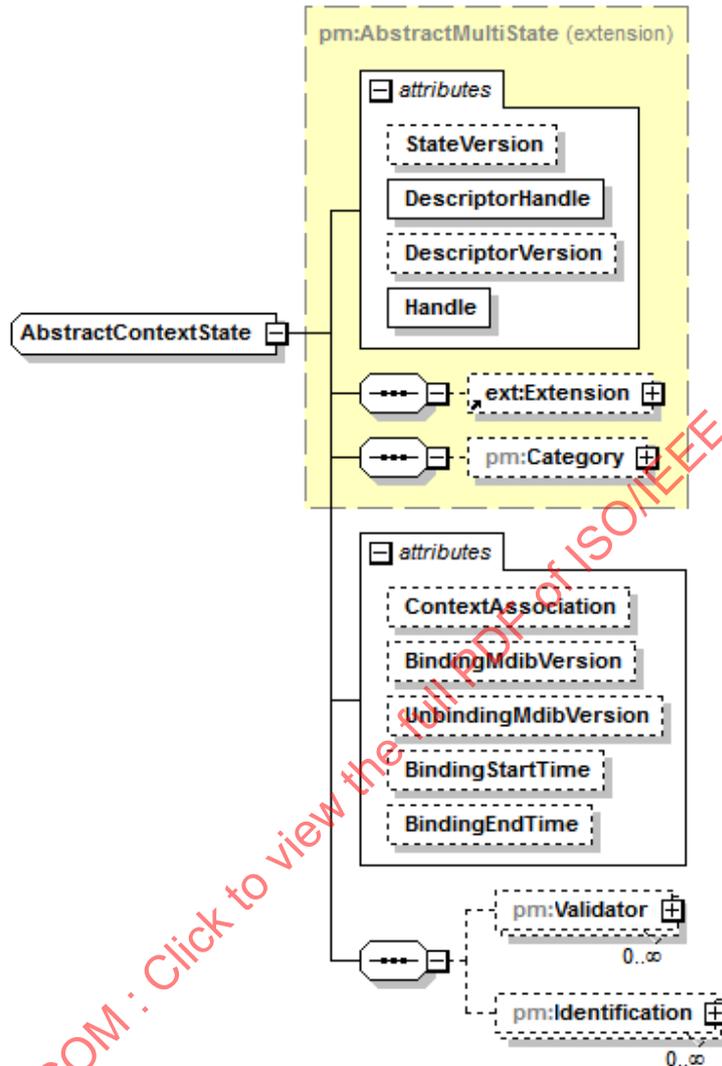
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Abstract base class for objects that specify that the MDS is able to provide context information that MAY be of relevance for the state data that is present at the communication interface at a certain point of time or time period.

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B.9 AbstractContextState

Type: complexType



Type extension of **pm:AbstractMultiState**

Children **tns:Extension**
pm:Category
pm:Validator
pm:Identification

Used by **GetContextStatesResponse/ContextState**
GetContextStatesByIdentificationResponse/ContextState
GetContextStatesByFilterResponse/ContextState
AbstractContextReport/ReportPart/ContextState
SetContextState/ProposedContextState
EnsembleContextState
LocationContextState
MeansContextState
OperatorContextState
PatientContextState
WorkflowContextState

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Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>BindingStartTime</u>	pm:Timestamp	optional
	<u>BindingEndTime</u>	pm:Timestamp	optional

Documentation Base type of a context state. Every context state can be identified as valid by a validator instance. Moreover, a context state's lifecycle is determined by a start and end. AbstractContextState bundles these information.

B.10 AbstractContextState/@ContextAssociation

Type: attribute

Type **pm:ContextAssociation**

Constraints	Kind	Value	Documentation
	enumeration	No	No = Not Associated. There is currently no context information associated, such that there cannot be made any assumptions on the encompassing context.
	enumeration	Pre	Pre = Pre-Associated. Context information is in a pre-association state.
	enumeration	Assoc	Assoc = Associated. Context information is associated.
	enumeration	Dis	Dis = Disassociated. Context information is no longer associated.

Documentation Association of a context. The implied value SHALL be "No".

R5027: Before a SERVICE PROVIDER decides to remove a specific context state from its MDIB, it SHALL change the context association of that context state to "No".

NOTE—BICEPS supports no special state removal flag. Therefore, a SERVICE CONSUMER has to rely on the context association in order to decide if a context state can be kept in memory or removed from memory.

B.11 AbstractContextState/@BindingMdibVersion

Type: attribute

Type **pm:ReferencedVersion**

Documentation BindingMdibVersion points to the version of an MDIB when a binding of the context state to an MDS starts.

B.12 AbstractContextState/@UnbindingMdibVersion

Type: attribute

Type **pm:ReferencedVersion**

Documentation UnbindingMdibVersion points to the version of an MDIB when a binding of a context state to an MDS ends (i.e., the version where the context association was disassociated the first time).

B.13 AbstractContextState/@BindingStartTime

Type: attribute

Type **pm:Timestamp**

Documentation Point in time when a binding of a context state to an MDS starts.

B.14 AbstractContextState/@BindingEndTime

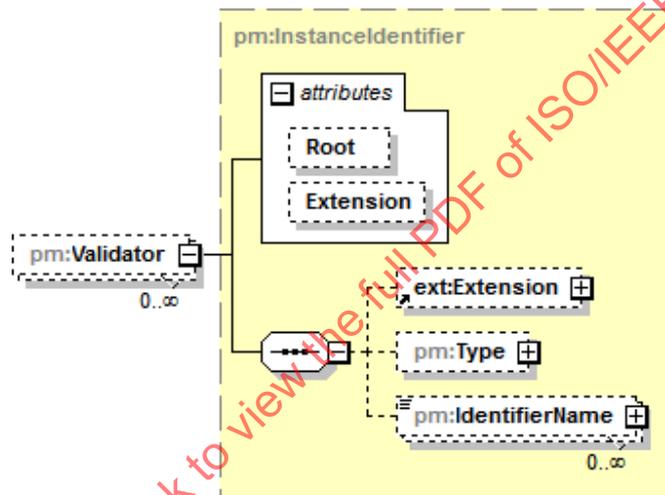
Type: attribute

Type **pm:Timestamp**

Documentation Point in time when a binding of a context state to an MDS ends.

B.15 AbstractContextState/Validator

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation OPTIONAL list of actors (e.g., persons, devices or any identifiable systems) which have confirmed that a binding of a context state to an MDS is correct.

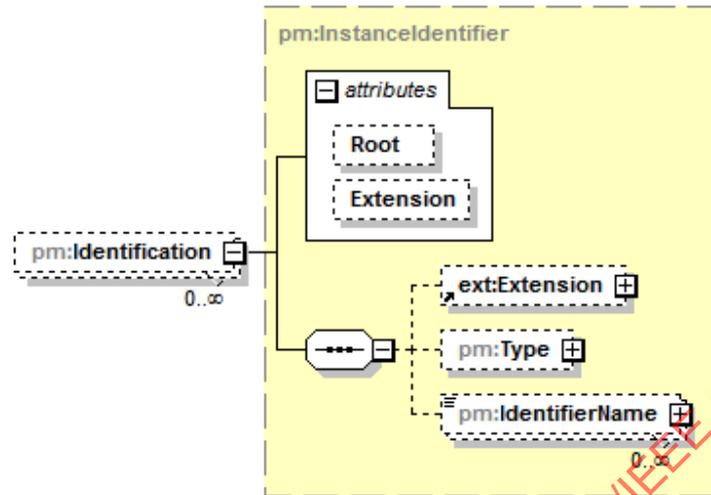
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B.16 AbstractContextState/Identification

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

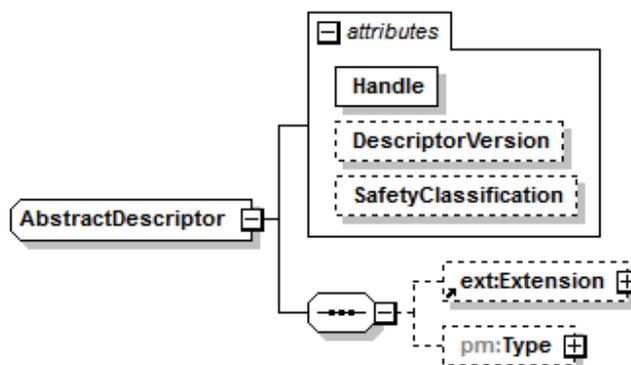
Documentation OPTIONAL ordered list of identifiers for the context. The list is ordered by the position of the identifiers in the list where the ELEMENT with the lower list index has a higher relevance than any entry with a higher list index. The SERVICE PROVIDER defines the relevance and MAY reorder the list at any time.

NOTE 1—Identification can be used to span a communication context between SERVICE PROVIDERs and SERVICE CONSUMERs.

NOTE 2—Identification can be empty, e.g., if pm:AbstractContextState/@ContextAssociation is "No".

B.17 AbstractDescriptor

Type: complexType



Children **tns:Extension**
pm:Type

Used by **GetDescriptorsFromArchiveResponse/Descriptor**
GetDescriptorResponse/Descriptor
DescriptionModificationReport/ReportPart/Descriptor
AbstractAlertDescriptor
AbstractContextDescriptor
AbstractDeviceComponentDescriptor
AbstractMetricDescriptor
AbstractOperationDescriptor

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation AbstractDescriptor defines foundational meta information of any object that is included in the descriptive part of the MDIB. Any descriptor object is derived from pm:AbstractDescriptor. The AbstractDescriptor's counterpart is pm:AbstractState.

B.18 AbstractDescriptor/@Handle

Type: attribute

Type **pm:Handle**

Constraints	Kind	Value
	minLength	1

Documentation The unique HANDLE of the descriptor. The HANDLE can be used by pm:AbstractState to reference the descriptor.

B.19 AbstractDescriptor/@DescriptorVersion

Type: attribute

Type **pm:VersionCounter**

Documentation DescriptorVersion is incremented by one with every descriptor modification. The implied value for the initial descriptor instance SHALL be "0".

B.20 AbstractDescriptor/@SafetyClassification

Type: attribute

Type **pm:SafetyClassification**

Constraints	Kind	Value	Documentation
	enumeration	Inf	Inf = Informational. The descriptor and the related state information are intended to be used for information purposes only. They are not intended to be used in clinical functions.
	enumeration	MedA	MedA = Medical Class A. The descriptor and related state information are intended to be used in clinical functions, specifically for general display in order to support patient and device monitoring. The displayed data is not intended to be used as sole source for diagnostic or therapeutic decisions. Deviations from this intended use are in the sole responsibility of the SERVICE CONSUMER.

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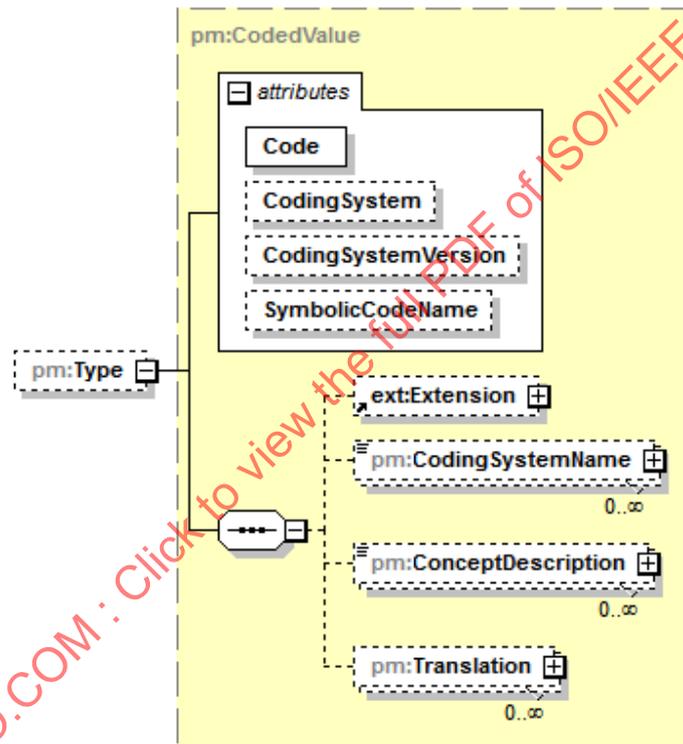
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enumeration	MedB	MedB = Medical Class B. The descriptor and related state information are intended to be used in clinical functions. The manufacturer has specified and considered a specific intended use for the data, which could result in nonserious injury. Deviations from this intended use are in the sole responsibility of the SERVICE CONSUMER.
enumeration	MedC	MedC = Medical Class C. The descriptor and related state information are intended to be used in clinical functions. The manufacturer has specified and considered a specific intended use for the data, which could result in serious injury. Deviations from this intended use are in the sole responsibility of the SERVICE CONSUMER.

Documentation The safety classification of the data that is described with this descriptor. The implied value SHALL be "Inf".

B.21 AbstractDescriptor/Type

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

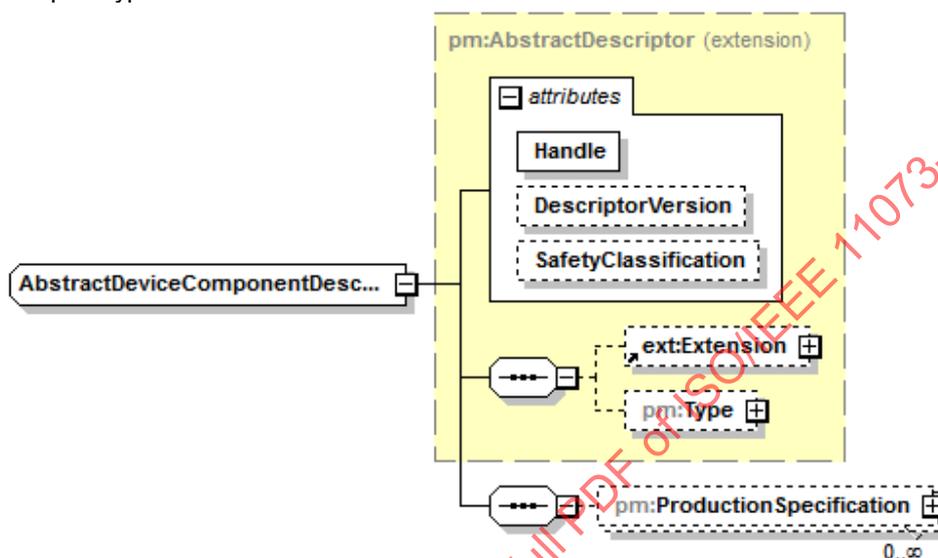
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional

SymbolicCodeName **pm:SymbolicCodeName** optional

Documentation The descriptor type that provides specific information about the descriptor instance, e.g., an pm:MdsDescriptor that designates an anesthesia workstation.

B.22 AbstractDeviceComponentDescriptor

Type: complexType



Type extension of **pm:AbstractDescriptor**

Children **tns:Extension**
pm:Type
pm:ProductionSpecification

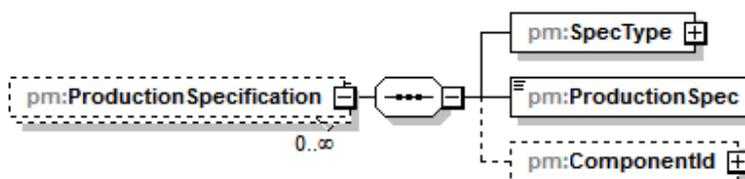
Used by **AbstractComplexDeviceComponentDescriptor**
BatteryDescriptor
ChannelDescriptor
ClockDescriptor
ScoDescriptor
SystemContextDescriptor

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation AbstractDeviceComponentDescriptor describes a basic DEVICE COMPONENT.

B.23 AbstractDeviceComponentDescriptor/ProductionSpecification

Type: element



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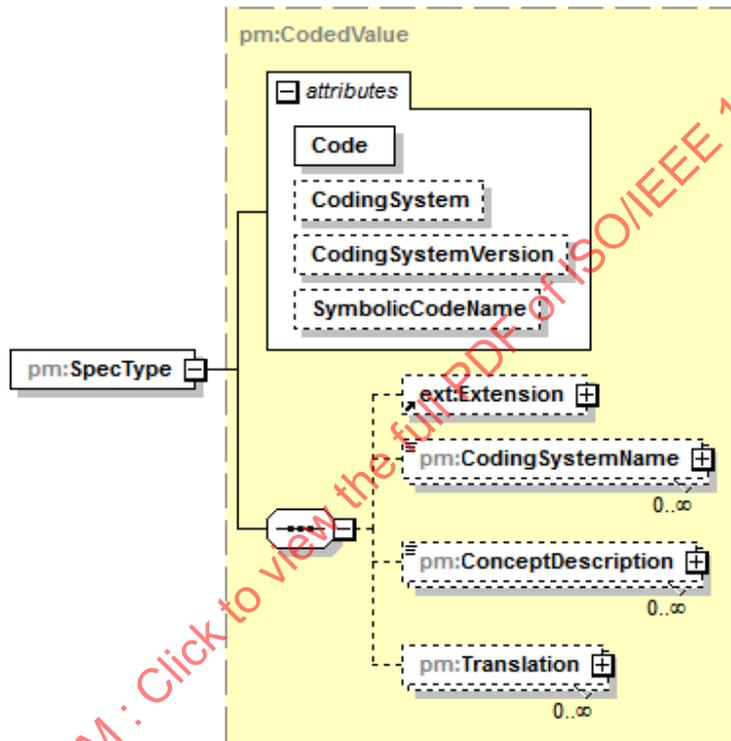
Properties Min. occurrence: 0
Max. occurrence: unbounded

Children pm:SpecType
pm:ProductionSpec
pm:ComponentId

Documentation List of production specifications of the component. The production specification describes ELEMENTS e.g., part numbers, serial numbers, revisions.

B.24 AbstractDeviceComponentDescriptor/ProductionSpecification/SpecType

Type: element



Type pm:CodedValue

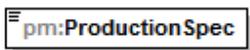
Children tns:Extension
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:Codeldentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation SpecType is the specification type, e.g., serial number, part number, hardware revision, software revision.

B.25 AbstractDeviceComponentDescriptor/ProductionSpecification/ProductionSpec

Type: element

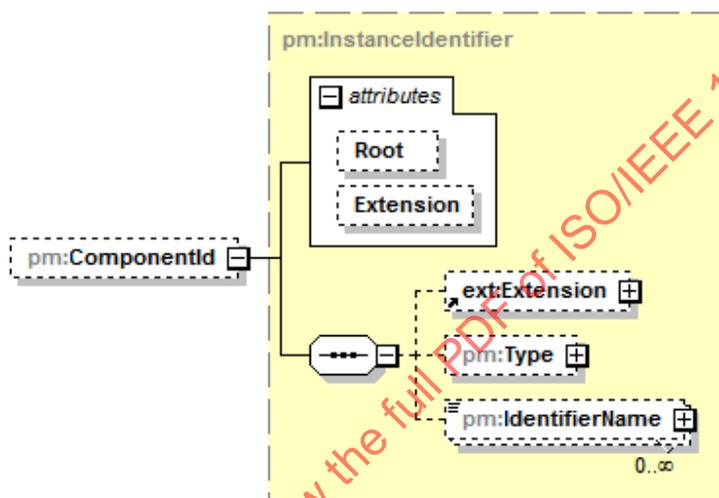


Type **xsd:string**

Documentation ProductionSpec describes the printable string of the production specification ELEMENT.

B.26 AbstractDeviceComponentDescriptor/ProductionSpecification/ComponentId

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Type
pm:IdentifierName

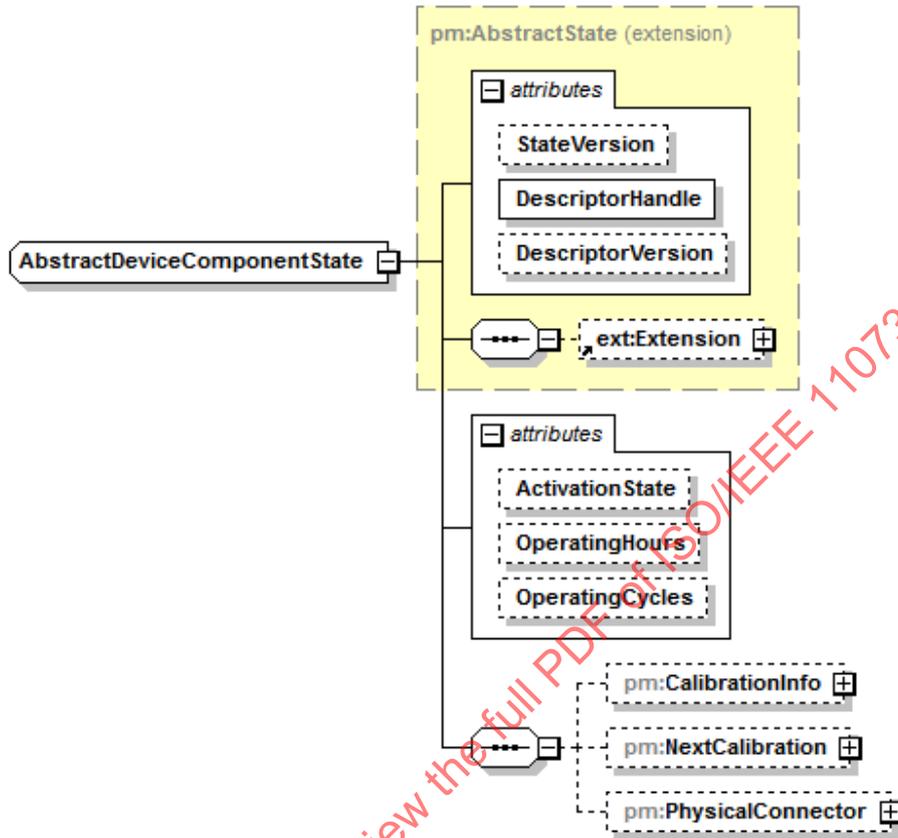
Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Describes the internal component unique identification. This is a provision for manufacturer specific standard components using a private object identifier (OID).

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B.27 AbstractDeviceComponentState

Type: complexType



Type extension of **pm:AbstractState**

Children **tns:Extension**
pm:CalibrationInfo
pm:NextCalibration
pm:PhysicalConnector

Used by **AbstractComponentReport/ReportPart/ComponentState**
SetComponentState/ProposedComponentState
AbstractComplexDeviceComponentState
BatteryState
ChannelState
ClockState
ScoState
SystemContextState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional

Documentation State of a component that is part of an MDS.

B.28 AbstractDeviceComponentState/@ActivationState

Type: attribute

Type **pm:ComponentActivation**

Constraints	Kind	Value	Documentation
	enumeration	On	The component is operating.
	enumeration	NotRdy	NotRdy = Not Ready. The component is not ready to be operated and not operating, but initialization is ongoing.
	enumeration	StndBy	StndBy = Stand By. The component is ready to be operated, but not currently operating.
	enumeration	Off	The component is inactive.
	enumeration	Shtdn	Shtdn = Shutdown. The component is ceasing from being ready to be operated or operating, but not yet inactive.
	enumeration	Fail	Fail = Failure. The component has detected a failure and is not ready to be operated.

Documentation See pm:ComponentActivation. The implied value SHALL be "On".

B.29 AbstractDeviceComponentState/@OperatingHours

Type: attribute

Type **xsd:unsignedInt**

Documentation OPTIONAL amount of operating hours (e.g., an OR light). There are no further semantics defined.

B.30 AbstractDeviceComponentState/@OperatingCycles

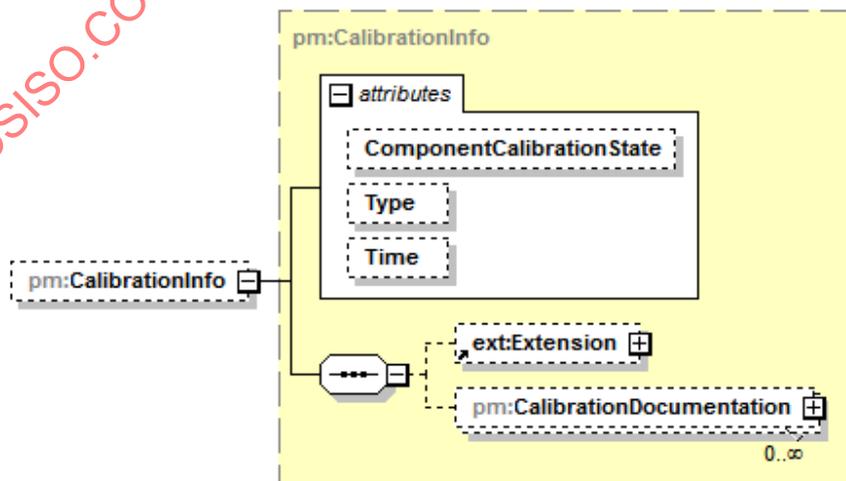
Type: attribute

Type **xsd:int**

Documentation OPTIONAL amount of operating cycles, e.g., the number of measurements taken within the component. There are no further semantics defined.

B.31 AbstractDeviceComponentState/CalibrationInfo

Type: element



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Type **pm:CalibrationInfo**

Properties Min. occurrence: 0
Max. occurrence: 1

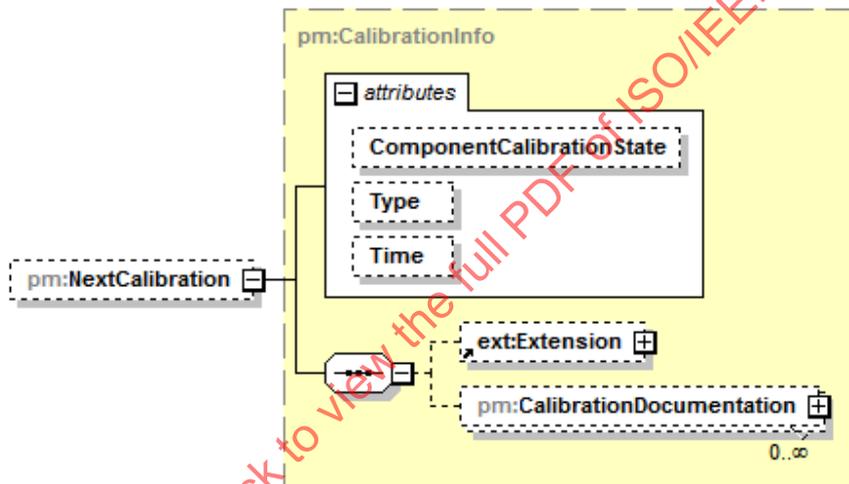
Children **tns:Extension**
pm:CalibrationDocumentation

Attributes	Name	Type	Use
	<u>ComponentCalibrationState</u>	pm:CalibrationState	optional
	<u>Type</u>	pm:CalibrationType	optional
	<u>Time</u>	pm:Timestamp	optional

Documentation Provides information about the last calibration that was performed.

B.32 AbstractDeviceComponentState/NextCalibration

Type: element



Type **pm:CalibrationInfo**

Properties Min. occurrence: 0
Max. occurrence: 1

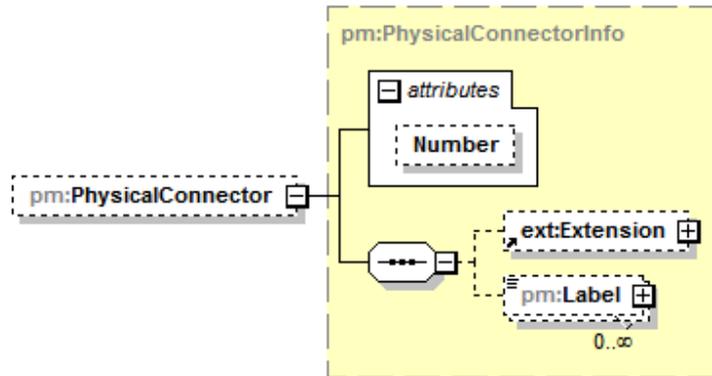
Children **tns:Extension**
pm:CalibrationDocumentation

Attributes	Name	Type	Use
	<u>ComponentCalibrationState</u>	pm:CalibrationState	optional
	<u>Type</u>	pm:CalibrationType	optional
	<u>Time</u>	pm:Timestamp	optional

Documentation Provides information about the next calibration that will be performed.

B.33 AbstractDeviceComponentState/PhysicalConnector

Type: element



Type `pm:PhysicalConnectorInfo`

Properties Min. occurrence: 0
Max. occurrence: 1

Children `tns:Extension`
`pm:Label`

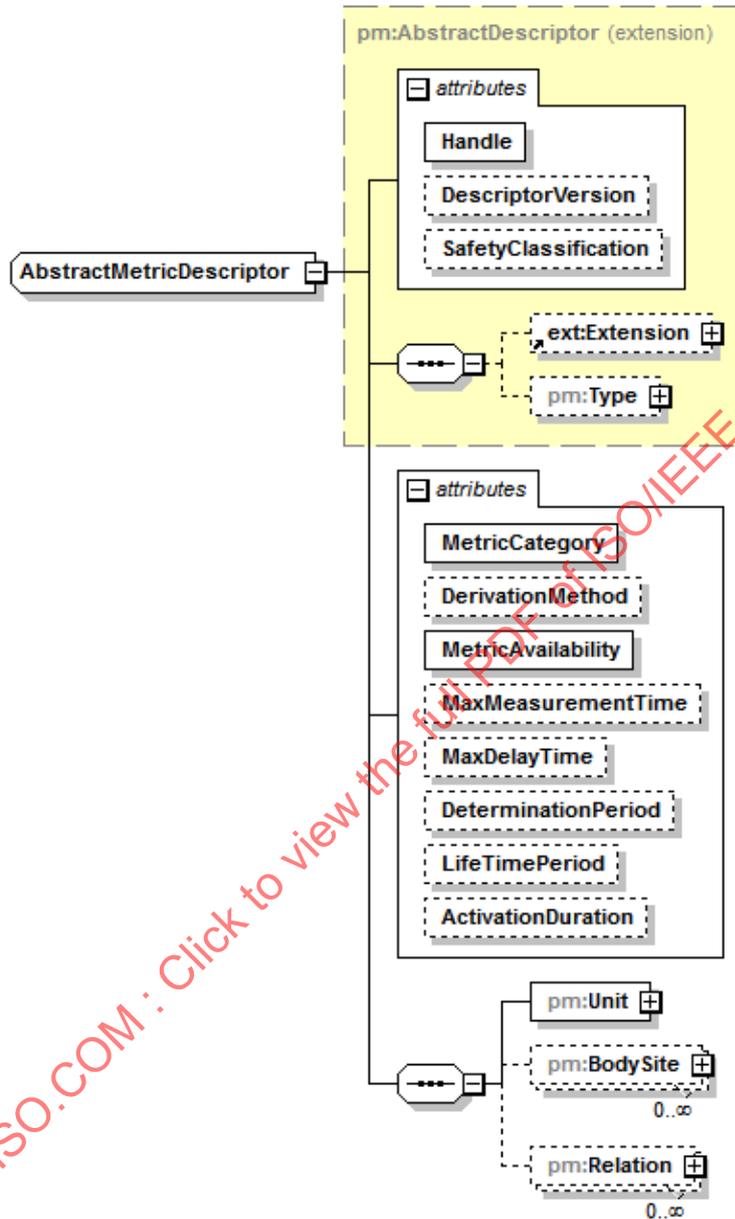
Attributes	Name	Type	Use
	<u><code>Number</code></u>	<code>xsd:int</code>	optional

Documentation The physical connector number for this component, see `pm:PhysicalConnectorInfo`.

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B.34 AbstractMetricDescriptor

Type: complexType



Type extension of **pm:AbstractDescriptor**

Children **tns:Extension**
pm:Type
pm:Unit
pm:BodySite
pm:Relation

Used by **ChannelDescriptor/Metric**
DistributionSampleArrayMetricDescriptor
NumericMetricDescriptor
RealTimeSampleArrayMetricDescriptor
StringMetricDescriptor

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MetricCategory</u>	pm:MetricCategory	required
	<u>DerivationMethod</u>	pm:DerivationMethod	optional
	<u>MetricAvailability</u>	pm:MetricAvailability	required
	<u>MaxMeasurementTime</u>	xsd:duration	optional
	<u>MaxDelayTime</u>	xsd:duration	optional
	<u>DeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional
	<u>ActivationDuration</u>	xsd:duration	optional

Documentation An abstract descriptor for a METRIC.

B.35 AbstractMetricDescriptor/@MetricCategory

Type: attribute

Type **pm:MetricCategory**

Constraints	Kind	Value	Documentation
	enumeration	Unspec	Unspec = Unspecified. None of the categories in MetricCategory is valid for the METRIC.
	enumeration	Msrmt	Msrmt = Measurement. The METRIC has been derived by measurement.
	enumeration	Clc	Clc = Calculation. The METRIC has been derived by calculation only.
	enumeration	Set	Set = Setting. The METRIC has a value that is adjustable by some (local or remote) control means.
	enumeration	Preset	Preset = Presetting. The METRIC has a value that is adjustable by some (local or remote) control means. Once the value is adjusted, it remains a Preset until committed, at which point it becomes a setting. Related settings MAY be defined by using pm:AbstractMetricDescriptor/pm:Relation.
	enumeration	Rcmm	Rcmm = Recommendation. The METRIC is a proposal for a setting or presetting. The related setting or presetting MAY be defined by using pm:AbstractMetricDescriptor/pm:Relation.

Documentation See pm:MetricCategory.

B.36 AbstractMetricDescriptor/@DerivationMethod

Type: attribute

Type **pm:DerivationMethod**

Constraints	Kind	Value	Documentation
	enumeration	Auto	Auto = Automatic derivation. The METRIC value is derived by an automatic mechanism (e.g., electronically measured).
	enumeration	Man	Man = Manual derivation. The METRIC is derived manually by a clinician/human.

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Documentation See pm:DerivationMethod. The default value SHALL be applied, depending on pm:AbstractDescriptor/@MetricCategory.

- If pm:AbstractDescriptor/@MetricCategory is "Set" or "Preset", then the default value of DerivationMethod is "Man"
- If pm:AbstractDescriptor/@MetricCategory is "Clc", "Msrmt", "Rcmm", then the default value of DerivationMethod is "Auto"
- If pm:AbstractDescriptor/@MetricCategory is "Unspec", then no default value is being implied

B.37 AbstractMetricDescriptor/@MetricAvailability

Type: attribute

Type **pm:MetricAvailability**

Constraints	Kind	Value	Documentation
	enumeration	Intr	Intr = Intermittent. Stopping or ceasing for a time; alternately ceasing and beginning again. Example: noninvasive blood pressure measurement.
	enumeration	Cont	Cont = Continuous. Without break, cessation, or interruption; without intervening time.

Documentation See pm:MetricAvailability.

B.38 AbstractMetricDescriptor/@MaxMeasurementTime

Type: attribute

Type **xsd:duration**

Documentation Maximum duration between start and stop time of measurement.

B.39 AbstractMetricDescriptor/@MaxDelayTime

Type: attribute

Type **xsd:duration**

Documentation Maximum delay to real time.

For a measurement or calculation, the maximum delay to real time is the estimated or known maximum difference between the point in time when a physical variable value has been present and when the value has been computed and is ready for communication. This MAY include an averaging period, but it does not include the communication delay.

For a setting, the maximum delay to real time is the estimated or known maximum difference between the point in time when a setting has been confirmed to be applicable and the time when the setting becomes effective on the actuator. This does not include any communication delay.

B.40 AbstractMetricDescriptor/@DeterminationPeriod

Type: attribute

Type **xsd:duration**

Documentation The maximum time interval between two determination steps of determined values under normal conditions.

- For METRICs with sample arrays as determined values where the availability is not continuous, this is the period of time between two determination steps, e.g., waveform snippets that are periodically determined.
- For METRICs with sample arrays as determined values where the availability is continuous, this is the period of time until the next waveform frame is generated.

NOTE—The determination period that is defined in the descriptor, might not be the currently active determination period. The active determination period is part of the METRIC state.

B.41 AbstractMetricDescriptor/@LifeTimePeriod

Type: attribute

Type **xsd:duration**

Documentation Given the timestamp of a measured METRIC value. The OPTIONAL ATTRIBUTE LifeTimePeriod defines the duration after the measured METRIC value is not useful anymore.

Example: a noninvasive blood pressure measured intermittently might only be considered useful for 24 hours. Hence, LifeTimePeriod would be "PT24H".

B.42 AbstractMetricDescriptor/@ActivationDuration

Type: attribute

Type **xsd:duration**

Documentation ActivationDuration defines the maximum time period pm:AbstractMetricState/@Activation is "On" before it changes to any other state.

NOTE—ActivationDuration is used to indicate the time that a measurement is performed after it has been activated. Example: if automatically measured NIBP is limited to a certain time period only in order to ensure that blood flow in the arm is ensured, then ActivationDuration could have a value of, e.g., five minutes.

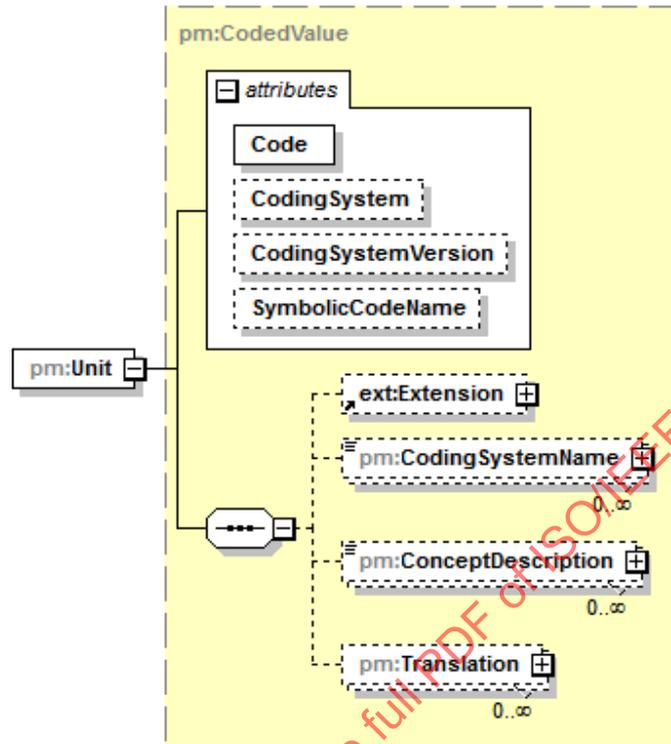
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B.43 AbstractMetricDescriptor/Unit

Type: element



Type **pm:CodedValue**

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:Codeldentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

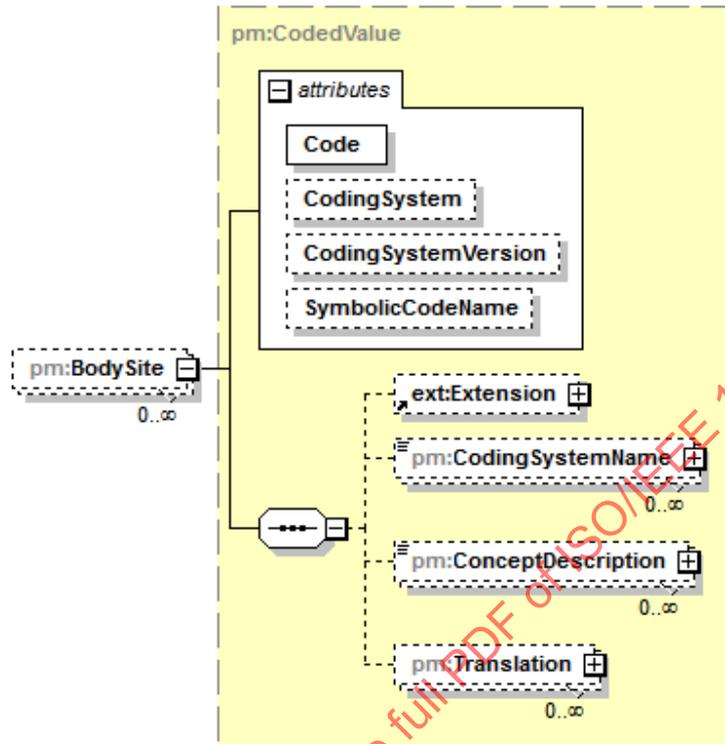
Documentation CODED VALUE for the unit of a METRIC.

NOTE—If the METRIC is dimensionless and has no unit, use the corresponding CODE from the CODING SYSTEM (e.g., 262656 (4::512) for IEEE 11073-10101 MDC_DIM_DIMLESS).

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B.44 AbstractMetricDescriptor/BodySite

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

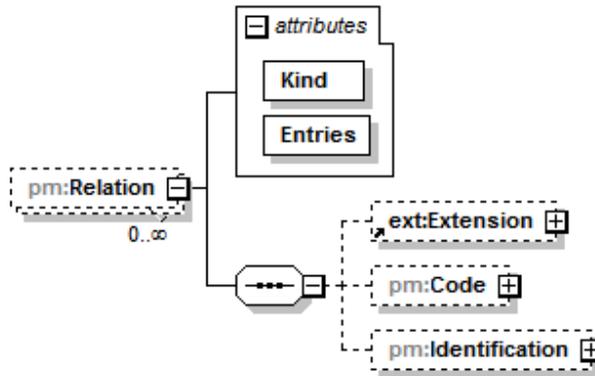
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation OPTIONAL list of CODED VALUES that describe the body sites where the METRIC is derived from or where it is applied to.

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B.45 AbstractMetricDescriptor/Relation

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Children tns:Extension
pm:Code
pm:Identification

Attributes	Name	Type	Use
	<u>Kind</u>	xsd:string	required
	<u>Entries</u>	pm:EntryRef	required

Documentation Relation allows the modelling of relationships between a metric and other containment tree entries. Related containment tree entries are defined in ./@Entries, whereby the flavor of a relationship can be set up in ./@Kind.

The cardinality of Relation is zero or more in order to express relations of different flavors for the same METRIC.

NOTE—Example: some settings of high frequency cutting devices cause changes in measurements (e.g., current form can influence the maximum emitted power). If such a setting is controllable by external means, presumably the SERVICE CONSUMER wants to be able to gain knowledge of affected measurements, which might be then accessed through the Relation element.

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B.46 AbstractMetricDescriptor/Relation/@Kind

Type: attribute

Type restriction of **xsd:string**

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	<i>Documentation</i>
	enumeration	Rcm	Rcm = Recommendation. The METRIC is a recommendation for the containment tree entries defined in ./pm:Relation/@Entries.
	enumeration	PS	PS = Presetting. This METRIC is a presetting for the containment tree entries defined in ./pm:Relation/@Entries.
	enumeration	SST	SST = Set of summary statistics. The METRIC is part of a set of summary statistics for a sample where other METRICs that belong to the summary statistics are defined in ./pm:Relation/@Entries.
	enumeration	ECE	ECE = Effect on containment tree entries. When changed, the METRIC has an effect on the containment tree entries defined in ./pm:Relation/@Entries. If Kind is "ECE", ./pm:Relation/pm:Code SHOULD be set to classify the effect.
	enumeration	DCE	DCE = Derived from containment tree entries. The METRIC is derived from the containment tree entries defined in ./pm:Relation/@Entries. If Kind is "DCE", ./pm:Relation/pm:Code MAY be set to classify the form of derivation.
	enumeration	Oth	Oth = Other. Relation is specified by other means, e.g., ./pm:Relation/pm:Code or extension element.
<hr/>			
<i>Documentation</i>	Kind specifies the relationship between the METRIC and referenced containment tree entries. Referenced containment tree entries are defined in ./pm:Relation/@Entries.		

B.47 AbstractMetricDescriptor/Relation/@Entries

Type: attribute

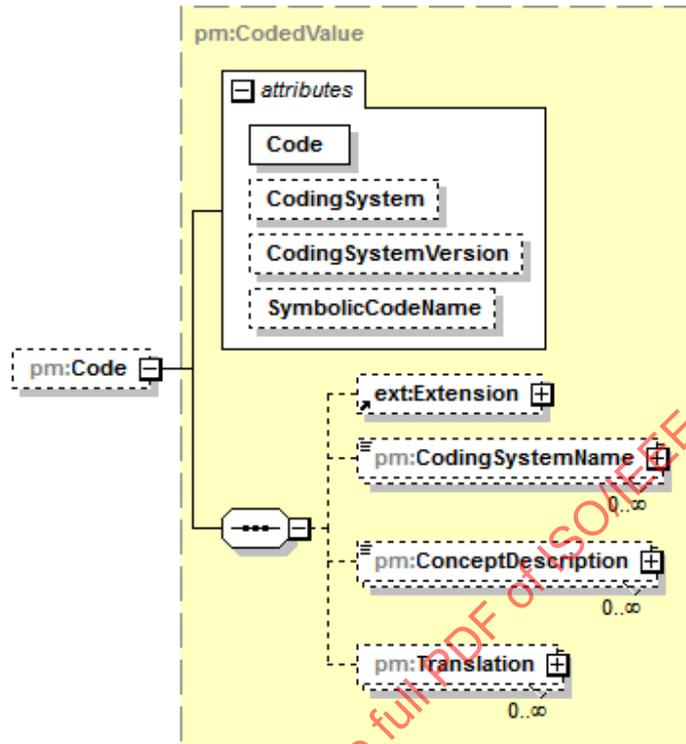
Type **pm:EntryRef**

<i>Documentation</i>	List of HANDLE references that relate to the METRIC. The relationship flavor is defined in ./pm:Relation/@Kind.
----------------------	---

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B.48 AbstractMetricDescriptor/Relation/Code

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

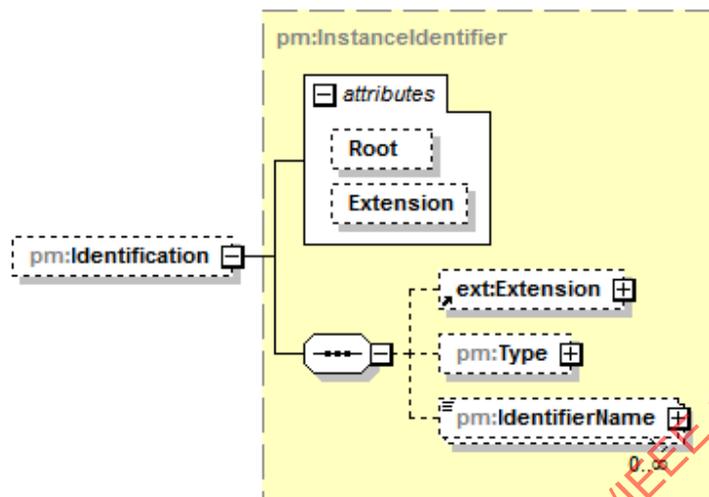
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Code allows the semantic description of the relationship between the METRIC and the list of related containment tree entries defined in ./pm:Relation/@Entries.

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B.49 AbstractMetricDescriptor/Relation/Identification

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

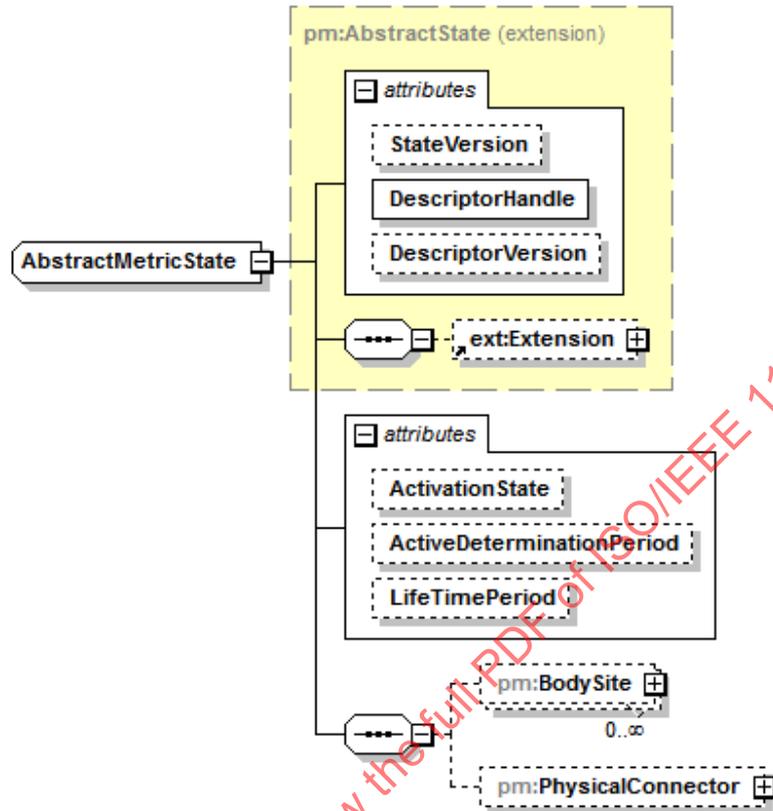
Documentation Identification allows relations to be grouped by instance identifiers.

NOTE—By that a SERVICE PROVIDER can, e.g., group sets of recommendations or presettings in order to allow easy identification.

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B.50 AbstractMetricState

Type: complexType



Type extension of **pm:AbstractState**

Children **tns:Extension**
pm:BodySite
pm:PhysicalConnector

Used by **AbstractMetricReport/ReportPart/MetricState**
SetMetricState/ProposedMetricState
DistributionSampleArrayMetricState
NumericMetricState
RealTimeSampleArrayMetricState
StringMetricState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>ActiveDeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional

Documentation Abstract state of a METRIC.

B.51 AbstractMetricState/@ActivationState

Type: attribute

Type **pm:ComponentActivation**

Constraints	Kind	Value	Documentation
	enumeration	On	The component is operating.
	enumeration	NotRdy	NotRdy = Not Ready. The component is not ready to be operated and not operating, but initialization is ongoing.
	enumeration	StndBy	StndBy = Stand By. The component is ready to be operated, but not currently operating.
	enumeration	Off	The component is inactive.
	enumeration	Shtdn	Shtdn = Shutdown. The component is ceasing from being ready to be operated or operating, but not yet inactive.
	enumeration	Fail	Fail = Failure. The component has detected a failure and is not ready to be operated.

Documentation The activation state of a METRIC. The implied value SHALL be "On".

B.52 AbstractMetricState/@ActiveDeterminationPeriod

Type: attribute

Type **xsd:duration**

Documentation OPTIONAL information of the currently active determination repetition time if it is different from the default determination time that is defined in the descriptive part. ActiveDeterminationPeriod is not necessarily the same as the update period of the periodic event service.

B.53 AbstractMetricState/@LifeTimePeriod

Type: attribute

Type **xsd:duration**

Documentation OPTIONAL currently active life-time period that supersedes pm:AbstractMetricDescriptor/@LifeTimePeriod.

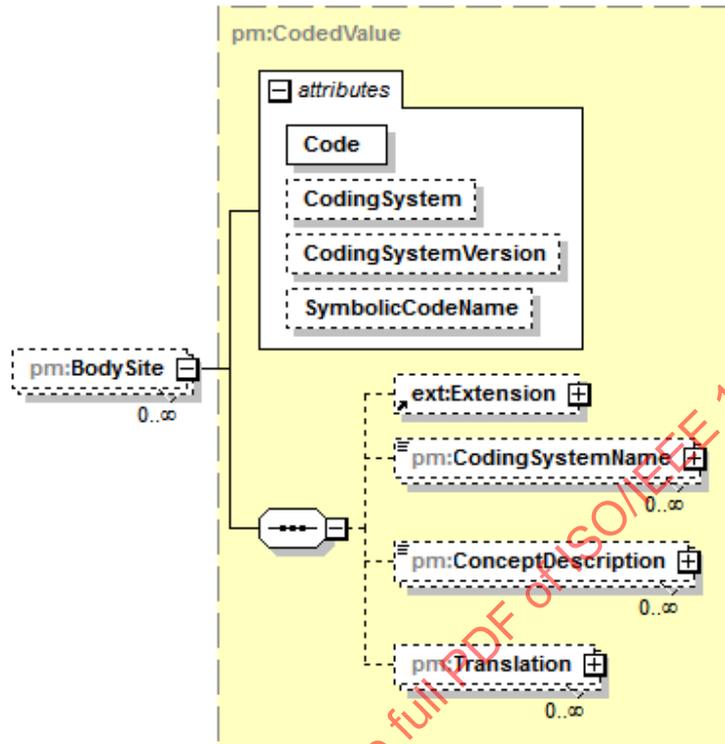
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B.54 AbstractMetricState/BodySite

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

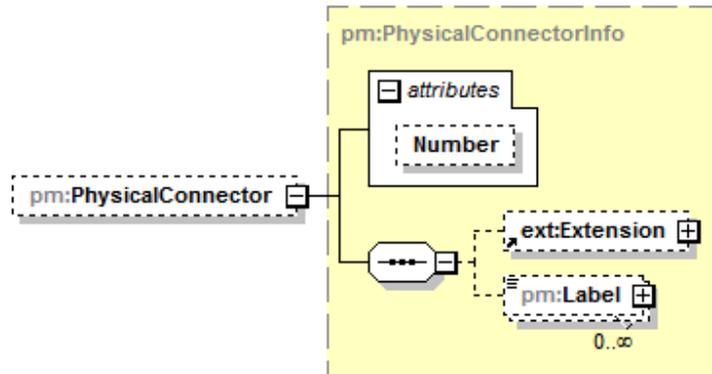
Documentation OPTIONAL list of CODED VALUES that describe the body sites where the measurement is performed or where the setting is applied to.

This list of body sites MAY provide more details to location of the measurement or setting that are be available at runtime only or that changes at runtime of the POC MEDICAL DEVICE. It SHOULD NOT contradict the location that has been listed in the descriptor.

Example: if in the descriptor the location "Upper Abdomen" is defined, than the state's body site give more details to where the measurement is performed like "Upper Right Quadrant" and "Liver".

B.55 AbstractMetricState/PhysicalConnector

Type: element



Type **pm:PhysicalConnectorInfo**

Properties Min. occurrence: 0
Max. occurrence: 1

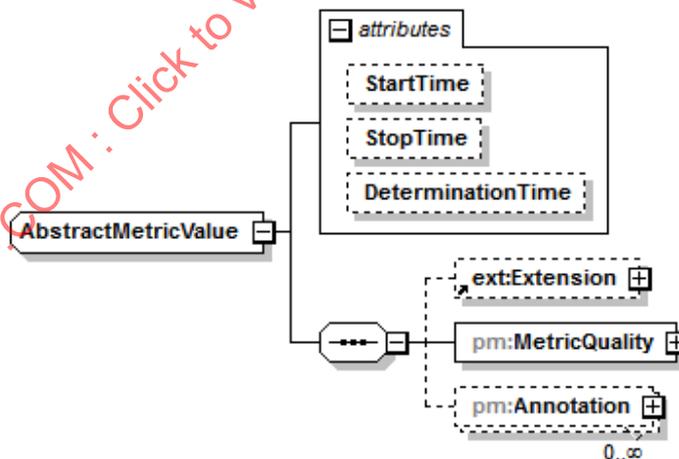
Children **tns:Extension**
pm:Label

Attributes	Name	Type	Use
	<u>Number</u>	xsd:int	optional

Documentation The physical connector number for this METRIC, see pm:PhysicalConnectorInfo.

B.56 AbstractMetricValue

Type: complexType



Children **tns:Extension**
pm:MetricQuality
pm:Annotation

Used by **NumericMetricValue**
SampleArrayValue
StringMetricValue

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Attributes	Name	Type	Use
	<u>StartTime</u>	pm:Timestamp	optional
	<u>StopTime</u>	pm:Timestamp	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional

Documentation Abstract value of a METRIC.

B.57 AbstractMetricValue/@StartTime

Type: attribute

Type **pm:Timestamp**

Documentation Time when measurement activity was started.

B.58 AbstractMetricValue/@StopTime

Type: attribute

Type **pm:Timestamp**

Documentation Time when measurement activity was stopped.

B.59 AbstractMetricValue/@DeterminationTime

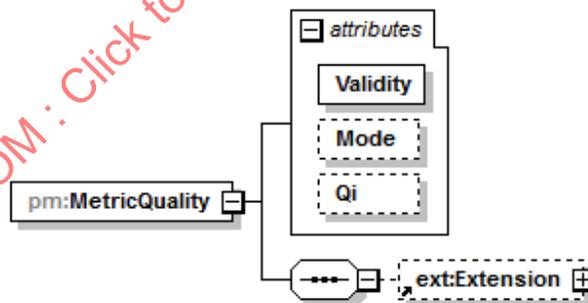
Type: attribute

Type **pm:Timestamp**

Documentation Time when determined value has been derived from measurement.

B.60 AbstractMetricValue/MetricQuality

Type: element



Attributes	Name	Type	Use
	<u>Validity</u>	pm:MeasurementValidity	required
	<u>Mode</u>	pm:GenerationMode	optional
	<u>Qi</u>	pm:QualityIndicator	optional

Documentation The quality state of the determined value of a METRIC.

B.61 AbstractMetricValue/MetricQuality/@Validity

Type: attribute

Type **pm:MeasurementValidity**

Constraints	Kind	Value	Documentation
	enumeration	Vld	Vld = Valid. A measured value that is correct from the perspective of the measuring device.
	enumeration	Vldated	Vldated = Validated Data. A measured value where the validity has been confirmed by an external actor, e.g., an operator, other than the POC MEDICAL DEVICE.
	enumeration	Ong	Ong = Measurement Ongoing. Indicates that a new measurement is just being taken and therefore measured value is not available.
	enumeration	Qst	Qst = Questionable. A measured value where correctness can not be guaranteed.
	enumeration	Calib	Calib = Calibration Ongoing. A measured value where correctness can not be guaranteed, because a calibration is currently going on.
	enumeration	Inv	Inv = Invalid. A measured value that is incorrect from the perspective of the measuring device.
	enumeration	Oflw	Oflw = Overflow. A measured value where correctness cannot be guaranteed as it is above all defined technical ranges.
	enumeration	Uflw	Uflw = Underflow. A measured value where correctness cannot be guaranteed as it is below all defined technical ranges.
	enumeration	NA	NA = Not Available. No value can be derived, e.g., if a sensor is not placed correctly.

Documentation While Validity is "Ong" or "NA", the enclosing METRIC value SHALL not possess a determined value. See also pm:MeasurementValidity.

NOTE—In case of other values the enclosing METRIC is allowed to possess a determined value.

B.62 AbstractMetricValue/MetricQuality/@Mode

Type: attribute

Type **pm:GenerationMode**

Constraints	Kind	Value	Documentation
	enumeration	Real	Real = Real Data. A value that is generated under real conditions.
	enumeration	Test	Test = Test Data. A value that is arbitrary and is for testing purposes only.
	enumeration	Demo	Demo = Demo Data. A value that is arbitrary and is for demonstration purposes only.

Documentation Describes whether data is generated by a real METRIC source or is part of any test or demo data. The implied value SHALL be "Real".

B.63 AbstractMetricValue/MetricQuality/@Qi

Type: attribute

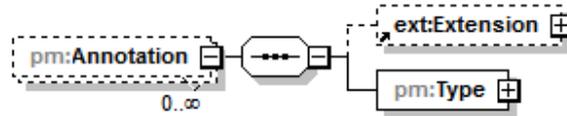
Type **pm:QualityIndicator**

Constraints	Kind	Value	Documentation
	minInclusive	0	The minimal value that indicates that the signal has the worst quality.
	maxInclusive	1	The maximal value that indicates that the signal has the best quality.

Documentation See pm:QualityIndicator. The implied value SHALL be "1".

B.64 AbstractMetricValue/Annotation

Type: element



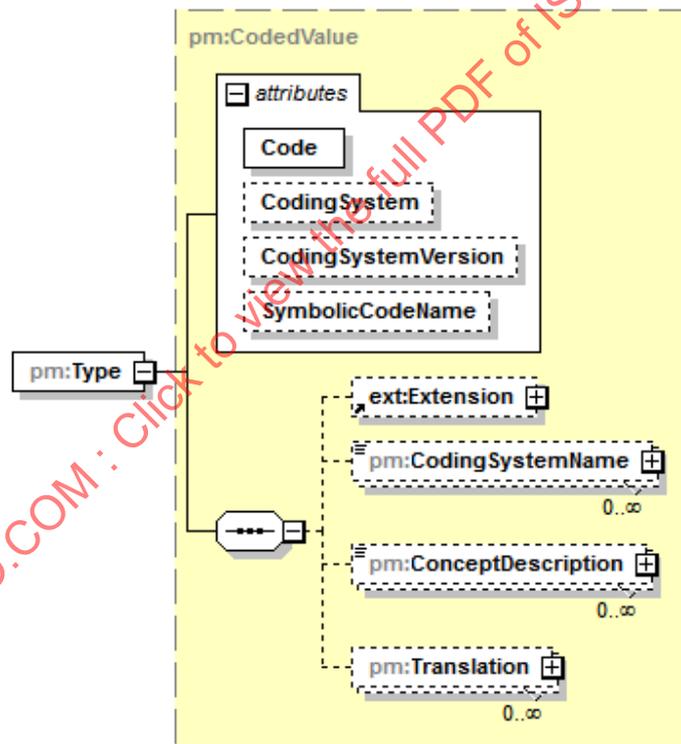
Properties Min. occurrence: 0
Max. occurrence: unbounded

Children tns:Extension
pm:Type

Documentation Annotation of a METRIC state value.

B.65 AbstractMetricValue/Annotation/Type

Type: element



Type pm:CodedValue

Children tns:Extension
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

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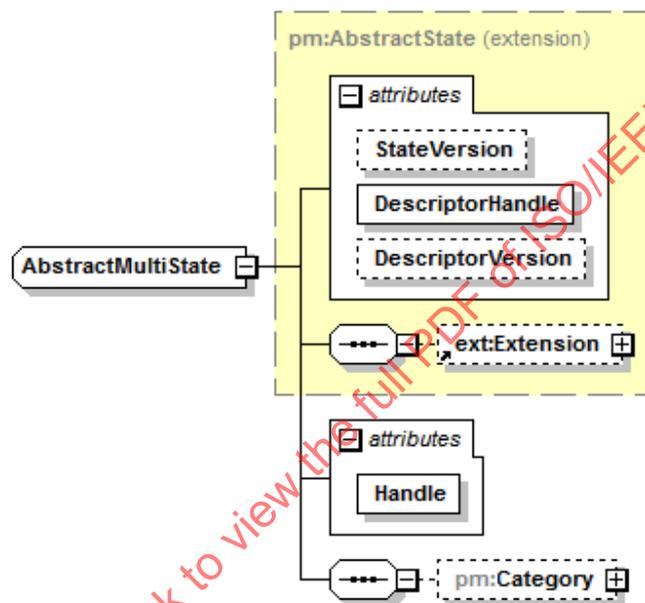
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation The CODED VALUE that describes the annotation of the ELEMENT.

Example: attach triggers in waveform curves.

B.66 AbstractMultiState

Type: complexType



Type extension of **pm:AbstractState**

Children **tns:Extension**
pm:Category

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required

Documentation AbstractMultiState is derived from pm:AbstractState. In contrast to pm:AbstractState, AbstractMultiState possesses a HANDLE name. The HANDLE name uniquely identifies the state, which is required if the relation to a descriptor is ambiguous.

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B.67 AbstractMultiState/@Handle

Type: attribute

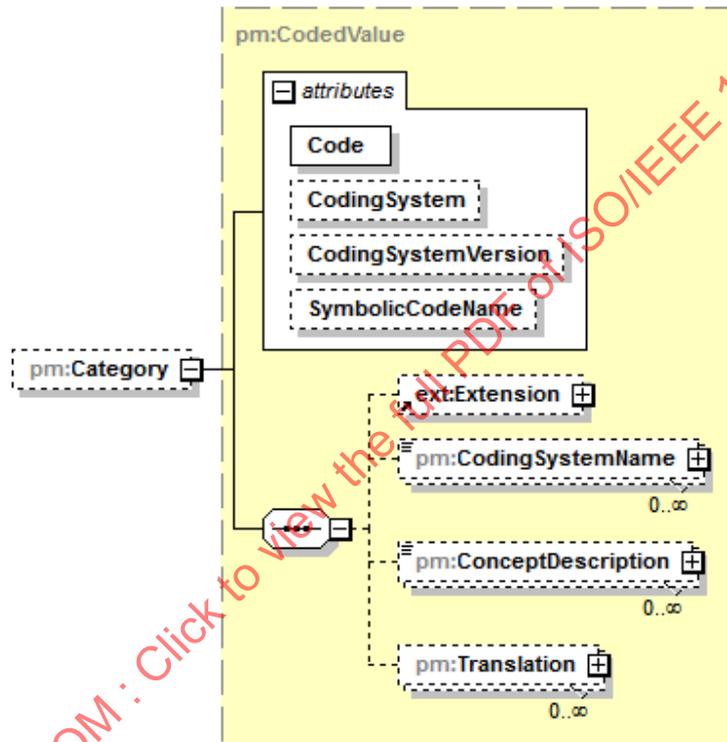
Type **pm:Handle**

Constraints	Kind	Value
	minLength	1

Documentation A name to uniquely identify the state.

B.68 AbstractMultiState/Category

Type: element



Type **pm:CodedValue**

Properties	Min. occurrence:	Max. occurrence:
	0	1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

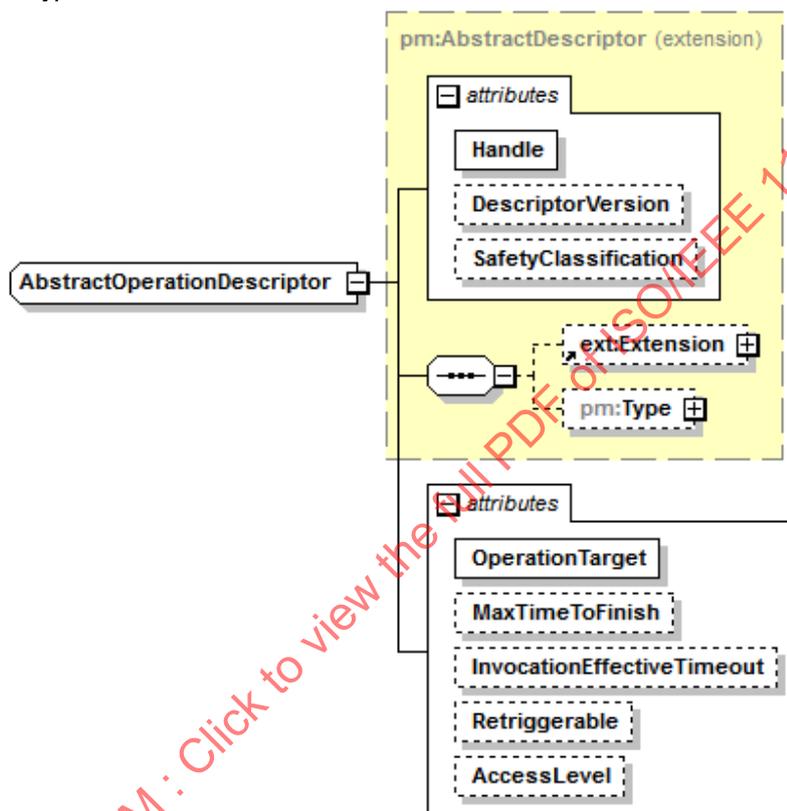
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation A CODED VALUE that allows the categorization of a multi-state inside the set of multi-states that belong to a descriptor of a certain type.

NOTE—By using the pm:AbstractMultiState/pm:Category it is possible to represent, e.g., different steps in a workflow (multiple states) with different association states. This is in contrast to the pm:WorkflowContextDescriptor/pm:Type where different workflow types are described that the POC MEDICAL DEVICE supports. See 5.3.7 for more details.

B.69 AbstractOperationDescriptor

Type: complexType



Type extension of **pm:AbstractDescriptor**

Children **tns:Extension**
pm:Type

Used by **ScoDescriptor/Operation**
AbstractSetStateOperationDescriptor
SetStringOperationDescriptor
SetValueOperationDescriptor

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional

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<u>Retriggerable</u>	xsd:boolean	optional
<u>AccessLevel</u>	xsd:string	optional

Documentation Abstract description of an operation that is exposed on the SCO.

B.70 AbstractOperationDescriptor/@OperationTarget

Type: attribute

Type **pm:HandleRef**

Constraints	Kind	Value
	minLength	1

Documentation A HANDLE reference this operation is targeted to. In case of a single state this is the HANDLE of the descriptor. When multiple states may belong to one descriptor (pm:AbstractMultiState), OperationTarget is the HANDLE of one of the state instances (if the state is modified by the operation).

B.71 AbstractOperationDescriptor/@MaxTimeToFinish

Type: attribute

Type **xsd:duration**

Documentation MaxTimeToFinish defines the maximum time an operation takes to get from the initial receiving of the command to a successful end.

B.72 AbstractOperationDescriptor/@InvocationEffectiveTimeout

Type: attribute

Type **xsd:duration**

Documentation InvocationEffectiveTimeout defines a time period in which the result of an invocation is effective after it has been successfully finished. When the time is up and the operation has not been retriggered, then the SERVICE PROVIDER MAY revert the operation target to another state.

NOTE—Example: if an arbitrary client remotely controls the cutter of a high frequency cutting device, due to safety reasons the cutter trigger might have a timeout until it stops automatically. To enable continuous activation, the client has to send repeated triggers within the given InvocationEffectiveTimeout duration.

B.73 AbstractOperationDescriptor/@Retriggerable

Type: attribute

Type **xsd:boolean**

Documentation Retriggerable is only applicable if ./@InvocationEffectiveTimeout is set. If set to "true", then Retriggerable indicates that a call to the activate operation resets the current ./@InvocationEffectiveTimeout, otherwise it will be left as it is until ./@InvocationEffectiveTimeout times out.

The implied value SHALL be "true".

B.74 AbstractOperationDescriptor/@AccessLevel

Type: attribute

Type restriction of **xsd:string**

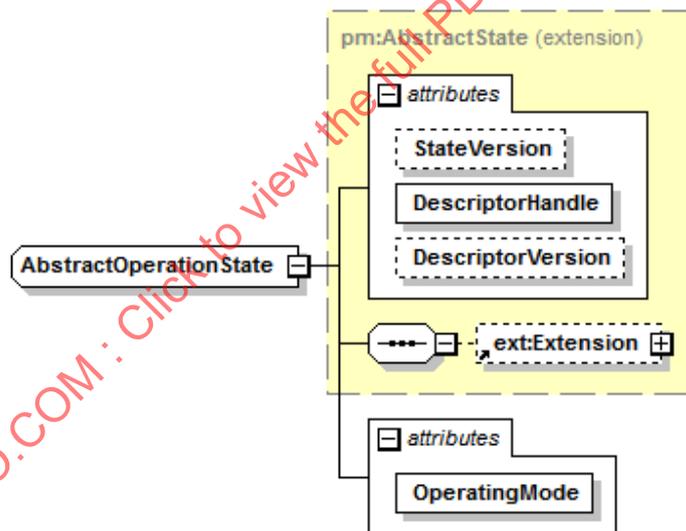
Constraints	Kind	Value	Documentation
	enumeration	Usr	Usr = User. Any person interacting with (i.e., operating or handling) the POC MEDICAL DEVICE.
	enumeration	CSUsr	CSUsr = Clinical Super User. Individuals or entity accountable to the RESPONSIBLE ORGANIZATION that configure clinical relevant settings of a POC MEDICAL DEVICE.
	enumeration	RO	RO = Responsible Organization. Access is restricted to a RESPONSIBLE ORGANIZATION.
	enumeration	SP	SP = Service Personnel. Access is restricted to SERVICE PERSONNEL.
	enumeration	Oth	Oth = Other. Access is restricted by other means (e.g., an extension).

Documentation AccessLevel defines a user group to whom access to the operation is granted. The implied value SHALL be "Usr".

R5054: Access to the invocation of the operation SHALL be restricted to the defined user group by a SERVICE CONSUMER.

B.75 AbstractOperationState

Type: complexType



Type extension of **pm:AbstractState**

Used by **AbstractOperationalStateReport/ReportPart/OperationState**
ActivateOperationState
SetAlertStateOperationState
SetComponentStateOperationState
SetContextStateOperationState
SetMetricStateOperationState
SetStringOperationState
SetValueOperationState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required

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<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of an operation that is exposed on the SCO.

B.76 AbstractOperationState/@OperatingMode

Type: attribute

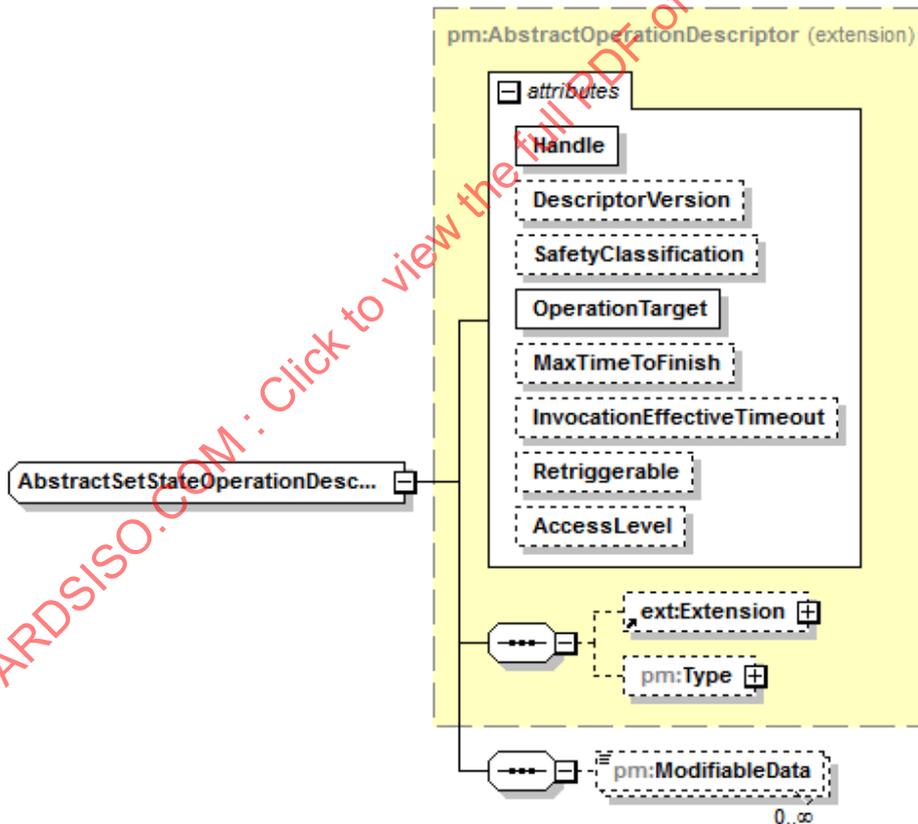
Type **pm:OperatingMode**

Constraints	Kind	Value	Documentation
	enumeration	Dis	Dis = Disabled. Object is disabled.
	enumeration	En	En = Enabled. Object is enabled
	enumeration	NA	NA = Not Available. Object is not available for interaction. This means that it is defined but currently not in a mode so that it can be interacted with.

Documentation Operating mode that defines if the operation is accessible.

B.77 AbstractSetStateOperationDescriptor

Type: complexType



Type extension of **pm:AbstractOperationDescriptor**

Children **tns:Extension**
pm:Type
pm:ModifiableData

Used by [ActivateOperationDescriptor](#)
[SetAlertStateOperationDescriptor](#)
[SetComponentStateOperationDescriptor](#)
[SetContextStateOperationDescriptor](#)
[SetMetricStateOperationDescriptor](#)

Attributes	Name	Type	Use
	Handle	pm:Handle	required
	DescriptorVersion	pm:VersionCounter	optional
	SafetyClassification	pm:SafetyClassification	optional
	OperationTarget	pm:HandleRef	required
	MaxTimeToFinish	xsd:duration	optional
	InvocationEffectiveTimeout	xsd:duration	optional
	Retriggerable	xsd:boolean	optional
	AccessLevel	xsd:string	optional

Documentation Abstract description of an operation that is exposed on the SCO and is intended to be used to set a complete state.

B.78 AbstractSetStateOperationDescriptor/ModifiableData

Type: element



Type xsd:string

Properties Min. occurrence: 0
 Max. occurrence: unbounded

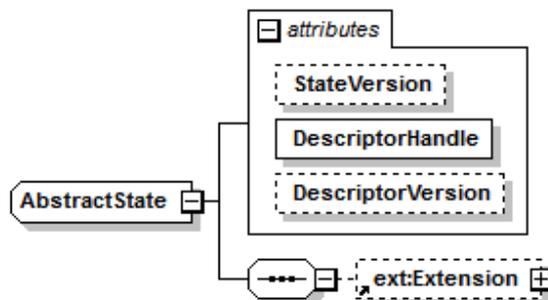
Documentation ModifiableData describes a list of ATTRIBUTEs and ELEMENTs the underlying operation modifies on invocation by means of XPath expressions.

R5010: If the ModifiableData list is empty, then all ELEMENTs/ATTRIBUTEs SHALL be modifiable except for pm:AbstractMultiState/@Handle, pm:AbstractState/@DescriptorHandle, pm:AbstractState/@StateVersion, and pm:AbstractState/@DescriptorVersion.

R5011: The root ELEMENT of the XPath expressions SHALL be the state of the CONTAINMENT TREE ENTRY referenced by pm:AbstractOperationDescriptor/@OperationTarget.

B.79 AbstractState

Type: complexType



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Used by GetStatesFromArchiveResponse/State
DescriptionModificationReport/ReportPart/State
MdState/State
AbstractAlertState
AbstractDeviceComponentState
AbstractMetricState
AbstractMultiState
AbstractOperationState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional

Documentation AbstractState defines foundational meta information of any object that is included in the state part of the MDIB. Any state object is derived from pm:AbstractState. The pm:AbstractState's counterpart is pm:AbstractDescriptor.

B.80 AbstractState/@StateVersion

Type: attribute

Type pm:VersionCounter

Documentation StateVersion is incremented by one with every state modification. The implied value for the initial state instance SHALL be "0".

B.81 AbstractState/@DescriptorHandle

Type: attribute

Type pm:HandleRef

Constraints	Kind	Value
	minLength	1

Documentation The HANDLE reference of a descriptor to which the state belongs.

B.82 AbstractState/@DescriptorVersion

Type: attribute

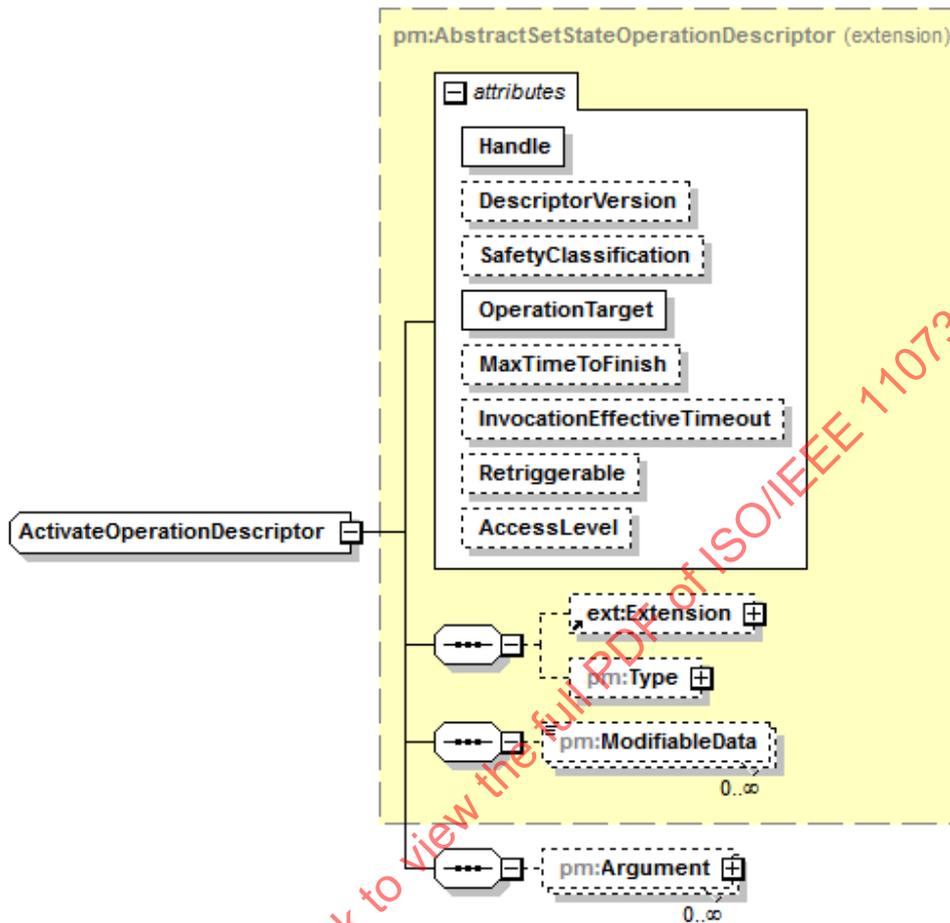
Type pm:ReferencedVersion

Documentation The current version of the descriptor to that the state belongs to. The implied value for the initial state instance SHALL be "0".

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B.83 ActivateOperationDescriptor

Type: complexType



Type extension of **pm:AbstractSetStateOperationDescriptor**

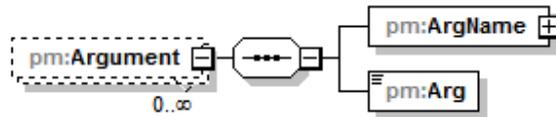
Children
tns:Extension
pm:Type
pm:ModifiableData
pm:Argument

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation Describes an activate operation that is exposed on the SCO. Activate operations are any parameterized operations that trigger an arbitrary action. The action that is triggered SHALL be defined by the pm:AbstractDescriptor/pm:Type ELEMENT.

B.84 ActivateOperationDescriptor/Argument

Type: element



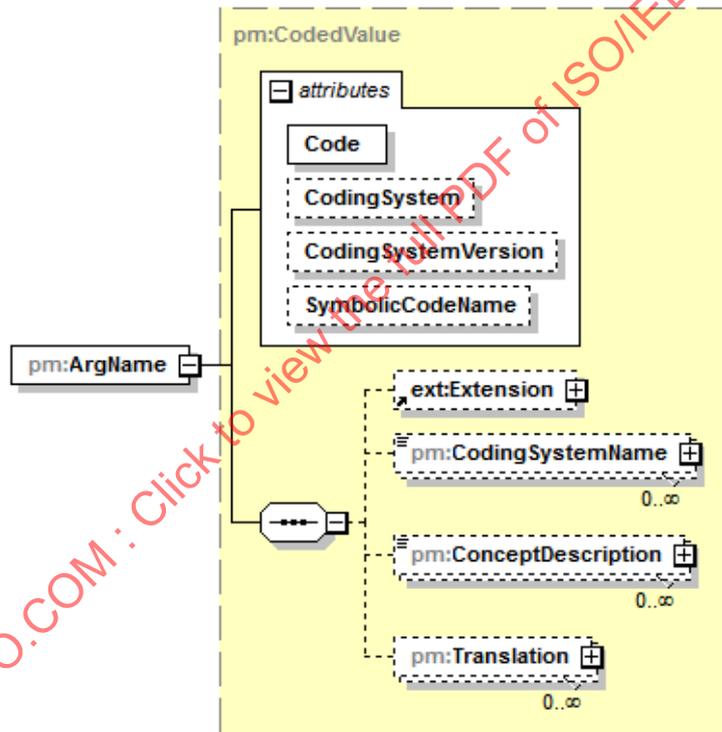
Properties Min. occurrence: 0
Max. occurrence: unbounded

Children pm:ArgName
pm:Arg

Documentation Argument description for an activate operation.

B.85 ActivateOperationDescriptor/Argument/ArgName

Type: element



Type pm:CodedValue

Children tns:Extension
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation CODED VALUE that describes this argument.

B.86 ActivateOperationDescriptor/Argument/Arg

Type: element

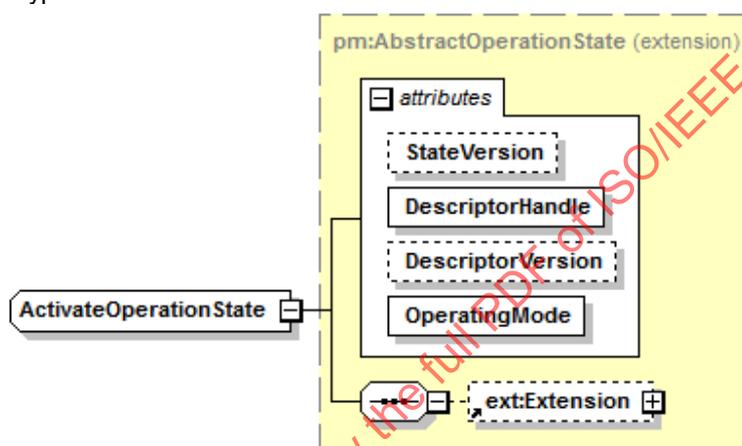


Type **xsd:QName**

Documentation Data type of the argument, defined by a qualified name.

B.87 ActivateOperationState

Type: complexType



Type extension of **pm:AbstractOperationState**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of an activate operation that is exposed on the SCO.

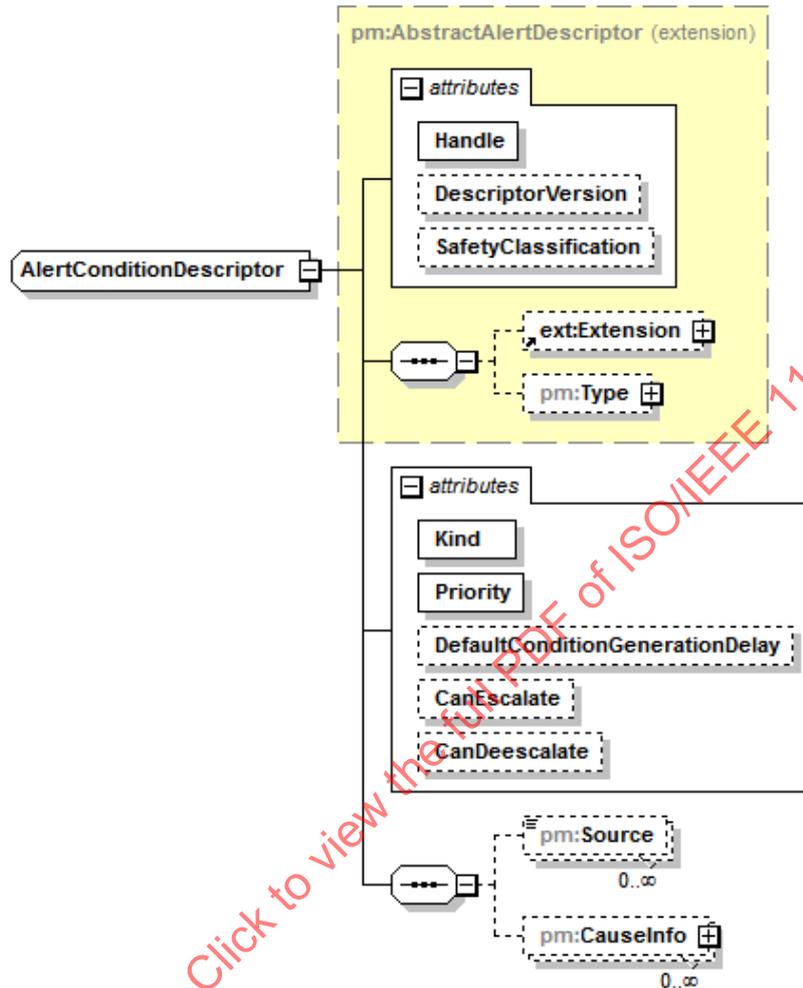
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B.88 AlertConditionDescriptor

Type: complexType



Type extension of **pm:AbstractAlertDescriptor**

Children **tns:Extension**
pm:Type
pm:Source
pm:CauseInfo

Used by **AlertSystemDescriptor/AlertCondition**
LimitAlertConditionDescriptor

Attributes	Name	Type	Use
	<i>Handle</i>	pm:Handle	required
	<i>DescriptorVersion</i>	pm:VersionCounter	optional
	<i>SafetyClassification</i>	pm:SafetyClassification	optional
	<i>Kind</i>	pm:AlertConditionKind	required
	<i>Priority</i>	pm:AlertConditionPriority	required
	<i>DefaultConditionGenerationDelay</i>	xsd:duration	optional
	<i>CanEscalate</i>	pm:AlertConditionPriority	optional
	<i>CanDeescalate</i>	pm:AlertConditionPriority	optional

Documentation An ALERT CONDITION contains the information about a potentially or actually HAZARDOUS SITUATION.

Examples: a physiological alarm limit has been exceeded or a sensor has been unplugged.

B.89 AlertConditionDescriptor/@Kind

Type: attribute

Type **pm:AlertConditionKind**

Constraints	Kind	Value	Documentation
	enumeration	Phy	Phy = Physiological. The condition arises from a patient-related variable. Examples: "blood pressure high" or "minute volume low".
	enumeration	Tec	Tec = Technical. The condition arises from a monitored equipment-related or ALERT SYSTEM-related variable. Examples: "battery low" or "sensor unplugged".
	enumeration	Oth	Oth = Other. The condition arises from another origin, e.g., equipment-user advisory conditions like "room temperature high".

Documentation See pm:AlertConditionKind.

B.90 AlertConditionDescriptor/@Priority

Type: attribute

Type **pm:AlertConditionPriority**

Constraints	Kind	Value	Documentation
	enumeration	Lo	Lo = Low. Awareness of the ALERT CONDITION is required.
	enumeration	Me	Me = Medium. Prompt response to remove the ALERT CONDITION is required.
	enumeration	Hi	Hi = High. Immediate response to remove the ALERT CONDITION is required.
	enumeration	None	No awareness of the ALERT CONDITION is required.

Documentation See pm:AlertConditionPriority.

NOTE—If the ATTRIBUTE pm:AlertConditionState/@ActualPriority is present, the priority defined for pm:AlertConditionDescriptor MAY not reflect the current severity of the potential or actual hazard that exists if the ALERT CONDITION is present.

B.91 AlertConditionDescriptor/@DefaultConditionGenerationDelay

Type: attribute

Type **xsd:duration**

Documentation DefaultConditionGenerationDelay is the period that describes delay from the physical fulfillment of an ALERT CONDITION to the generation of the ALERT CONDITION on the POC MEDICAL DEVICE. The implied value SHALL be "PT0S".

B.92 AlertConditionDescriptor/@CanEscalate

Type: attribute

Type restriction of **pm:AlertConditionPriority**

Constraints	Kind	Value	Documentation
	enumeration	Lo	Lo = Low. Alert condition can escalate to low priority.

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enumeration	Me	Me = Medium. Alert condition can escalate to medium priority.
enumeration	Hi	Hi = High. Alert condition can escalate to high priority.

Documentation Indicates if an alert condition can escalate from one priority to another.

B.93 AlertConditionDescriptor/@CanDeescalate

Type: attribute

Type restriction of **pm:AlertConditionPriority**

Constraints	Kind	Value	Documentation
	enumeration	Me	Me = Medium. Alert condition can deescalate to medium priority.
	enumeration	Lo	Lo = Low. Alert condition can deescalate to low priority.
	enumeration	None	No = None. Alert condition can deescalate to condition with no priority.

Documentation Indicates if an alert condition can deescalate from one priority to another.

B.94 AlertConditionDescriptor/Source

Type: element



Type **pm:HandleRef**

<i>Properties</i>	Min. occurrence:	0
	Max. occurrence:	unbounded

Constraints	Kind	Value
	minLength	1

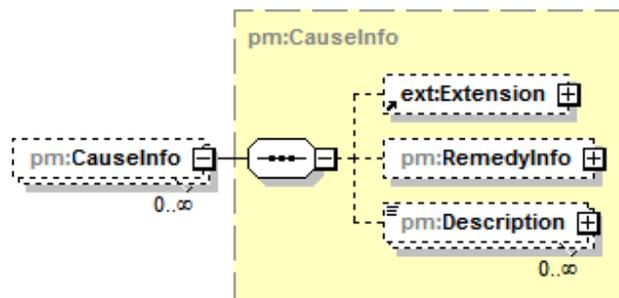
Documentation A list of HANDLE references to sources (e.g., METRICs) that cause the ALERT CONDITION.

Example if a source is present: the heart rate METRIC is the source for a "heart rate high" ALERT CONDITION.

Example if no source is present: a "cable disconnection" ALERT CONDITION has no source.

B.95 AlertConditionDescriptor/CauseInfo

Type: element



Type **pm:CauseInfo**

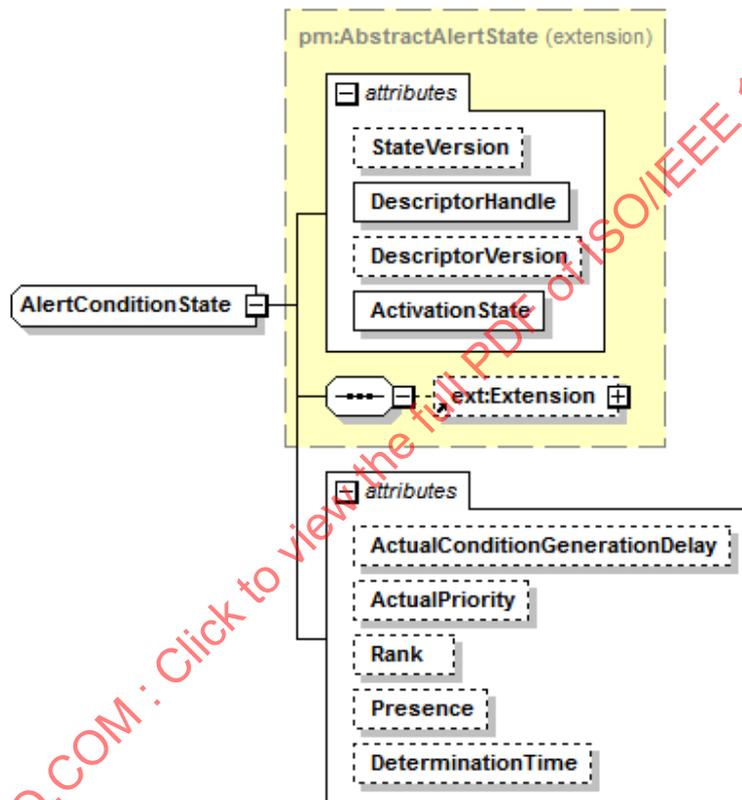
Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:RemedyInfo
pm:Description

Documentation Information about possible causes if the ALERT CONDITION is present.

B.96 AlertConditionState

Type: complexType



Type extension of **pm:AbstractAlertState**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:AlertActivation	required
	<u>ActualConditionGenerationDelay</u>	xsd:duration	optional
	<u>ActualPriority</u>	pm:AlertConditionPriority	optional
	<u>Rank</u>	xsd:int	optional
	<u>Presence</u>	xsd:boolean	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional

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Documentation AlertConditionState contains the dynamic/volatile information of an ALERT CONDITION. See pm:AlertConditionDescriptor for static information.

B.97 AlertConditionState/@ActualConditionGenerationDelay

Type: attribute

Type **xsd:duration**

Documentation ActualConditionGenerationDelay overrides pm:AlertConditionDescriptor/@DefaultConditionGenerationDelay.

B.98 AlertConditionState/@ActualPriority

Type: attribute

Type **pm:AlertConditionPriority**

Constraints	Kind	Value	Documentation
	enumeration	Lo	Lo = Low. Awareness of the ALERT CONDITION is required.
	enumeration	Me	Me = Medium. Prompt response to remove the ALERT CONDITION is required.
	enumeration	Hi	Hi = High. Immediate response to remove the ALERT CONDITION is required.
	enumeration	None	No awareness of the ALERT CONDITION is required.

Documentation The current priority of the ALERT CONDITION that has been modified by an escalation or de-escalation process.

NOTE—If this ATTRIBUTE is present in an pm:AlertConditionState ELEMENT, the related pm:AlertConditionDescriptor/pm:Priority ELEMENT MAY NOT reflect the current severity of the potential or actual hazard that exists if this ALERT CONDITION is present.

B.99 AlertConditionState/@Rank

Type: attribute

Type **xsd:int**

Documentation The rank is an optional ATTRIBUTE allowing finer distinction of ALERT CONDITION priorities. A ranking is a relationship between a set of items such that, for any two items, the first is either "ranked higher than", "ranked lower than" or "ranked equal to" the second.

B.100 AlertConditionState/@Presence

Type: attribute

Type **xsd:boolean**

Documentation The Presence ATTRIBUTE is set to "true" if the ALERT CONDITION has been detected and is still present. Otherwise it is set to "false". The implied value SHALL be "false".

B.101 AlertConditionState/@DeterminationTime

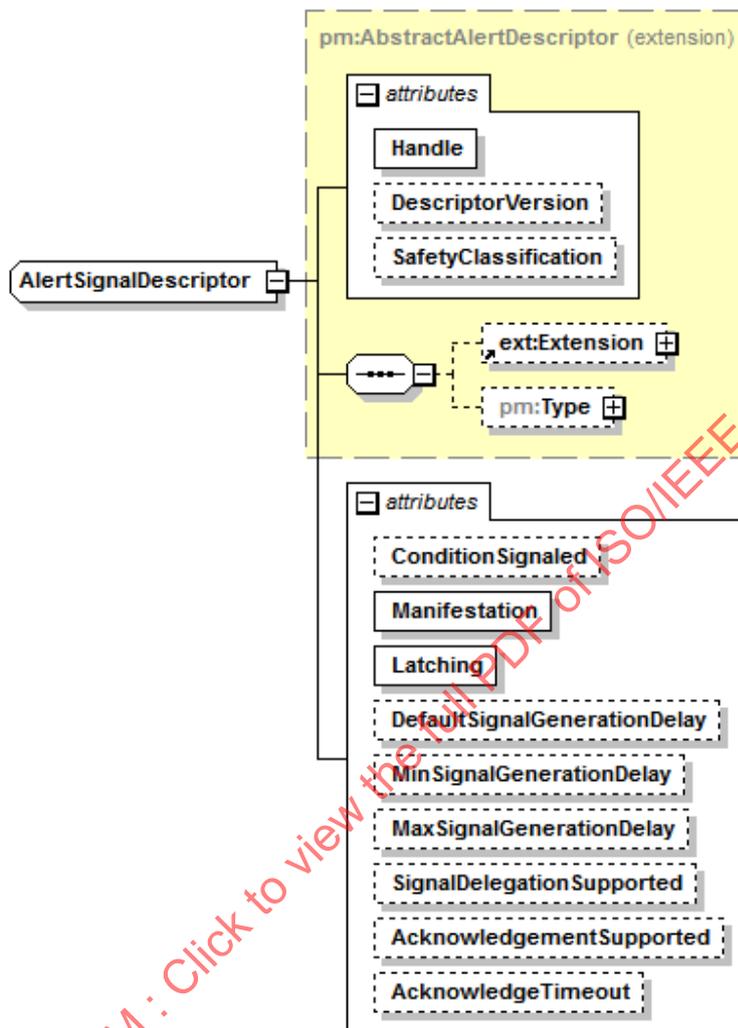
Type: attribute

Type **pm:Timestamp**

Documentation Timepoint when the ALERT CONDITION has changed its presence the last time.

B.102 AlertSignalDescriptor

Type: complexType



Type extension of **pm:AbstractAlertDescriptor**

Children **ns:Extension**
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>ConditionSignaled</u>	pm:HandleRef	optional
	<u>Manifestation</u>	pm:AlertSignalManifestation	required
	<u>Latching</u>	xsd:boolean	required
	<u>DefaultSignalGenerationDelay</u>	xsd:duration	optional
	<u>MinSignalGenerationDelay</u>	xsd:duration	optional
	<u>MaxSignalGenerationDelay</u>	xsd:duration	optional

<u>SignalDelegationSupported</u>	xsd:boolean	optional
<u>AcknowledgementSupported</u>	xsd:boolean	optional
<u>AcknowledgeTimeout</u>	xsd:duration	optional

Documentation AlertSignalDescriptor represents an ALERT SIGNAL. An ALERT SIGNAL contains information about the way an ALERT CONDITION is communicated to a human. It is generated by an ALERT SYSTEM to indicate the presence or occurrence of an ALERT CONDITION.

Example: a signal could be a lamp (see pm:AlertSignalDescriptor/pm:Manifestation) on a remote POC MEDICAL DEVICE, such as the nurses handheld device (see pm:AlertSignalDescriptor/pm:SignalDelegationSupported), which starts flashing when the heart rate is exceeding 150bpm (see pm:AlertSignalDescriptor/pm:ConditionSignaled) for more than 2 seconds (see pm:AlertSignalDescriptor/pm:DefaultSignalGenerationDelay), and keeps flashing until the nurse confirms the alarm, even if the alarm condition is not present anymore (see pm:AlertSignalDescriptor/pm:Latching).

B.103 AlertSignalDescriptor/@ConditionSignaled

Type: attribute

Type **pm:HandleRef**

Constraints	Kind	Value
	minLength	1

Documentation Reference to an ALERT CONDITION communicated by the ALERT SIGNAL. The ALERT CONDITION signaled has to be in the same ALERT SYSTEM or in an ALERT SYSTEM that is underneath the ALERT SYSTEM of this ALERT SIGNAL in the CONTAINMENT TREE.

Example: assume an MDS possesses two VMDs and an ALERT SYSTEM A, and each of these VMDs possess itself an ALERT SYSTEM (B and C). An ALERT SIGNAL from the ALERT SYSTEM A of the MDS is allowed to reference an ALERT CONDITION from the ALERT SYSTEMS A, B and C. In contrast to this an ALERT SIGNAL from the ALERT SYSTEM B is allowed to reference only ALERT CONDITIONS from the ALERT SYSTEM B and not from the ALERT SYSTEM A or C.

B.104 AlertSignalDescriptor/@Manifestation

Type: attribute

Type **pm:AlertSignalManifestation**

Constraints	Kind	Value	Documentation
	enumeration	Aud	Aud = Audible. The ALERT SIGNAL manifests in an audible manner, i.e., the alert can be heard. Example: an alarm sound.
	enumeration	Vis	Vis = Visible. The ALERT SIGNAL manifests in a visible manner, i.e., the alert can be seen. Example: a red flashing light.
	enumeration	Tan	Tan = Tangible. The ALERT SIGNAL manifests in a tangible manner, i.e., the alert can be felt. Example: vibration.
	enumeration	Oth	Oth = Other. The ALERT SIGNAL manifests in a manner not further specified.

Documentation See pm:AlertSignalManifestation.

B.105 AlertSignalDescriptor/@Latching

Type: attribute

Type **xsd:boolean**

Documentation An ALERT SIGNAL is latching if it outlives its triggering ALERT CONDITION until it is stopped by deliberate action.

Example: if the patient's heart rate exceeds a given limit for a certain time, but then normalizes such that the ALERT CONDITION no longer exists, it might be desirable to keep the ALERT SIGNAL alive until, e.g., the nurse confirms it. Otherwise the ALERT CONDITION could pass unnoticed.

B.106 AlertSignalDescriptor/@DefaultSignalGenerationDelay

Type: attribute

Type **xsd:duration**

Documentation DefaultSignalGenerationDelay is the default period from the onset of an ALERT CONDITION to the generation of the ALERT SIGNAL. The implied value SHALL be "PT0S".

Example: if the heart rate exceeds a limit periodically as the actual rate oscillates around the limit value, it might be desirable to not directly generate the ALERT SIGNAL whenever the limit is exceeded, but to wait for the given delay first.

In the case of a FALLBACK ALERT SIGNAL, DefaultSignalGenerationDelay is the default period of time from when a PARTICIPANT last retriggered the SetAlertStateOperation to the generation of the FALLBACK ALERT SIGNAL.

B.107 AlertSignalDescriptor/@MinSignalGenerationDelay

Type: attribute

Type **xsd:duration**

Documentation OPTIONAL minimum delay of pm:AlertSignalState/@ActualSignalGenerationDelay.

B.108 AlertSignalDescriptor/@MaxSignalGenerationDelay

Type: attribute

Type **xsd:duration**

Documentation OPTIONAL maximum delay of pm:AlertSignalState/@ActualSignalGenerationDelay.

B.109 AlertSignalDescriptor/@SignalDelegationSupported

Type: attribute

Type **xsd:boolean**

Documentation SignalDelegationSupported is set to "true" to indicate if the signal can be generated at another PARTICIPANT as primary ALERT SIGNAL, otherwise "false". The implied value SHALL be "false".

B.110 AlertSignalDescriptor/@AcknowledgementSupported

Type: attribute

Type **xsd:boolean**

Documentation AcknowledgementSupported is set to "true" to indicate if the ALERT SIGNAL supports acknowledgment. The implied value SHALL be "false".

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B.111 AlertSignalDescriptor/@AcknowledgeTimeout

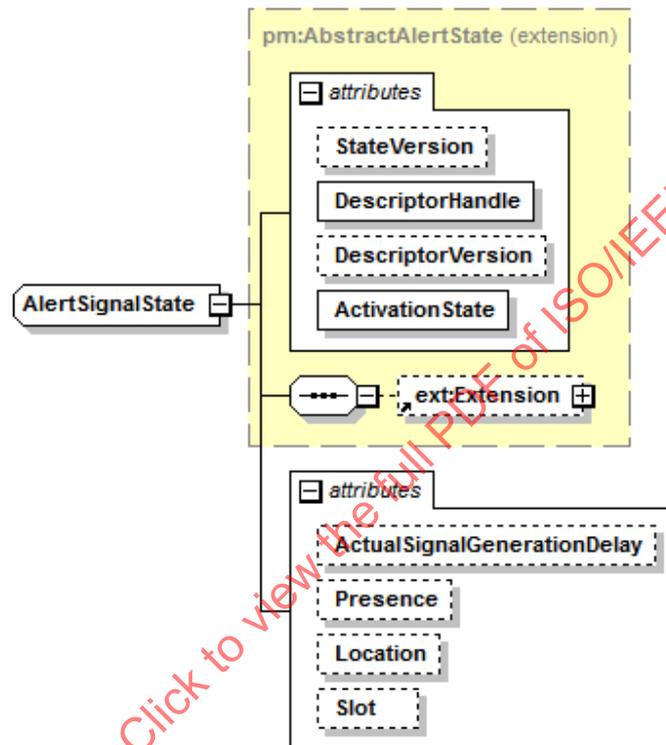
Type: attribute

Type `xsd:duration`

Documentation Indicates the acknowledgment timeout if the signal supports acknowledgment. If no duration is defined, an indefinite acknowledgment timeout SHALL be supported.

B.112 AlertSignalState

Type: complexType



Type extension of `pm:AbstractAlertState`

Attributes	Name	Type	Use
	<u>StateVersion</u>	<code>pm:VersionCounter</code>	optional
	<u>DescriptorHandle</u>	<code>pm:HandleRef</code>	required
	<u>DescriptorVersion</u>	<code>pm:ReferencedVersion</code>	optional
	<u>ActivationState</u>	<code>pm:AlertActivation</code>	required
	<u>ActualSignalGenerationDelay</u>	<code>xsd:duration</code>	optional
	<u>Presence</u>	<code>pm:AlertSignalPresence</code>	optional
	<u>Location</u>	<code>pm:AlertSignalPrimaryLocation</code>	optional
	<u>Slot</u>	<code>xsd:unsignedInt</code>	optional

Documentation AlertSignalState contains the dynamic/volatile information of an ALERT SIGNAL. See `pm:AlertSignalDescriptor` for static information.

B.113 AlertSignalState/@ActualSignalGenerationDelay

Type: attribute

Type `xsd:duration`

Documentation ActualSignalGenerationDelay overrides pm:AlertSignalDescriptor/@DefaultSignalGenerationDelay.

B.114 AlertSignalState/@Presence

Type: attribute

Type `pm:AlertSignalPresence`

Constraints	Kind	Value	Documentation
	enumeration	On	Indicates that an ALERT SIGNAL is currently generated.
	enumeration	Off	Indicates that an ALERT SIGNAL is currently not generated.
	enumeration	Latch	Latch = Latched. "Latched" indicates that an ALERT SIGNAL is currently generated even if the ALERT CONDITION is no longer present.
	enumeration	Ack	Ack = Acknowledged. "Acknowledged" indicates that an ALERT SIGNAL is currently not generated due to an acknowledgment even if the ALERT CONDITION is still present. Acknowledged signals are those, where an auditory ALERT SIGNAL that is related to a currently active ALERT CONDITION, is inactive until the ALERT CONDITION is no longer present.

Documentation See pm:AlertSignalPresence. The implied value SHALL be "Off".

B.115 AlertSignalState/@Location

Type: attribute

Type `pm:AlertSignalPrimaryLocation`

Constraints	Kind	Value	Documentation
	enumeration	Loc	Loc = Local. The ALERT SIGNAL is perceivable on the machine where the ALERT CONDITION has been detected.
	enumeration	Rem	Rem = Remote. The ALERT SIGNAL is perceivable on a remote machine.

Documentation See pm:AlertSignalPrimaryLocation. The implied value SHALL be "Loc".

B.116 AlertSignalState/@Slot

Type: attribute

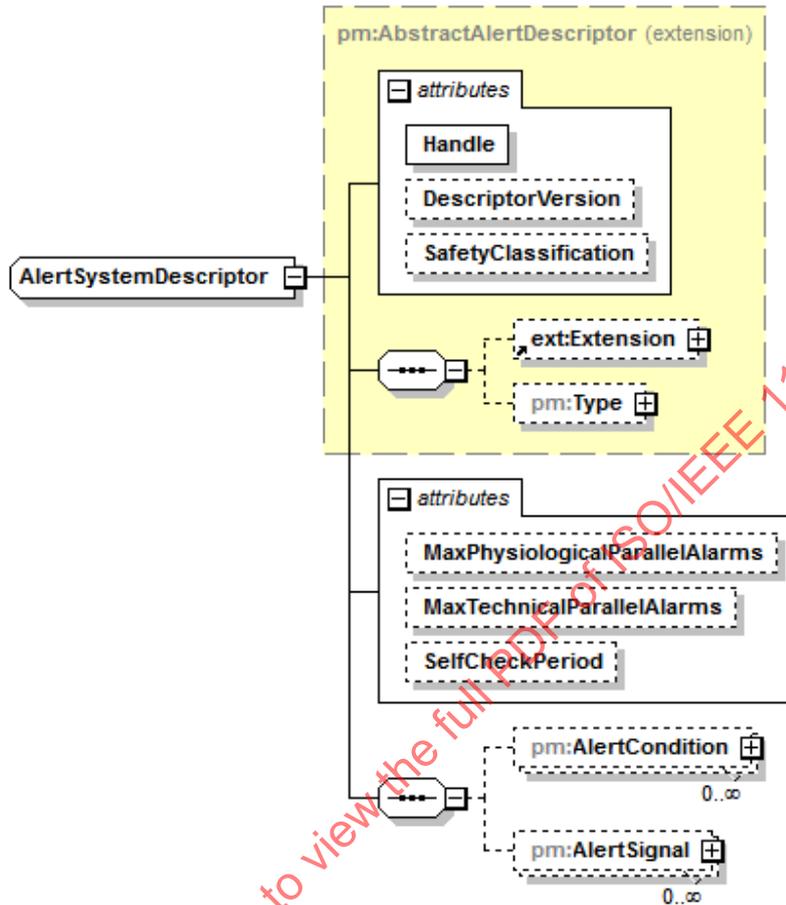
Type `xsd:unsignedInt`

Documentation The slot is a 0-based index that allows a prioritization of the ALERT SIGNAL with regard to signal tangibility. The Slot SHOULD be used if the medium for signal generation has only a limited capability of parallel signal generation. The smaller the slot index, the higher is the priority in generation of the signal.

Example: if a signal is audible and there are different audio signals for different ALERT SIGNALs, and more than one ALERT SIGNAL has to be generated, the generating system has to decide which of the ALERT SIGNALs it generates as overlaying audio signals might not be desirable. For example, if the first ALERT SIGNAL has a slot number of 0 and the second ALERT SIGNAL has a slot number 1 and both signals are active, then the ALERT SYSTEM generates only the ALERT SIGNAL with the slot number 0.

B.117 AlertSystemDescriptor

Type: complexType



Type extension of **pm:AbstractAlertDescriptor**

Children
tns:Extension
pm:Type
pm:AlertCondition
pm:AlertSignal

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MaxPhysiologicalParallelAlarms</u>	xsd:unsignedInt	optional
	<u>MaxTechnicalParallelAlarms</u>	xsd:unsignedInt	optional
	<u>SelfCheckPeriod</u>	xsd:duration	optional

Documentation AlertSystemDescriptor describes an ALERT SYSTEM to detect ALERT CONDITIONS and generate ALERT SIGNALS, which belong to specific ALERT CONDITIONS.

ALERT CONDITIONS are represented by a list of pm:AlertConditionDescriptor ELEMENTs and ALERT SIGNALS are represented by a list of pm:AlertSignalDescriptor ELEMENTs.

B.118 AlertSystemDescriptor/@MaxPhysiologicalParallelAlarms

Type: attribute

Type `xsd:unsignedInt`

Documentation The maximum number of physiological alarm conditions that can be present at a point of time. If no value is given, an unlimited number SHALL be assumed.

B.119 AlertSystemDescriptor/@MaxTechnicalParallelAlarms

Type: attribute

Type `xsd:unsignedInt`

Documentation The maximum number of technical alarm conditions that can be present at a point of time. If no value is given, an unlimited number SHALL be assumed.

B.120 AlertSystemDescriptor/@SelfCheckPeriod

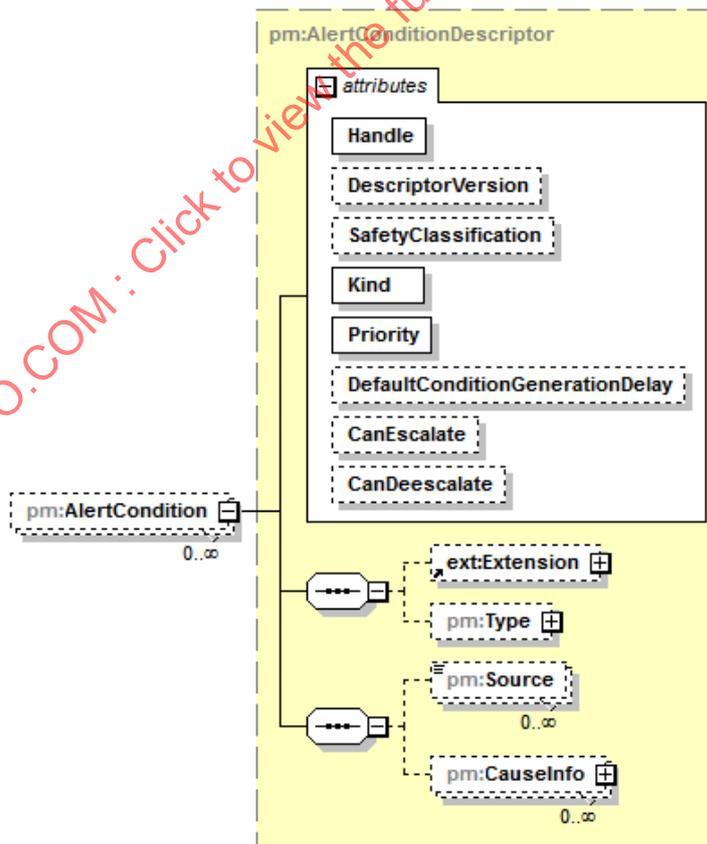
Type: attribute

Type `xsd:duration`

Documentation The self check time period defines the value after which a self test of the ALERT SYSTEM is performed. This self check period MAY be used to detect if an ALERT SYSTEM is still operating.

B.121 AlertSystemDescriptor/AlertCondition

Type: element



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Type **pm:AlertConditionDescriptor**

Properties Min. occurrence: 0
Max. occurrence: unbounded

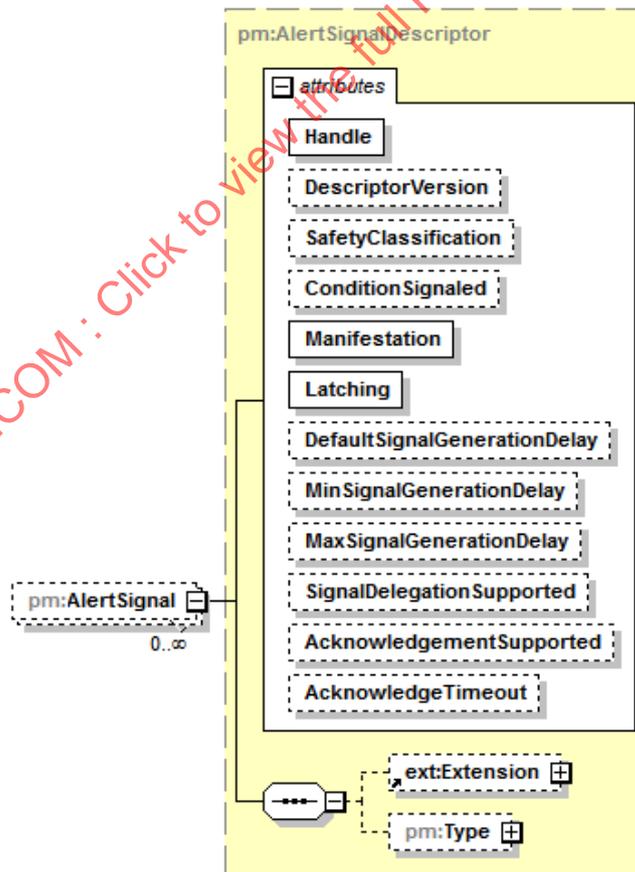
Children **tns:Extension**
pm:Type
pm:Source
pm:CauseInfo

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>Kind</u>	pm:AlertConditionKind	required
	<u>Priority</u>	pm:AlertConditionPriority	required
	<u>DefaultConditionGenerationDelay</u>	xsd:duration	optional
	<u>CanEscalate</u>	pm:AlertConditionPriority	optional
	<u>CanDeescalate</u>	pm:AlertConditionPriority	optional

Documentation Description of all ALERT CONDITIONS that can be detected by the surrounding ALERT SYSTEM.

B.122 AlertSystemDescriptor/AlertSignal

Type: element



Type **pm:AlertSignalDescriptor**

<i>Properties</i>	Min. occurrence: 0
	Max. occurrence: unbounded

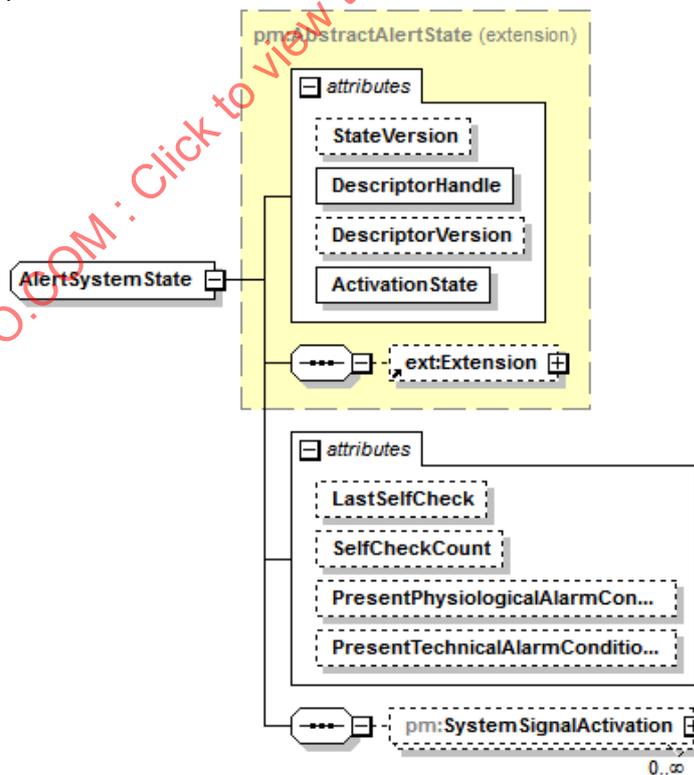
Children **tns:Extension**
pm:Type

<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>ConditionSignaled</u>	pm:HandleRef	optional
	<u>Manifestation</u>	pm:AlertSignalManifestation	required
	<u>Latching</u>	xsd:boolean	required
	<u>DefaultSignalGenerationDelay</u>	xsd:duration	optional
	<u>MinSignalGenerationDelay</u>	xsd:duration	optional
	<u>MaxSignalGenerationDelay</u>	xsd:duration	optional
	<u>SignalDelegationSupported</u>	xsd:boolean	optional
	<u>AcknowledgementSupported</u>	xsd:boolean	optional
	<u>AcknowledgeTimeout</u>	xsd:duration	optional

Documentation Description of all ALERT SIGNALS that MAY be generated by the surrounding ALERT SYSTEM as a consequence of a detected ALERT CONDITIONS.

B.123 AlertSystemState

Type: complexType



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Type extension of **pm:AbstractAlertState**

<i>Children</i>	tns:Extension pm:SystemSignalActivation		
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:AlertActivation	required
	<u>LastSelfCheck</u>	pm:Timestamp	optional
	<u>SelfCheckCount</u>	xsd:long	optional
	<u>PresentPhysiologicalAlarmConditions</u>	pm:AlertConditionReference	optional
	<u>PresentTechnicalAlarmConditions</u>	pm:AlertConditionReference	optional
<i>Documentation</i>	AlertSystemState contains the dynamic/volatile information of an ALERT SYSTEM. See pm:AlertSystemDescriptor for static information.		

B.124 AlertSystemState/@LastSelfCheck

Type: attribute

Type **pm:Timestamp**

Documentation Timepoint when the ALERT SYSTEM has performed a self check the last time. LastSelfCheck SHALL be updated on every pm:AlertSystemDescriptor/pm:SelfCheckPeriod.

B.125 AlertSystemState/@SelfCheckCount

Type: attribute

Type **xsd:long**

Documentation Number of self checks performed.

This specification does not prescribe the origin of the value, i.e., whether the counter is incremented since the last boot or whether the counter represents the self checks ever performed.

B.126 AlertSystemState/@PresentPhysiologicalAlarmConditions

Type: attribute

Type **pm:AlertConditionReference**

Documentation List of HANDLE references to the present physiological alarm conditions that have been determined by the ALERT SYSTEM.

B.127 AlertSystemState/@PresentTechnicalAlarmConditions

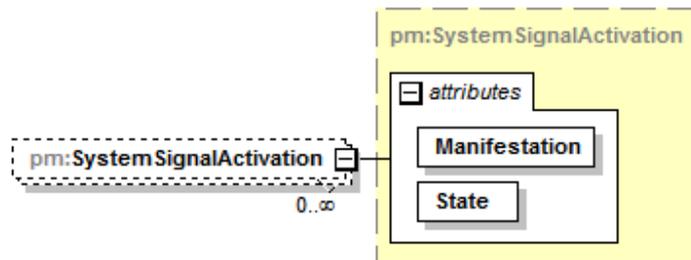
Type: attribute

Type **pm:AlertConditionReference**

Documentation List of HANDLE references to the present technical alarm conditions that have been determined by the ALERT SYSTEM.

B.128 AlertSystemState/SystemSignalActivation

Type: element

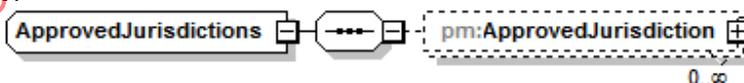


Type **pm:SystemSignalActivation**

Properties	Min. occurrence: 0	
	Max. occurrence: unbounded	
Attributes		
<i>Name</i>	<i>Type</i>	<i>Use</i>
<u>Manifestation</u>	pm:AlertSignalManifestation	required
<u>State</u>	pm:AlertActivation	required
Documentation	<p>Describes a compound ALERT SIGNAL activation for local audible, visible, and tangible ALERT SIGNALs within the ALERT SYSTEM.</p> <p>If a SystemSignalActivation SSA is set for any ALERT SIGNAL manifestation within an ALERT SYSTEM, then the following rules SHALL apply for any local ALERT SIGNAL ASi within the ALERT SYSTEM where SSA/@Manifestation is equal to ASi/@Manifestation:</p> <ul style="list-style-type: none"> — If SSA/@State is "On", any ASi/@ActivationState is "On", "Off", or "Psd" — If SSA/@State is "Psd", any ASi/@ActivationState is "Psd" or "Off" — If SSA/@State is "Off", all ASi/@ActivationState are "Off" — If any ASi/@ActivationState is "On" then SSA/@State is "On" — If all ASi/@ActivationState are "Psd" then SSA/@State is "Psd" — If all ASi/@ActivationState are "Off" then SSA/@State is "Off" <p>NOTE 1—A local ALERT SIGNAL is an ALERT SIGNAL where pm:AlertSignalState/@Location is set to "Loc", whereas a remote ALERT SIGNAL is an ALERT SIGNAL where pm:AlertSignalState/@Location is set to "Rem".</p> <p>NOTE 2—Remote signals are not considered by SystemSignalActivation.</p>	

B.129 ApprovedJurisdictions

Type: complexType

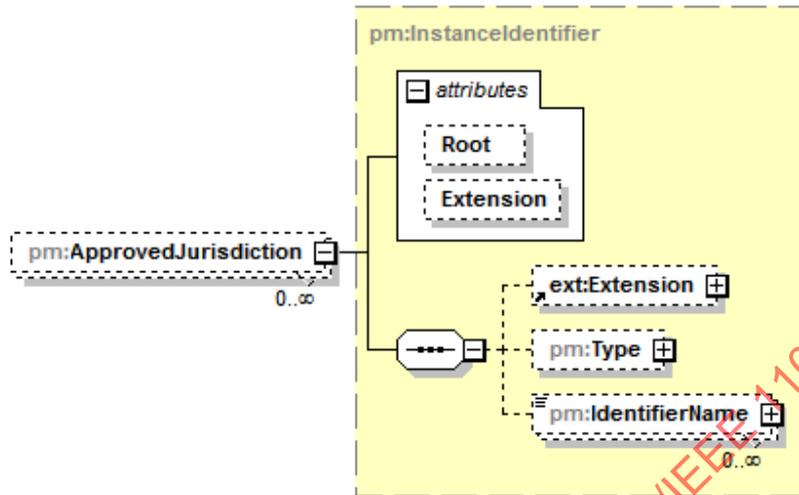


Used by **MdsDescriptor/ApprovedJurisdictions**
VmdDescriptor/ApprovedJurisdictions

Documentation List of regions in which a DEVICE COMPONENT is approved to be operated. If the list does not contain any entries, then the DEVICE COMPONENT is not approved for any region.

B.130 ApprovedJurisdictions/ApprovedJurisdiction

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
 Max. occurrence: unbounded

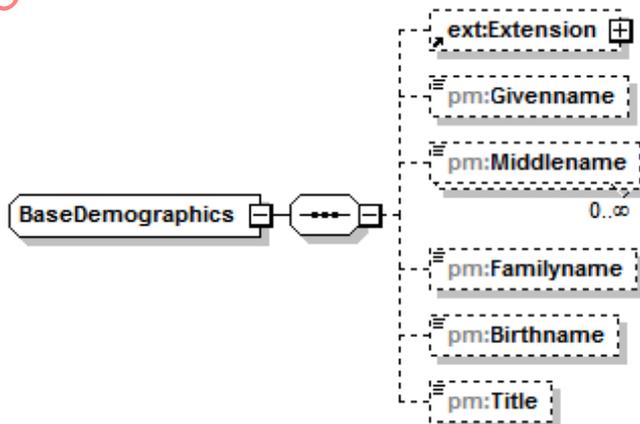
Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Region in which the DEVICE COMPONENT is approved to be operated.
 NOTE—See also: <https://unstats.un.org/unsd/methodology/m49/>

B.131 BaseDemographics

Type: complexType



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Children tns:Extension
pm:Givenname
pm:Middlename
pm:Familyname
pm:Birthname
pm>Title

Used by PersonReference/Name
OperatorContextState/OperatorDetails
PatientDemographicsCoreData

Documentation Definition of basic demographic information.

B.132 BaseDemographics/Givenname

Type: element



Type **xsd:string**

Properties Min. occurrence: 0
 Max. occurrence: 1

Documentation Given name of a person.

B.133 BaseDemographics/Middlename

Type: element



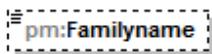
Type **xsd:string**

Properties Min. occurrence: 0
 Max. occurrence: unbounded

Documentation Middle name of a person.

B.134 BaseDemographics/Familyname

Type: element



Type **xsd:string**

Properties Min. occurrence: 0
 Max. occurrence: 1

Documentation Family name of a person.

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B.135 BaseDemographics/Birthname

Type: element



Type **xsd:string**

Properties Min. occurrence: 0
Max. occurrence: 1

Documentation Birth name of a person.

B.136 BaseDemographics/Title

Type: element



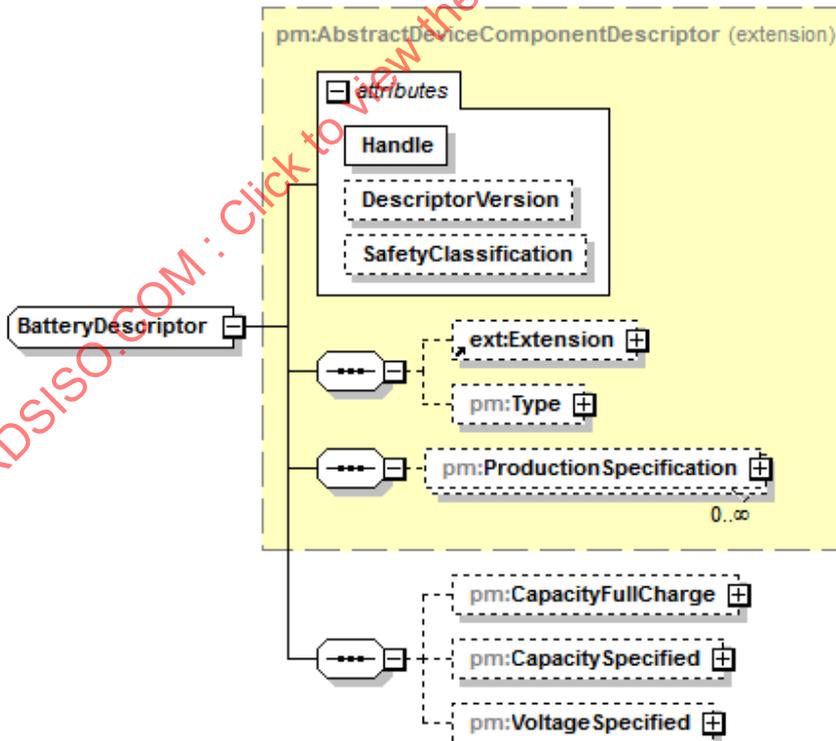
Type **xsd:string**

Properties Min. occurrence: 0
Max. occurrence: 1

Documentation Title of a person.

B.137 BatteryDescriptor

Type: complexType



Type extension of **pm:AbstractDeviceComponentDescriptor**

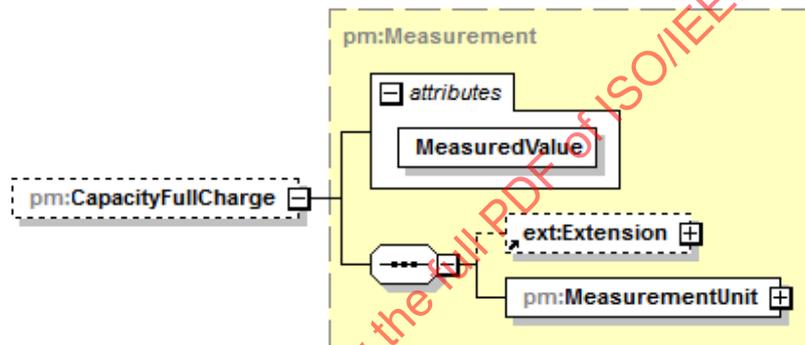
Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:CapacityFullCharge
pm:CapacitySpecified
pm:VoltageSpecified

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation For battery-powered devices, battery information can be contained in this object.

B.138 BatteryDescriptor/CapacityFullCharge

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
 Max. occurrence: 1

Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Current battery capacity after a full charge.

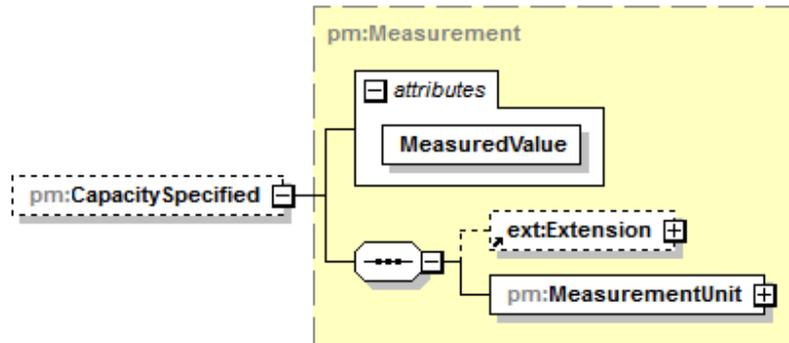
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B.139 BatteryDescriptor/CapacitySpecified

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

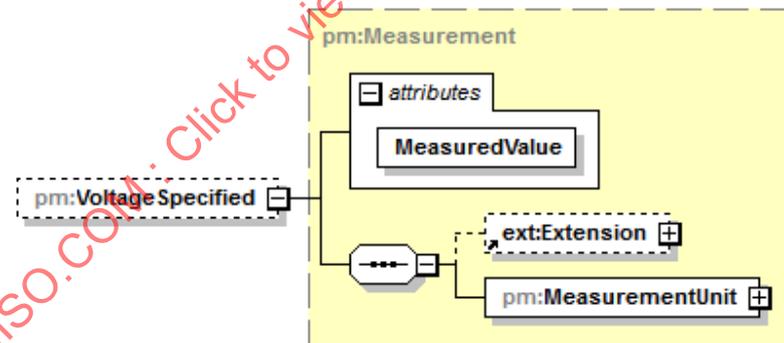
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Rated capacity the manufacturer claims for the battery.

B.140 BatteryDescriptor/VoltageSpecified

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

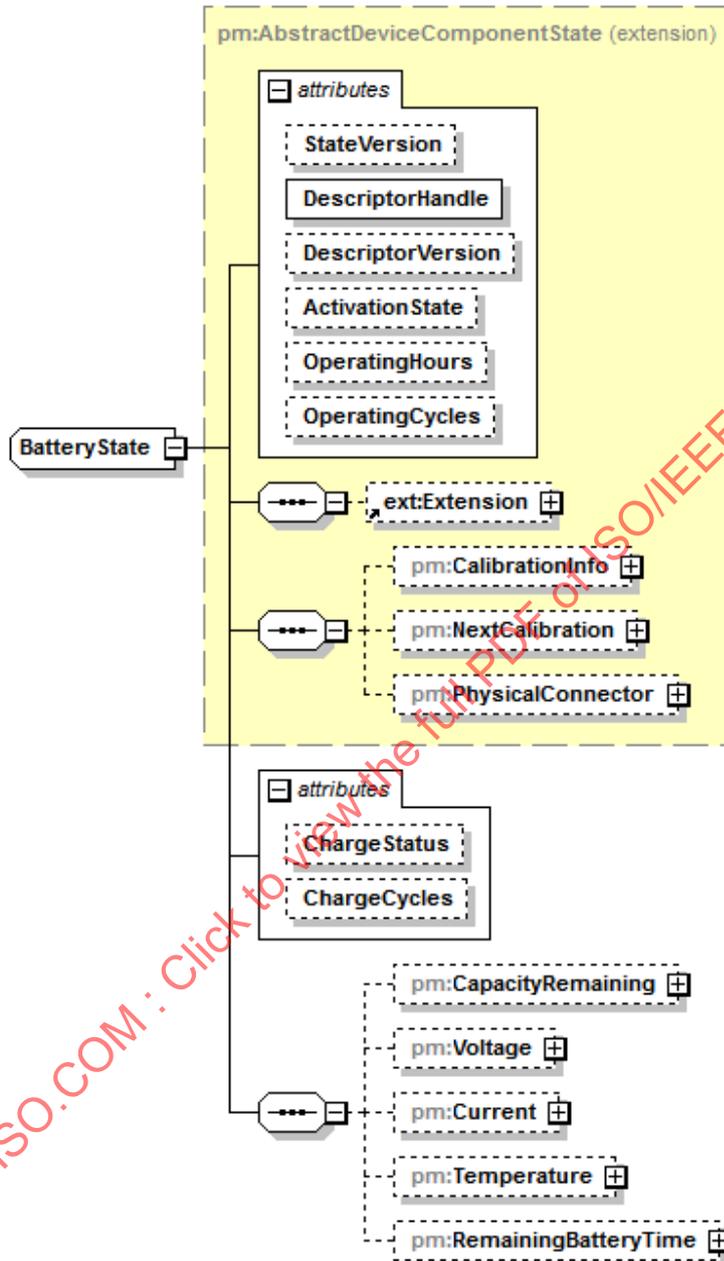
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Specified battery voltage.

B.141 BatteryState

Type: complexType



Type extension of **pm:AbstractDeviceComponentState**

- Children
- [tns:Extension](#)
 - [pm:CalibrationInfo](#)
 - [pm:NextCalibration](#)
 - [pm:PhysicalConnector](#)
 - [pm:CapacityRemaining](#)
 - [pm:Voltage](#)
 - [pm:Current](#)
 - [pm:Temperature](#)
 - [pm:RemainingBatteryTime](#)

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Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional
	<u>ChargeStatus</u>	xsd:string	optional
	<u>ChargeCycles</u>	xsd:unsignedInt	optional

Documentation State of a battery of an MDS.

The current power source is designated by `./@ActivationState`:

- If `./@ActivationState` equals "On", the device is running on battery
- If `./@ActivationState` equals "Off", the device is in mains operation and currently not able to be run on battery
- If `./@ActivationState` equals "StndBy", the device is in mains operation and can be switched to run on battery
- If `./@ActivationState` equals "Fail", the battery has a malfunction. Detailed error information SHOULD be communicated by using an ALERT SYSTEM.

Enumerations "Shtdn" and "NotRdy" are undefined for `BatteryState`.

B.142 BatteryState/@ChargeStatus

Type: attribute

Type restriction of `xsd:string`

Constraints	Kind	Value	Documentation
	enumeration	Ful	Ful = Full. All available active material is in a state such that the charging under the selected conditions produces no significant increase of capacity. See also IEC 60050-482 International Electrotechnical Vocabulary, 482-05-42.
	enumeration	ChB	ChB = Charging Battery. Battery is currently supplied with electric energy from an external circuit. See also IEC 60050-482 International Electrotechnical Vocabulary, 482-05-27.
	enumeration	DisChB	DisChB = Discharging Battery. Battery delivers, to an external electric circuit and under specified conditions, electric energy produced in the cells. See also IEC 60050-482 International Electrotechnical Vocabulary, 482-03-23
	enumeration	DEB	DEB = Discharged Empty Battery. Discharged secondary battery. See also IEC 60050-482 International Electrotechnical Vocabulary, 482-05-31.

Documentation Current charge status of the battery.

B.143 BatteryState/@ChargeCycles

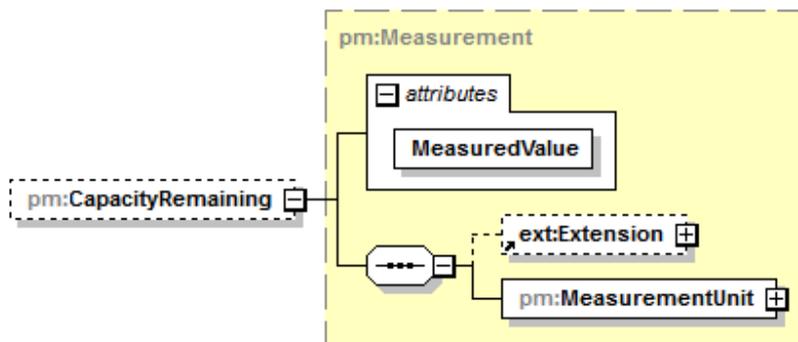
Type: attribute

Type `xsd:unsignedInt`

Documentation Number of charge/discharge cycles.

B.144 BatteryState/CapacityRemaining

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

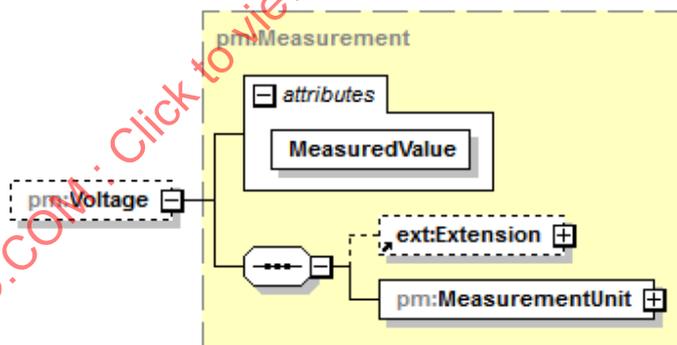
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Remaining capacity at current load.

B.145 BatteryState/Voltage

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

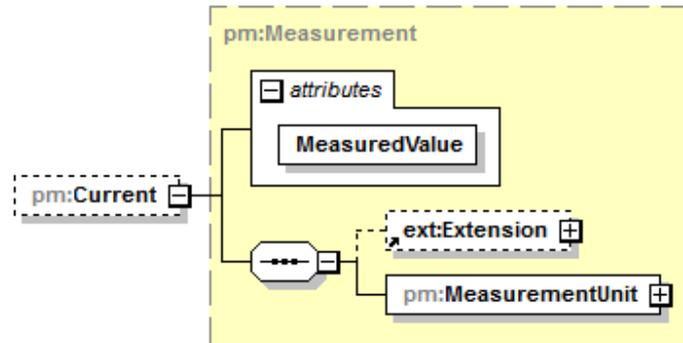
Documentation Voltage between the terminals of a cell or battery when being discharged. See also IEC 60050-482 International Electrotechnical Vocabulary, 482-03-28.

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B.146 BatteryState/Current

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

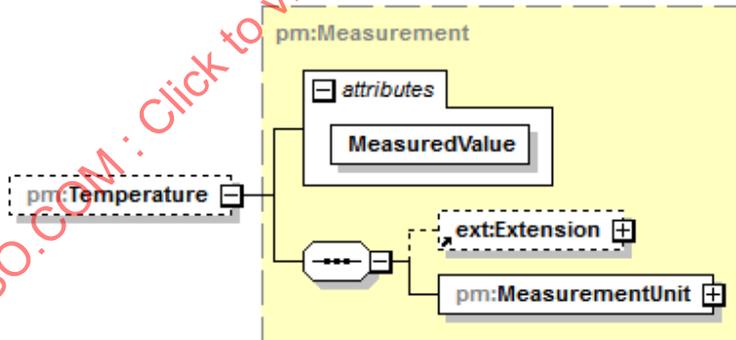
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Electric current delivered by a battery during its discharge; negative if battery is charge. See also IEC 60050-482 International Electrotechnical Vocabulary, 482-03-24.

B.147 BatteryState/Temperature

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

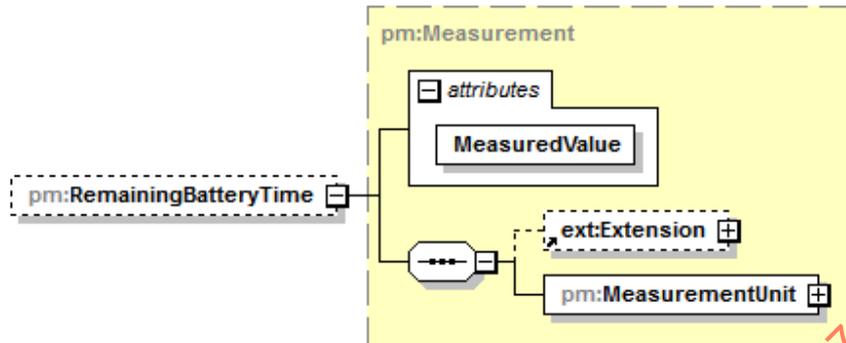
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Current battery temperature.

B.148 BatteryState/RemainingBatteryTime

Type: element



Type pm:Measurement

Properties Min. occurrence: 0
Max. occurrence: 1

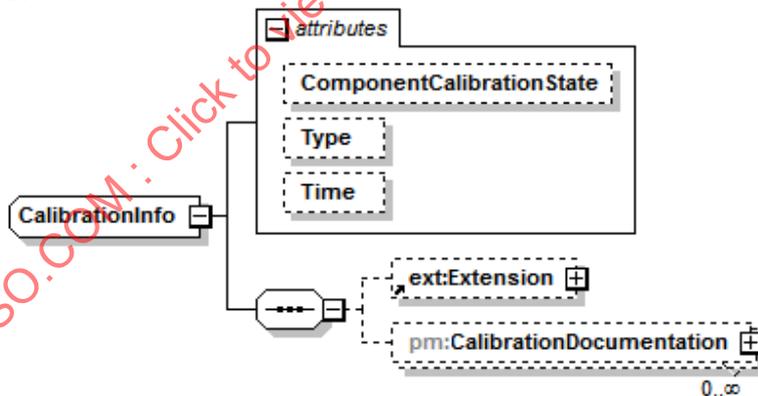
Children tns:Extension
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Current remaining time until battery is discharged

B.149 CalibrationInfo

Type: complexType



Children tns:Extension
pm:CalibrationDocumentation

Used by AbstractDeviceComponentState/CalibrationInfo
AbstractDeviceComponentState/NextCalibration

Attributes	Name	Type	Use
	<u>ComponentCalibrationState</u>	pm:CalibrationState	optional
	<u>Type</u>	pm:CalibrationType	optional
	<u>Time</u>	pm:Timestamp	optional

Documentation Provides information in terms of component calibration. By default, it only maintains a calibration flag.

B.150 CalibrationInfo/@ComponentCalibrationState

Type: attribute

Type **pm:CalibrationState**

Constraints	Kind	Value	Documentation
	enumeration	No	No = Not Calibrated. Defines that a component is not calibrated.
	enumeration	Req	Req = Calibration Required. Defines that a component requires a calibration.
	enumeration	Run	Run = Running. Defines that a calibration for a component is running.
	enumeration	Cal	Cal = Calibrated. Defines that a component is calibrated.
	enumeration	Oth	Oth = Other. The calibration state is defined by other means.

Documentation ATTRIBUTE definition of ComponentCalibration.

B.151 CalibrationInfo/@Type

Type: attribute

Type **pm:CalibrationType**

Constraints	Kind	Value	Documentation
	enumeration	Offset	Offset calibration.
	enumeration	Gain	Gain calibration
	enumeration	TP	Two point calibration.
	enumeration	Unspec	Unspecified calibration type.

Documentation Type of the calibration. The implied value SHALL be "Unspec".

B.152 CalibrationInfo/@Time

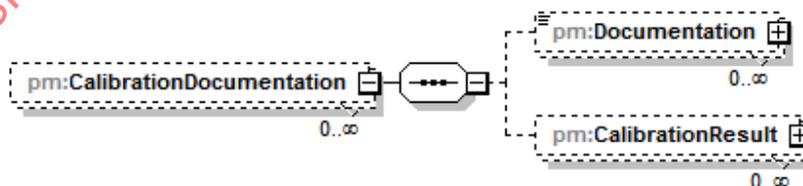
Type: attribute

Type **pm:Timestamp**

Documentation Time of the calibration.

B.153 CalibrationInfo/CalibrationDocumentation

Type: element



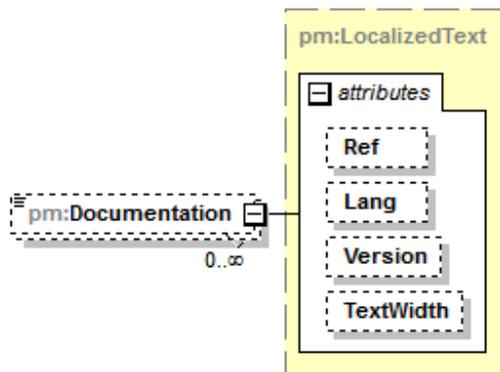
Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **pm:Documentation**
pm:CalibrationResult

Documentation CalibrationDocumentation provides information regarding necessary or performed calibration steps including potential calibration results like accuracy.

B.154 CalibrationInfo/CalibrationDocumentation/Documentation

Type: element



Type **pm:LocalizedText**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Constraints	Kind	Value
	minLength	0

Attributes	Name	Type	Use
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional

Documentation Human-readable documentation of a CalibrationDocumentation entry.

B.155 CalibrationInfo/CalibrationDocumentation/CalibrationResult

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

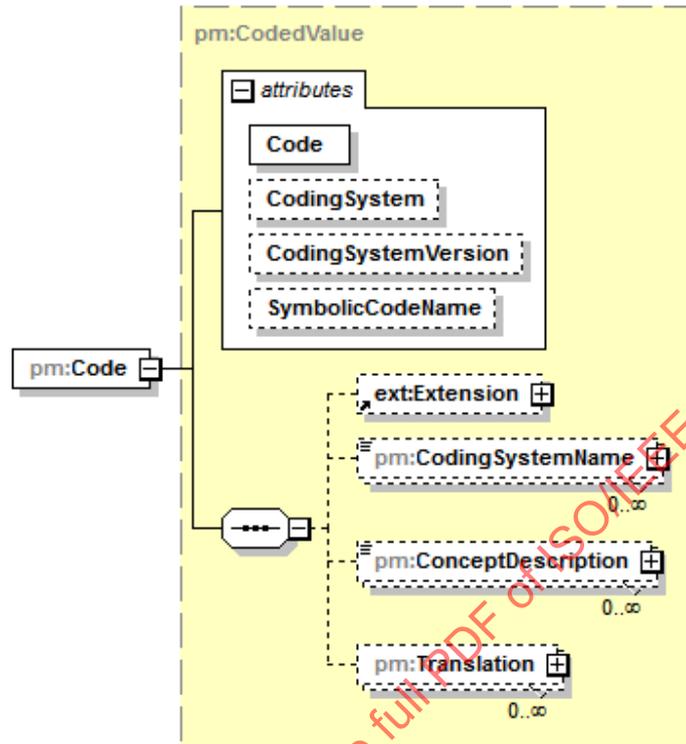
Children **pm:Code**
pm:Value

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B.156 CalibrationInfo/CalibrationDocumentation/CalibrationResult/Code

Type: element



Type **pm:CodedValue**

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

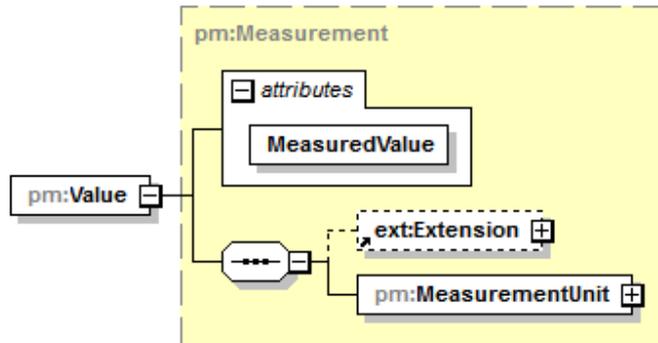
Attributes	Name	Type	Use
	<u>Code</u>	pm:Codeldentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Code that semantically describes the calibration result.

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B.157 CalibrationInfo/CalibrationDocumentation/CalibrationResult/Value

Type: element



Type pm:Measurement

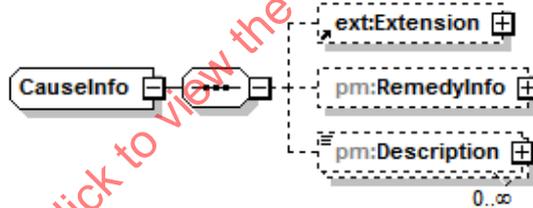
Children tns:Extension
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Measurement that represents the value related to that specific calibration result.

B.158 CauseInfo

Type: complexType

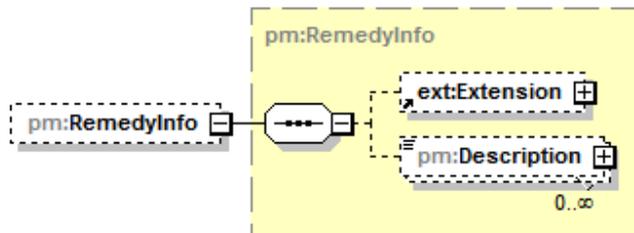


Children tns:Extension
pm:RemedyInfo
pm:Description

Documentation Cause information for an ALERT CONDITION.

B.159 CauseInfo/RemedyInfo

Type: element



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Type **pm:RemedyInfo**

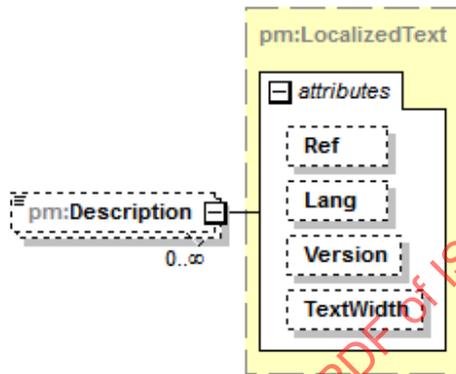
Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Description

Documentation OPTIONAL information on how to remedy the ALERT CONDITION.

B.160 CauseInfo/Description

Type: element



Type **pm:LocalizedText**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Constraints	Kind	Value
	minLength	0

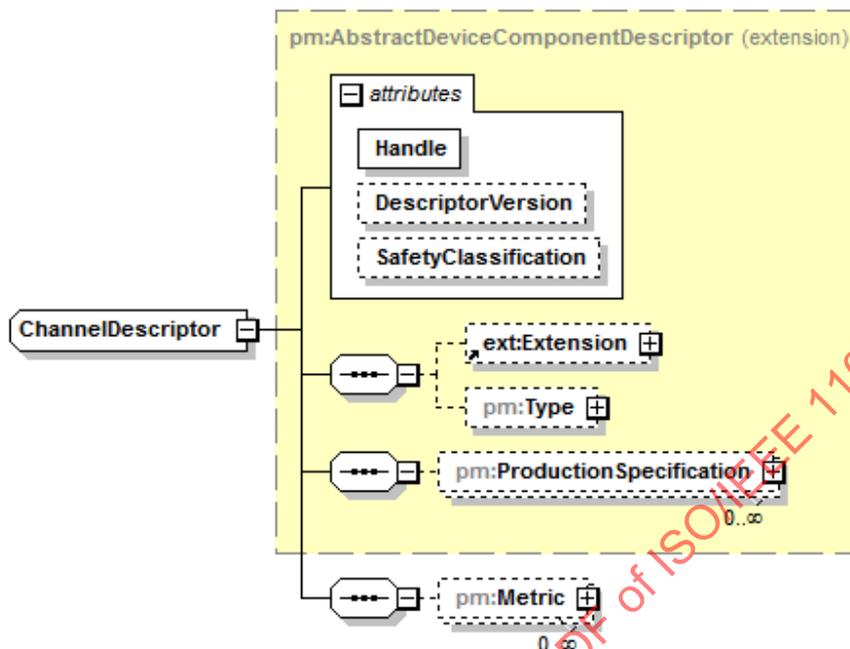
Attributes	Name	Type	Use
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional

Documentation OPTIONAL human-readable texts that describe the cause.

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B.161 ChannelDescriptor

Type: complexType



Type extension of **pm:AbstractDeviceComponentDescriptor**

Children
tns:Extension
pm:Type
pm:ProductionSpecification
pm:Metric

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation ChannelDescriptor describes a CHANNEL to group METRICS and alerts. It is used for organizational purposes only.

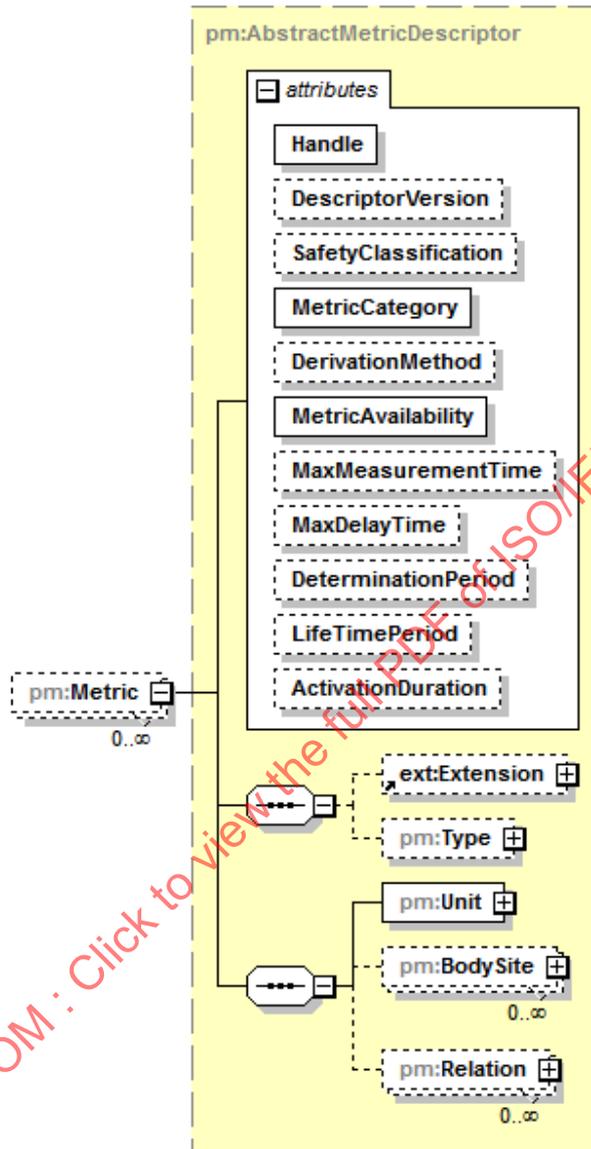
Example: an example would be a blood pressure VMD with one CHANNEL to group together all METRICS that deal with the blood pressure (e.g., pressure value, pressure waveform). A second CHANNEL object could be used to group together METRICS that deal with heart rate.

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B.162 ChannelDescriptor/Metric

Type: element



Type **pm:AbstractMetricDescriptor**

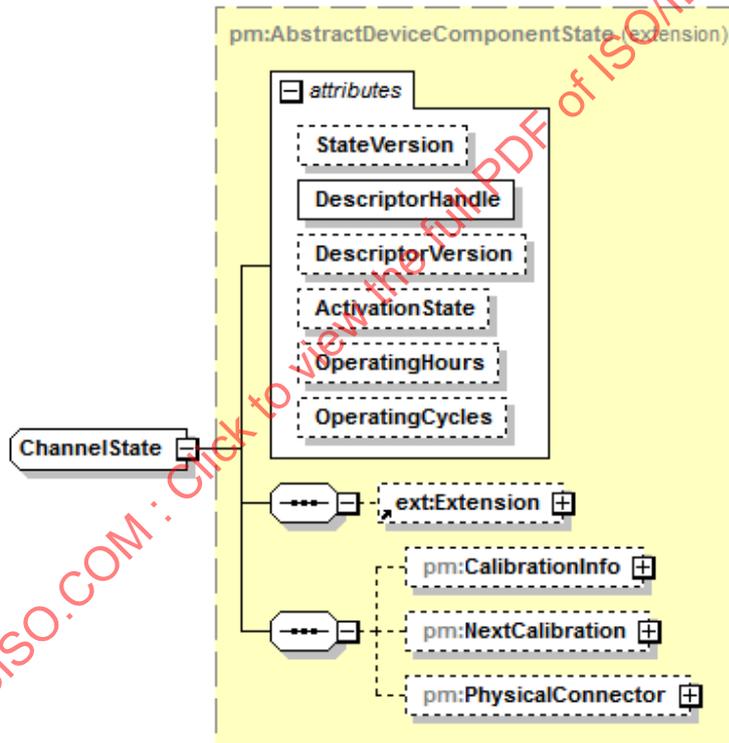
pm:AbstractMetricDescriptor			
Properties	Min. occurrence:	0	
	Max. occurrence:	unbounded	
Children	<u>tns:Extension</u> <u>pm:Type</u> <u>pm:Unit</u> <u>pm:BodySite</u> <u>pm:Relation</u>		
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional

<u>SafetyClassification</u>	pm:SafetyClassification	optional
<u>MetricCategory</u>	pm:MetricCategory	required
<u>DerivationMethod</u>	pm:DerivationMethod	optional
<u>MetricAvailability</u>	pm:MetricAvailability	required
<u>MaxMeasurementTime</u>	xsd:duration	optional
<u>MaxDelayTime</u>	xsd:duration	optional
<u>DeterminationPeriod</u>	xsd:duration	optional
<u>LifeTimePeriod</u>	xsd:duration	optional
<u>ActivationDuration</u>	xsd:duration	optional

Documentation List of METRICs that are grouped into the CHANNEL. The list is ordered by the position of the METRIC in the list where the ELEMENT with a lower list index has a higher clinical relevance than any entry with a higher list index. The SERVICE PROVIDER defines the clinical relevance and MAY reorder the list at any time.

B.163 ChannelState

Type: complexType



Type extension of **pm:AbstractDeviceComponentState**

Children
tns:Extension
pm:CalibrationInfo
pm:NextCalibration
pm:PhysicalConnector

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional

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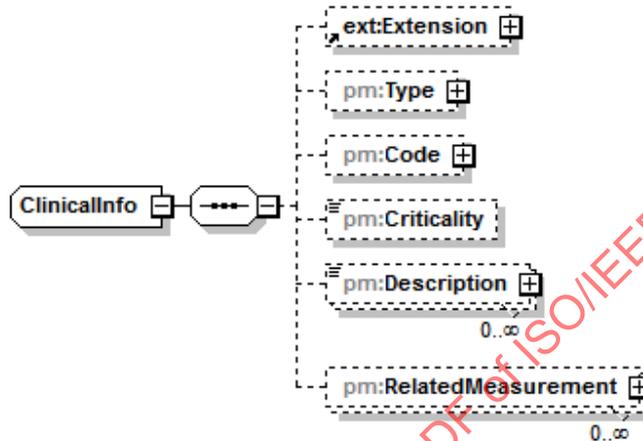
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<u>ActivationState</u>	pm:ComponentActivation	optional
<u>OperatingHours</u>	xsd:unsignedInt	optional
<u>OperatingCycles</u>	xsd:int	optional

Documentation The state of a CHANNEL.

B.164 ClinicalInfo

Type: complexType



Children **tns:Extension**
pm:Type
pm:Code
pm:Criticality
pm:Description
pm:RelatedMeasurement

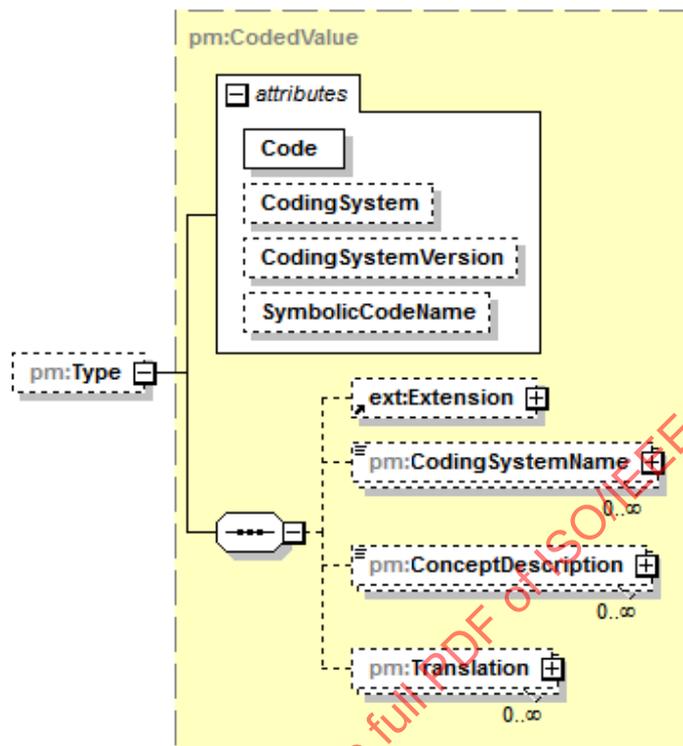
Used by **WorkflowContextState/WorkflowDetail/RelevantClinicalInfo**
WorkflowContextState/WorkflowDetail/PerformedOrderDetail/ResultingClinicalInfo

Documentation This type describes a minimal clinical observation.

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B.165 ClinicalInfo/Type

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Type of clinical information, e.g., allergy, intolerance, clinical condition, diagnosis, problem.

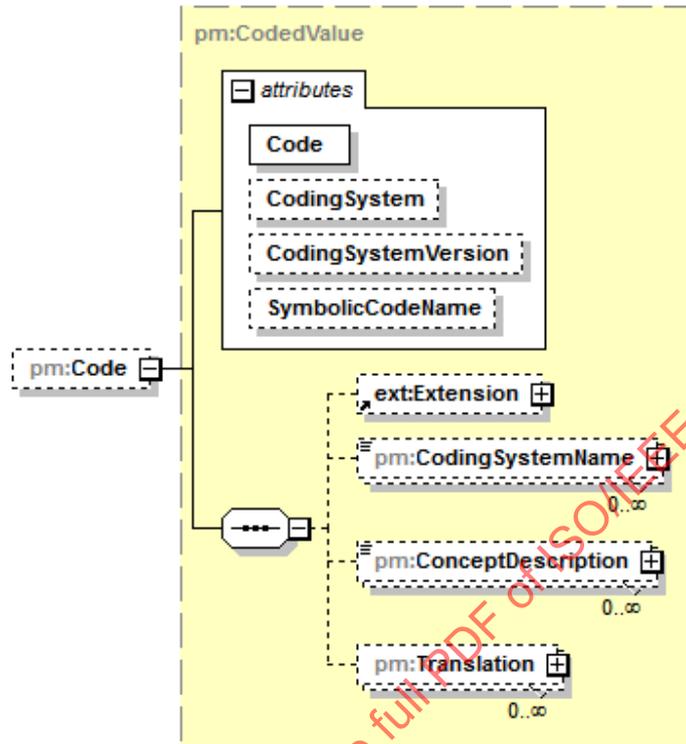
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B.166 ClinicalInfo/Code

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

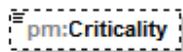
Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Code that specifies the kind of the type of observation, e.g., a specific allergy or a specific diagnosis.

B.167 ClinicalInfo/Criticality

Type: element



Type restriction of **xsd:string**

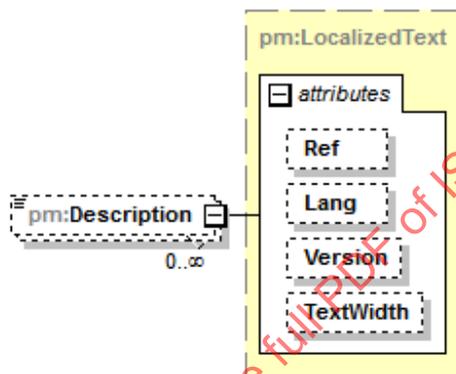
Properties Min. occurrence: 0
Max. occurrence: 1

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	<i>Documentation</i>
	enumeration	Lo	Lo = Low. Noncompliance does not result in a severe, life-threatening, or fatal situation.
	enumeration	Hi	Hi = High. Noncompliance might result in a severe, life-threatening, or fatal situation.

Documentation Potential clinical harm if this clinical information is not considered while treating the patient. The implied value SHALL be "Lo".

B.168 ClinicalInfo/Description

Type: element

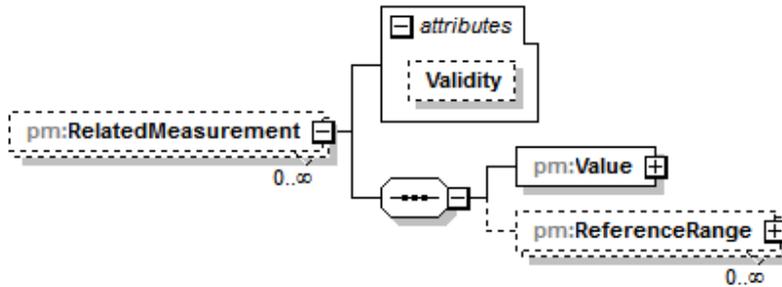


Type **pm:LocalizedText**

<i>Properties</i>	Min. occurrence: 0	Max. occurrence: unbounded	
<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	
	minLength	0	
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional
<i>Documentation</i>	List of possible (localized) free text descriptions of the clinical information.		
	If a pm:CodedValue for this clinical information is available, it is encouraged to be set as pm:ClinicalInfo/pm:Code.		

B.169 ClinicalInfo/RelatedMeasurement

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Children	pm:Value pm:ReferenceRange						
Attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td><u>Validity</u></td> <td>pm:MeasurementValidity</td> <td>optional</td> </tr> </tbody> </table>	Name	Type	Use	<u>Validity</u>	pm:MeasurementValidity	optional
Name	Type	Use					
<u>Validity</u>	pm:MeasurementValidity	optional					
Documentation	Related measurements for this clinical observation if applicable.						

B.170 ClinicalInfo/RelatedMeasurement/@Validity

Type: attribute

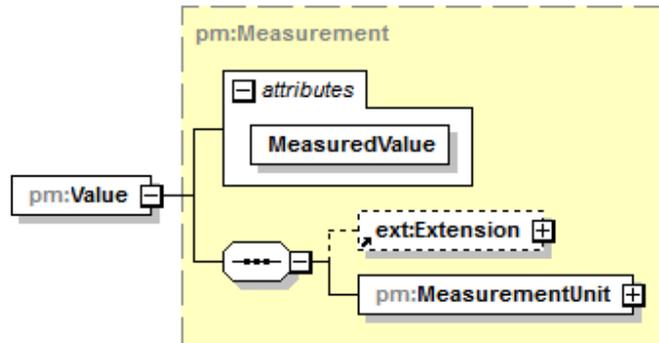
Type **pm:MeasurementValidity**

Constraints	Kind	Value	Documentation
	enumeration	Vld	Vld = Valid. A measured value that is correct from the perspective of the measuring device.
	enumeration	Vldated	Vldated = Validated Data. A measured value where the validity has been confirmed by an external actor, e.g., an operator, other than the POC MEDICAL DEVICE.
	enumeration	Ong	Ong = Measurement Ongoing. Indicates that a new measurement is just being taken and therefore measured value is not available.
	enumeration	Qst	Qst = Questionable. A measured value where correctness can not be guaranteed.
	enumeration	Calib	Calib = Calibration Ongoing. A measured value where correctness can not be guaranteed, because a calibration is currently going on.
	enumeration	Inv	Inv = Invalid. A measured value that is incorrect from the perspective of the measuring device.
	enumeration	Oflw	Oflw = Overflow. A measured value where correctness cannot be guaranteed as it is above all defined technical ranges.
	enumeration	Uflw	Uflw = Underflow. A measured value where correctness cannot be guaranteed as it is below all defined technical ranges.
	enumeration	NA	NA = Not Available. No value can be derived, e.g., if a sensor is not placed correctly.

Documentation Validity of the related measurement. See also pm:MeasurementValidity.

B.171 ClinicalInfo/RelatedMeasurement/Value

Type: element



Type **pm:Measurement**

Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation The related measurement's value.

B.172 ClinicalInfo/RelatedMeasurement/ReferenceRange

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **pm:Range**
pm:Meaning

Documentation Representation of the normal or abnormal reference range for the measurement.

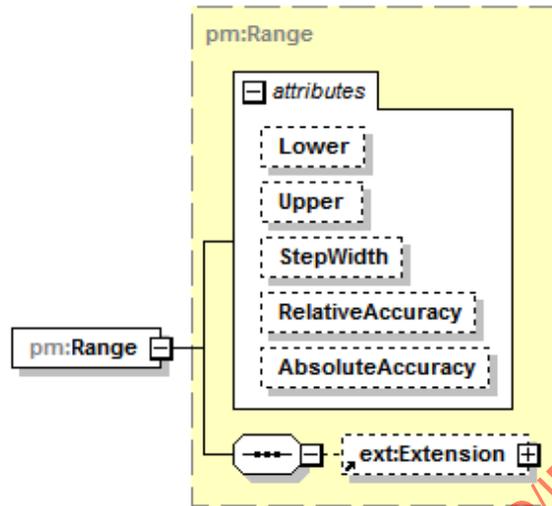
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B.173 ClinicalInfo/RelatedMeasurement/ReferenceRange/Range

Type: element



Type pm:Range

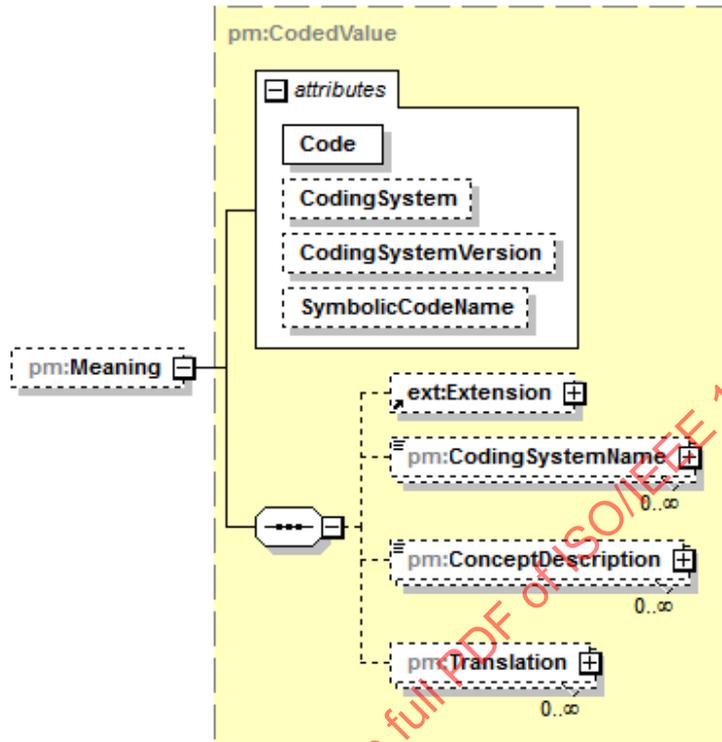
Attributes	Name	Type	Use
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional

Documentation Range that SHALL be populated at least with ./@Lower or ./@Upper.

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B.174 ClinicalInfo/RelatedMeasurement/ReferenceRange/Meaning

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Indicates the meaning of the reference range.

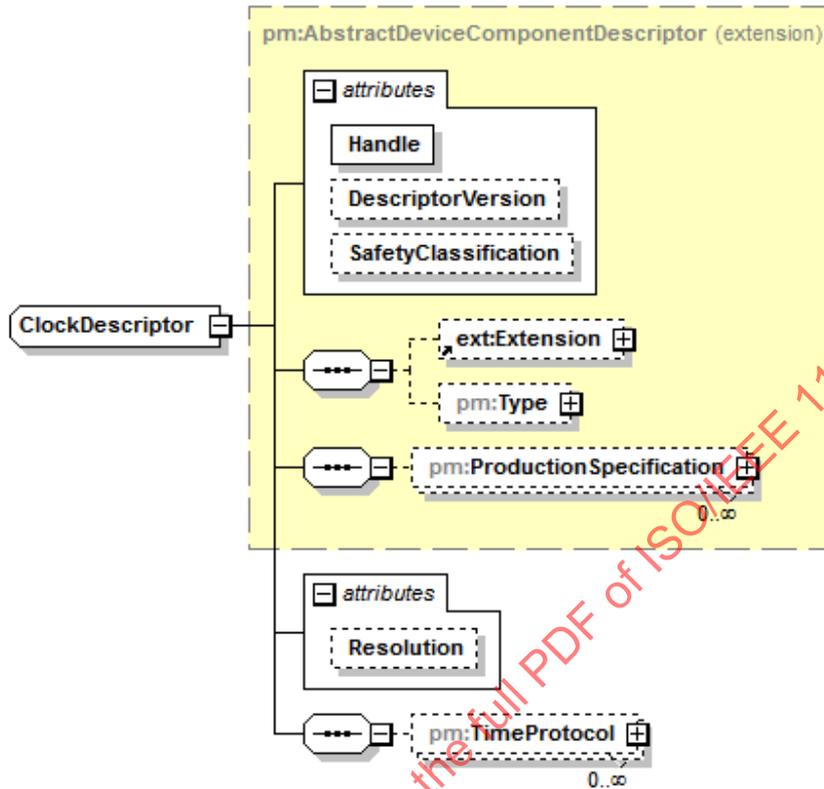
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B.175 ClockDescriptor

Type: complexType



Type extension of **pm:AbstractDeviceComponentDescriptor**

Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:TimeProtocol

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>Resolution</u>	xsd:duration	optional

Documentation ClockDescriptor describes the capabilities of an MDS regarding date/time handling and synchronization. The presence of a ClockDescriptor does not imply any specific hardware or software support.

B.176 ClockDescriptor/@Resolution

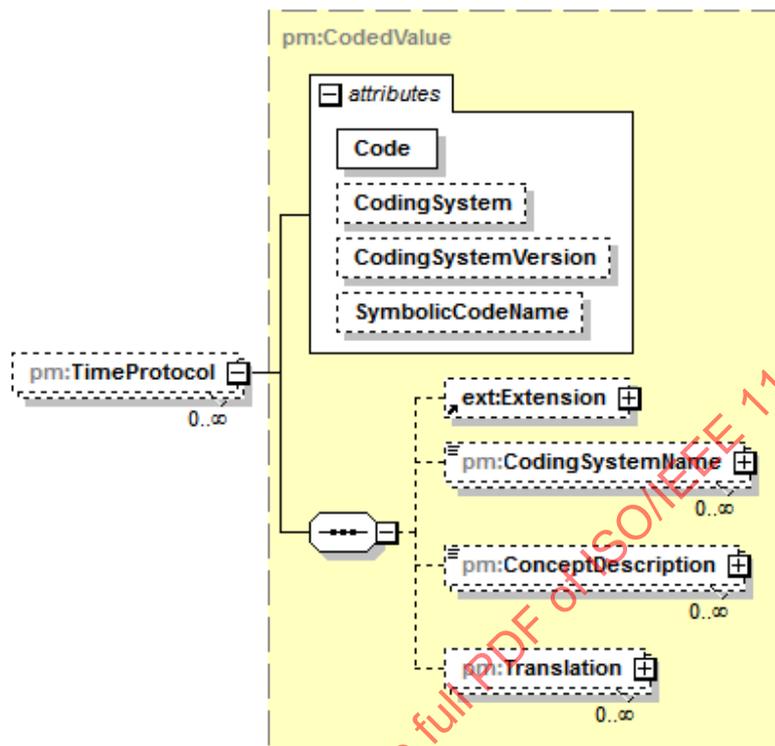
Type: attribute

Type **xsd:duration**

Documentation Time between actual ticks of the clock in microseconds. If none is given, the resolution is unknown.

B.177 ClockDescriptor/TimeProtocol

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation OPTIONAL list of protocols that can be used to set the POC MEDICAL DEVICE's clock. An empty list implies that the clock cannot be set and is therefore uncalibrated and unsynchronized (e.g., equal to MDC:MDC_TIME_SYNC_NONE).

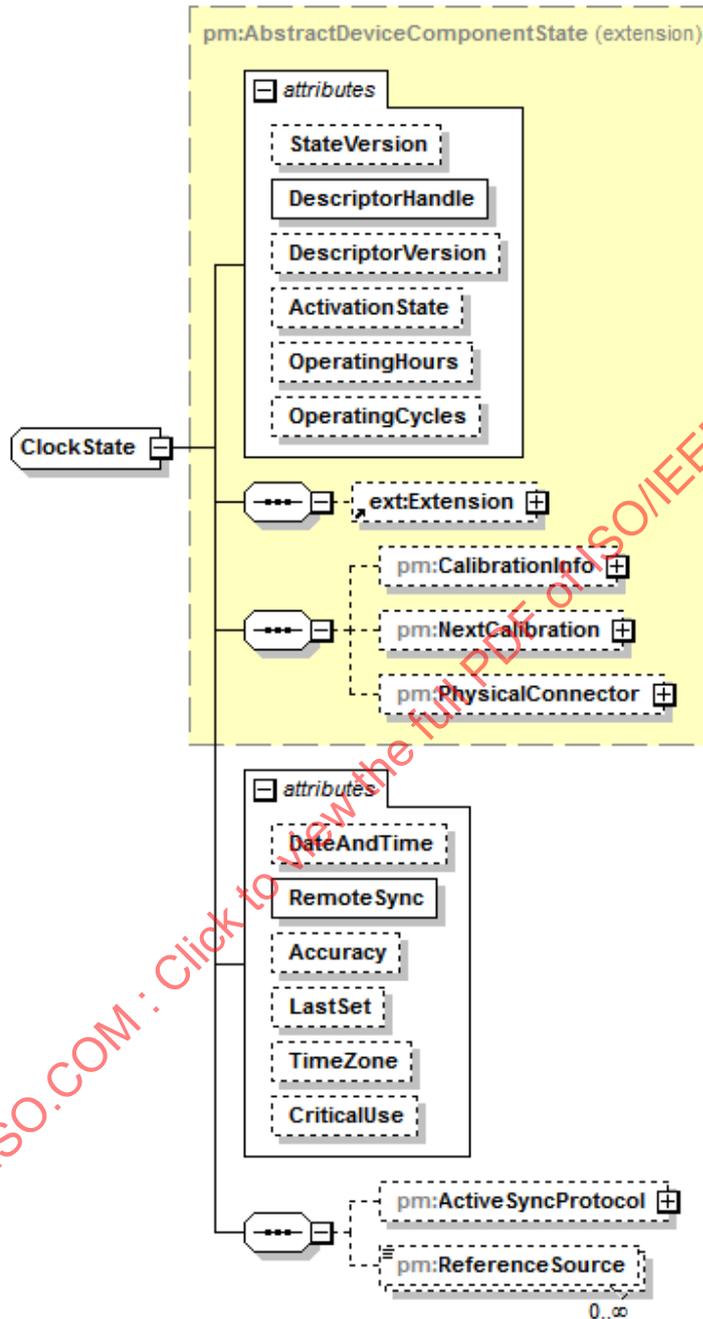
Example: {MDC:MDC_TIME_SYNC_EBWW, MDC:MDC_TIME_SYNC_SNTPV4, MDC:MDC_TIME_SYNC_NTPV3} if the clock supports synchronization using manually setting on the POC MEDICAL DEVICE, SNTP v4.0 (RFC 2030) and NTP v3.0 (RFC 1305).

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B.178 ClockState

Type: complexType



Type extension of **pm:AbstractDeviceComponentState**

- Children
- tns:Extension
 - pm:CalibrationInfo
 - pm:NextCalibration
 - pm:PhysicalConnector
 - pm:ActiveSyncProtocol
 - pm:ReferenceSource

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<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional
	<u>DateAndTime</u>	pm:Timestamp	optional
	<u>RemoteSync</u>	xsd:boolean	required
	<u>Accuracy</u>	xsd:decimal	optional
	<u>LastSet</u>	pm:Timestamp	optional
	<u>TimeZone</u>	pm:TimeZone	optional
	<u>CriticalUse</u>	xsd:boolean	optional

Documentation State of a clock of an MDS.

B.179 ClockState/@DateAndTime

Type: attribute

Type **pm:Timestamp**

Documentation Current date/time setting. As the current date/time changes at a high frequency, a change of this value SHALL NOT cause an update of the state version unless it has been synchronized either remotely or manually.

NOTE—DateAndTime could be filled when the clock is explicitly requested.

B.180 ClockState/@RemoteSync

Type: attribute

Type **xsd:boolean**

Documentation Indicates if the time is synchronized to an external source or set by an operator.

B.181 ClockState/@Accuracy

Type: attribute

Type **xsd:decimal**

Documentation Accuracy is a decimal number indicating the maximum error in seconds of the absolute time relative to a primary reference clock source.

In systems where time synchronization is not used and the clock is set manually by "eyeball and wristwatch" (EBWW), this SHALL be initialized to three minutes when the clock time is set. If NTP is used, this is equivalent to Root Dispersion + 1/2 Root Delay.

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B.182 ClockState/@LastSet

Type: attribute

Type **pm:Timestamp**

Documentation Time point when the absolute time was set or synchronized.

NOTE 1—If a time synchronization protocol is used that "changes" the time and date at a high frequency, it is proposed to update this value at a lower periodicity (e.g., once every 10 minutes or once an hour), so as not to consume communications bandwidth unnecessarily.

NOTE 2—Synchronization might be achieved by slewing the time. This means that the virtual frequency of the software clock is adjusted to make the clock go faster or slower until it is corrected.

B.183 ClockState/@TimeZone

Type: attribute

Type **pm:TimeZone**

Documentation Identifies the time zone and DST of the clock.

B.184 ClockState/@CriticalUse

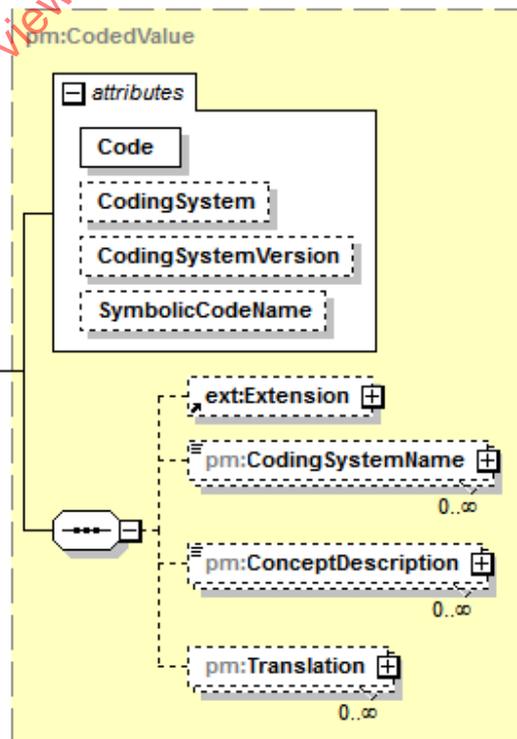
Type: attribute

Type **xsd:boolean**

Documentation Identifies that the clock information is actively being used in care delivery algorithms/protocols. The implied value SHALL be "false".

B.185 ClockState/ActiveSyncProtocol

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Protocol that is actively being used for time sync.

Examples: MDC:MDC_TIME_SYNC_NTPV3 if the clock is synchronized using NTP v3.0 (RFC 1305) or MDC:MDC_TIME_SYNC_NONE if the clock is not synchronized.

B.186 ClockState/ReferenceSource

Type: element



Type **xsd:string**

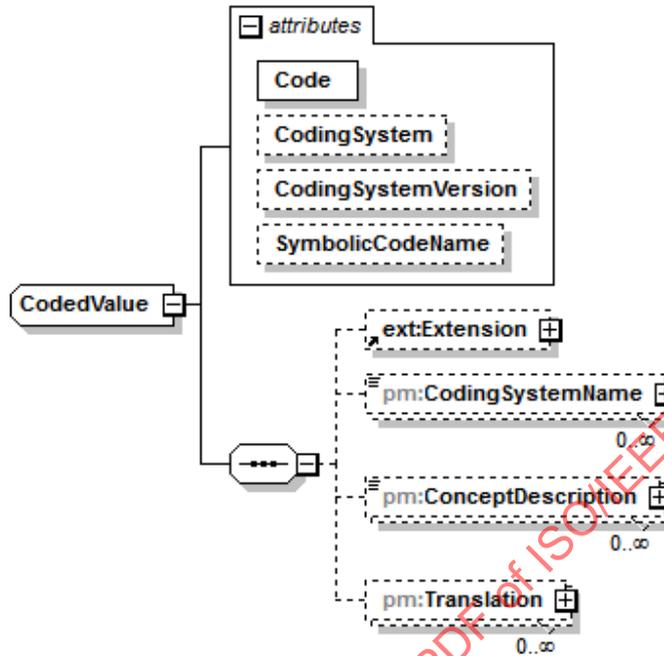
Properties Min. occurrence: 0
Max. occurrence: unbounded

Documentation Identifies the clock's external reference source(s), e.g., NTP server addresses.

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B.187 CodedValue

Type: complexType



Children tns:Extension
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Used by SystemErrorReport/ReportPart/ErrorCode
ClockState/ActiveSyncProtocol
ActivateOperationDescriptor/Argument/ArgName
AbstractMetricDescriptor/BodySite
AbstractMetricState/BodySite
AbstractMultiState/Category
CalibrationInfo/CalibrationDocumentation/CalibrationResult/Code
AbstractMetricDescriptor/Relation/Code
ClinicalInfo/Code
WorkflowContextState/WorkflowDetail/DangerCode
DistributionSampleArrayMetricDescriptor/DomainUnit
ClinicalInfo/RelatedMeasurement/ReferenceRange/Meaning
Measurement/MeasurementUnit
ImagingProcedure/Modality
ImagingProcedure/ProtocolCode
PatientDemographicsCoreData/Race
PersonParticipation/Role
OrderDetail/Service
AbstractDeviceComponentDescriptor/ProductionSpecification/SpecType
ClockDescriptor/TimeProtocol
InstanceIdentifier/Type
AbstractDescriptor/Type
AbstractMetricValue/Annotation/Type
EnumStringMetricDescriptor/AllowedValue/Type
ScoState/OperationGroup/Type
ClinicalInfo/Type
ContainmentTreeEntry/Type
AbstractMetricDescriptor/Unit

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Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation In general, in an interoperability format, objects, attributes, and methods are identified by nomenclature codes. CodedValue offers the ability to represent such nomenclature codes.

Two CodedValue objects C1 and C2 are equivalent, if

- C1/@Code equals C2/@Code
- C1/@CodingSystem equals C2/@CodingSystem, both with expanded default values
- C1/@CodingSystemVersion equals C2/@CodingSystemVersion
- If there exists a CodedValue object T1 in C1/pm:Translation and a CodedValue object T2 in C2/pm:Translation such that T1 and T2 are equivalent, C1 and T2 are equivalent, or C2 and T1 are equivalent.

NOTE 1—When ./@CodingSystem is not explicitly defined in CodedValue, it is replaced implicitly by a default identifier. The ./@CodingSystem ATTRIBUTE is then called "expanded".

NOTE 2—As prescribed in ./@CodingSystemVersion, a version is set only if a unique version identification by ./@CodingSystem is not possible. Hence, there can be no implicit version mismatch.

NOTE 3—Equivalence between CodedValue objects is not necessarily transitive.

B.188 CodedValue/@Code

Type: attribute

Type **pm:CodeIdentifier**

Constraints	Kind	Value
	minLength	1

Documentation REQUIRED unique identifier of the CODE in the CODING SYSTEM.

Example: as "20720" from Block 2, of IEEE 11073-10101:2004, is the id for "MDC_PRESS_AWAY", the context-free CODE (CF_Code10) is "151792" which represents the unique identifier used within IEEE 11073-10101:2004.

B.189 CodedValue/@CodingSystem

Type: attribute

Type **xsd:anyURI**

Documentation Unique identifier of a CODING SYSTEM that pm:CodedValue/@Code originating from.

If no CODING SYSTEM is defined, the implied value SHALL be "urn:oid:1.2.840.10004.1.1.1.0.0.1", which refers to ISO/IEC 11073-10101.

Example: "urn:oid:1.2.840.10004.1.1.1.0.0.1" for the ISO/IEC 11073-10101.

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B.190 CodedValue/@CodingSystemVersion

Type: attribute

Type **xsd:string**

Documentation CodingSystemVersion is a particular version of the CODING SYSTEM defined by pm:CodedValue/@CodingSystem. CodingSystemVersion SHALL be set if multiple versions of the underlying CODING SYSTEM exist and a unique identification of the CODED VALUE is not possible by other means.

Example: "20041215" for the ISO/IEC 11073-10101:2004, as it is the release date of the standard's first edition.

B.191 CodedValue/@SymbolicCodeName

Type: attribute

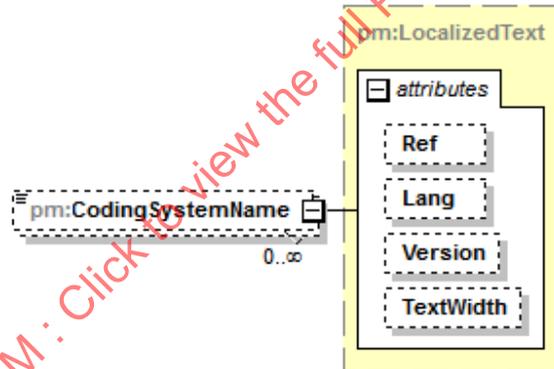
Type **pm:SymbolicCodeName**

Constraints	Kind	Value
	minLength	1

Documentation See pm:SymbolicCodeName.

B.192 CodedValue/CodingSystemName

Type: element



Type **pm:LocalizedText**

Properties	Min. occurrence:	0
	Max. occurrence:	unbounded

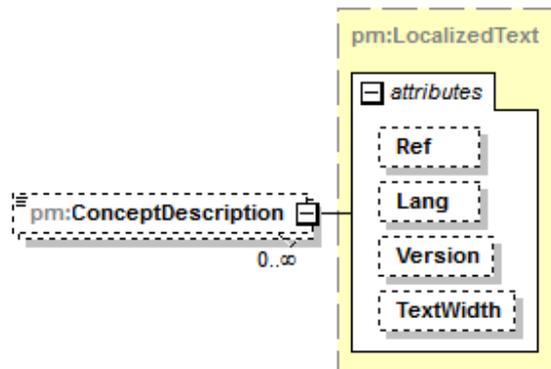
Constraints	Kind	Value
	minLength	0

Attributes	Name	Type	Use
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional

Documentation Human-readable name of the CODING SYSTEM that is described by pm:CodedValue/@CodingSystem.

B.193 CodedValue/ConceptDescription

Type: element

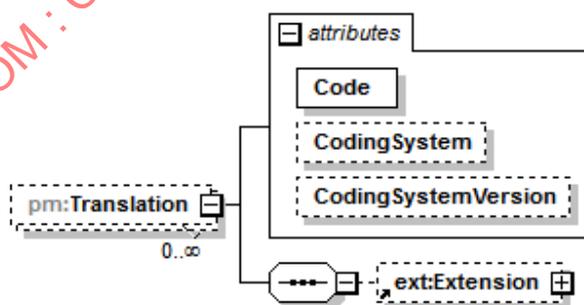


Type **pm:LocalizedText**

Properties		Min. occurrence: 0
		Max. occurrence: unbounded
Constraints		
<i>Kind</i>	<i>Value</i>	
minLength	0	
Attributes		
<i>Name</i>	<i>Type</i>	<i>Use</i>
<u>Ref</u>	pm:LocalizedTextRef	optional
<u>Lang</u>	xsd:language	optional
<u>Version</u>	pm:ReferencedVersion	optional
<u>TextWidth</u>	pm:LocalizedTextWidth	optional
Documentation		
Multiple OPTIONAL human-readable texts that describe the CODE in more detail.		

B.194 CodedValue/Translation

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Attributes			
<i>Name</i>	<i>Type</i>	<i>Use</i>	
<u>Code</u>	pm:CodeIdentifier	required	
<u>CodingSystem</u>	xsd:anyURI	optional	
<u>CodingSystemVersion</u>	xsd:string	optional	

Documentation Set of alternative or equivalent representations.

B.195 CodedValue/Translation/@Code

Type: attribute

Type **pm:CodeIdentifier**

Constraints	Kind	Value
	minLength	1

Documentation A code as defined by pm:CodedValue/@Code.

B.196 CodedValue/Translation/@CodingSystem

Type: attribute

Type **xsd:anyURI**

Documentation A coding system as defined by pm:CodedValue/@CodingSystem.

B.197 CodedValue/Translation/@CodingSystemVersion

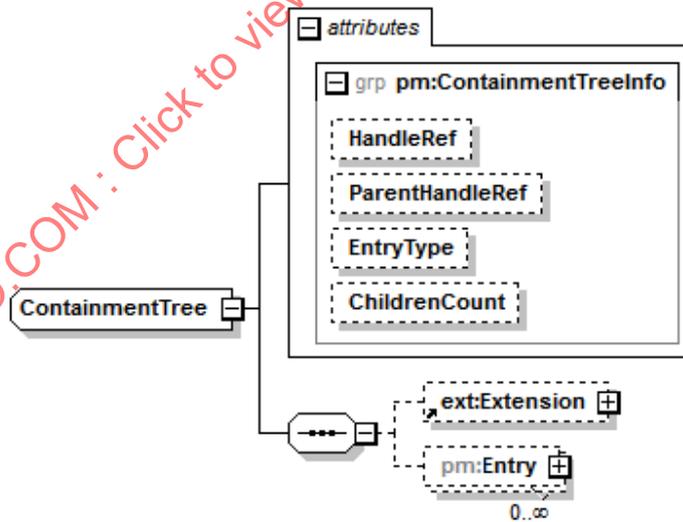
Type: attribute

Type **xsd:string**

Documentation A coding system version as defined by pm:CodedValue/@CodingSystemVersion.

B.198 ContainmentTree

Type: complexType



Children **tns:Extension**
pm:Entry

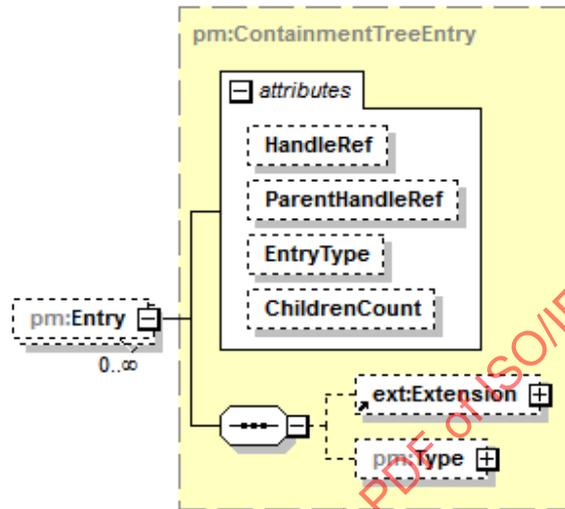
Attributes	Name	Type	Use
	<u>HandleRef</u>	pm:HandleRef	optional
	<u>ParentHandleRef</u>	pm:HandleRef	optional

<u>EntryType</u>	xsd:QName	optional
<u>ChildrenCount</u>	xsd:int	optional

Documentation CONTAINMENT TREE part of an ELEMENT of an MDS CONTAINMENT TREE.

B.199 ContainmentTree/Entry

Type: element



Type **pm:ContainmentTreeEntry**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:type

<i>Attributes</i>	Name	Type	Use
	<u>HandleRef</u>	pm:HandleRef	optional
	<u>ParentHandleRef</u>	pm:HandleRef	optional
	<u>EntryType</u>	xsd:QName	optional
	<u>ChildrenCount</u>	xsd:int	optional

Documentation An entry of a CONTAINMENT TREE ENTRY.

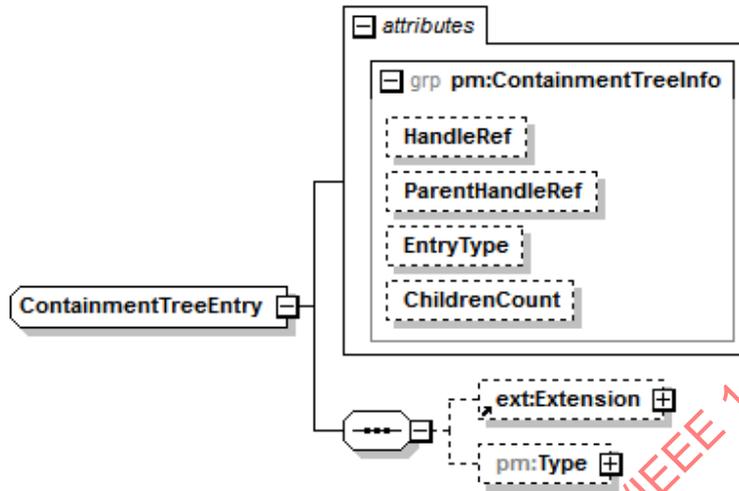
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B.200 ContainmentTreeEntry

Type: complexType



Children tns:Extension
pm:Type

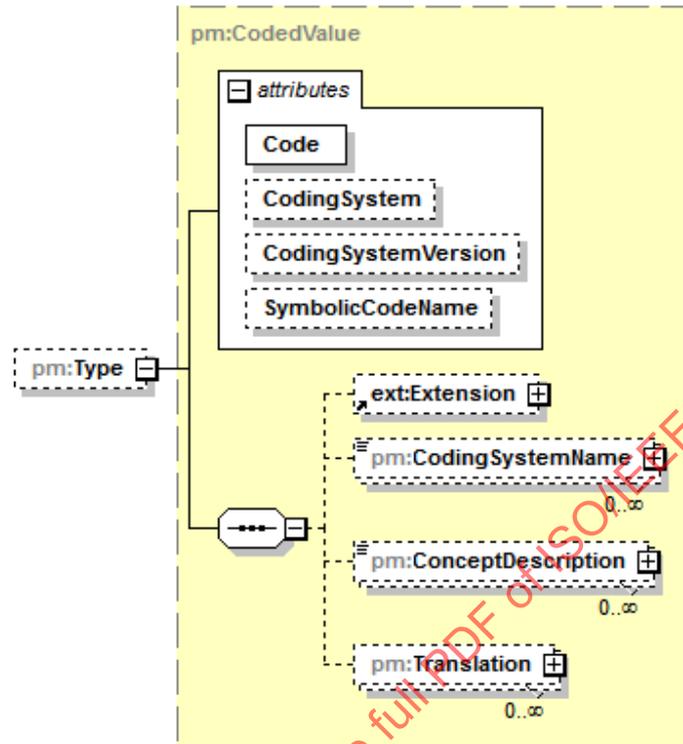
Attributes			
Name	Type	Use	
<u>HandleRef</u>	pm:HandleRef	optional	
<u>ParentHandleRef</u>	pm:HandleRef	optional	
<u>EntryType</u>	xsd:QName	optional	
<u>ChildrenCount</u>	xsd:int	optional	

Documentation An entry in a CONTAINMENT TREE.

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B.201 ContainmentTreeEntry/Type

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation If given, pm:AbstractDescriptor/pm:Type of the descriptor that is conveyed with the CONTAINMENT TREE entry.

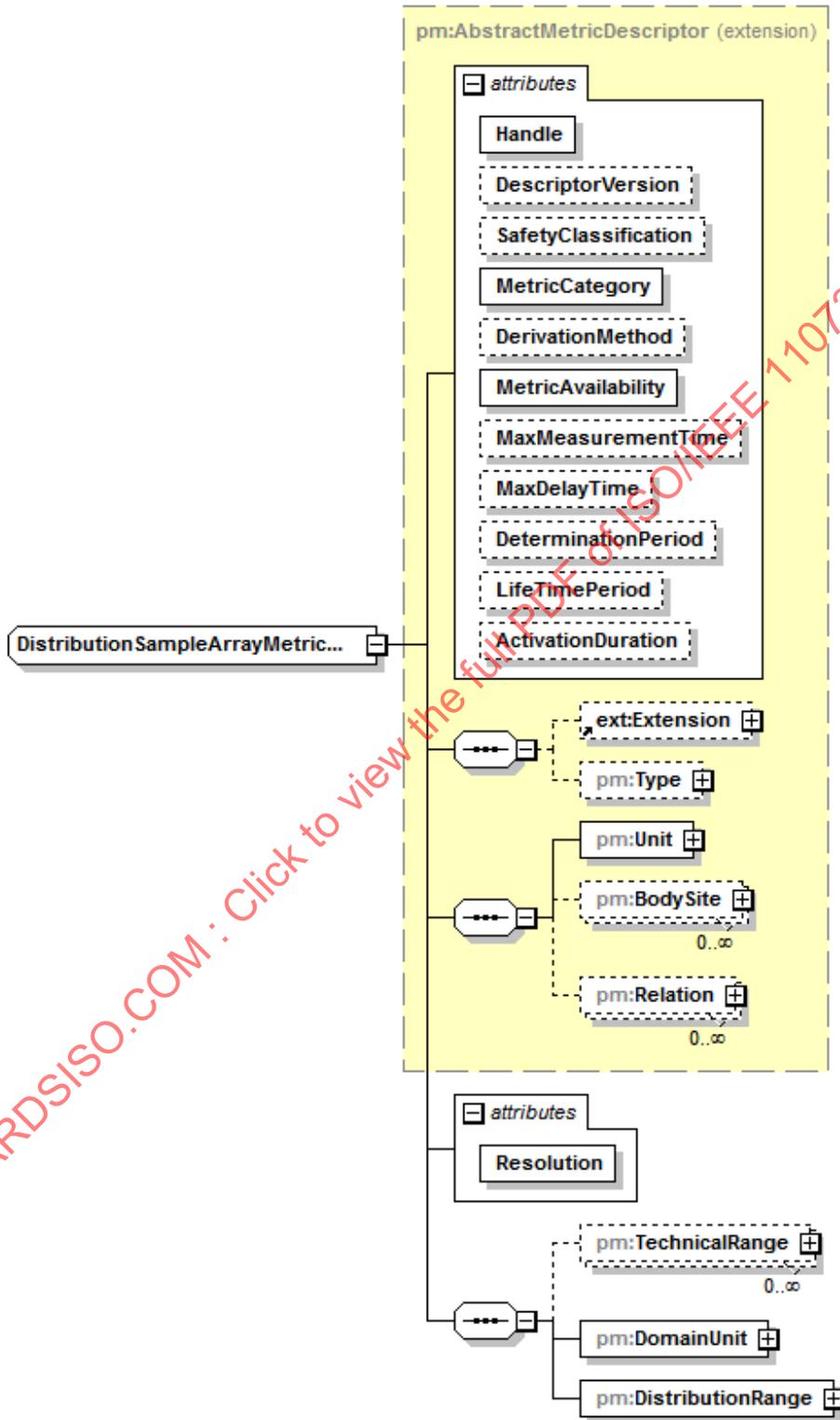
STANDARDS.PDSI.COM Click to view the full PDF of ISO/IEEE 11073-10207:2019

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B.202 DistributionSampleArrayMetricDescriptor

Type: complexType



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Type extension of **pm:AbstractMetricDescriptor**

<i>Children</i>	<u>tns:Extension</u> <u>pm:Type</u> <u>pm:Unit</u> <u>pm:BodySite</u> <u>pm:Relation</u> <u>pm:TechnicalRange</u> <u>pm:DomainUnit</u> <u>pm:DistributionRange</u>
-----------------	---

<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MetricCategory</u>	pm:MetricCategory	required
	<u>DerivationMethod</u>	pm:DerivationMethod	optional
	<u>MetricAvailability</u>	pm:MetricAvailability	required
	<u>MaxMeasurementTime</u>	xsd:duration	optional
	<u>MaxDelayTime</u>	xsd:duration	optional
	<u>DeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional
	<u>ActivationDuration</u>	xsd:duration	optional
	<u>Resolution</u>	xsd:decimal	required

Documentation Declares a sample array that represents equally spaced value distributions in the form of arrays containing scaled sample values. In contrast to real-time sample arrays, distribution sample arrays provide observed two-dimensional values, not necessarily time points.

NOTE—An example for a distribution sample array metric might be a fourier-transformed electroencephalogram to derive frequency distribution.

B.203 DistributionSampleArrayMetricDescriptor/@Resolution

Type: attribute

Type **xsd:decimal**

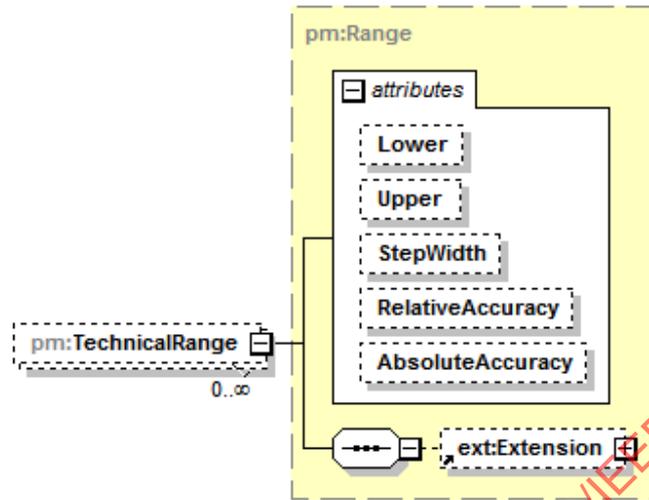
Documentation The resolution of the means to determine the METRIC's value. Resolution is the minimum determinable difference between two determined values.

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B.204 DistributionSampleArrayMetricDescriptor/TechnicalRange

Type: element



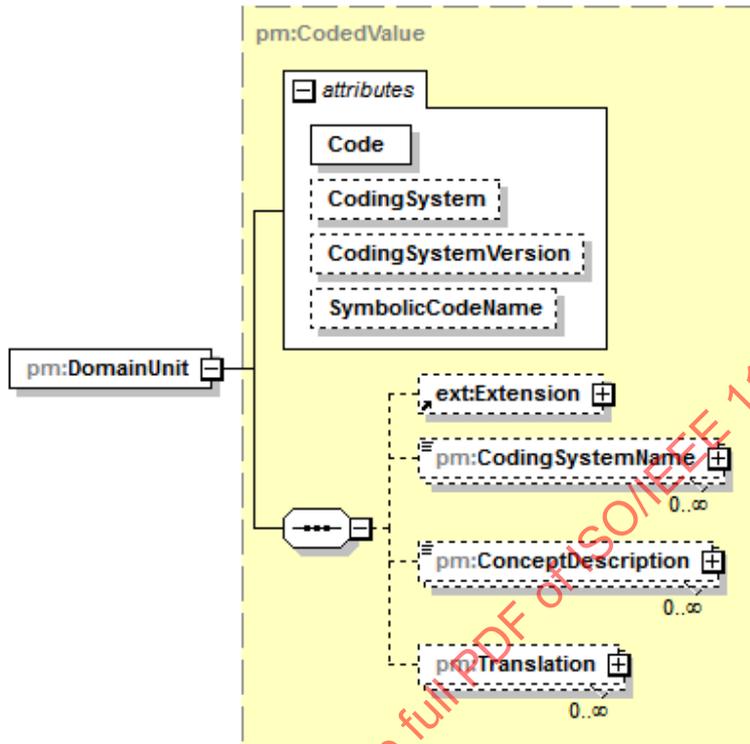
Type **pm:Range**

<i>Properties</i>	Min. occurrence:	0	
	Max. occurrence:	unbounded	
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional
<i>Documentation</i>	The maximum range of the values of the distribution sample array.		

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B.205 DistributionSampleArrayMetricDescriptor/DomainUnit

Type: element



Type **pm:CodedValue**

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

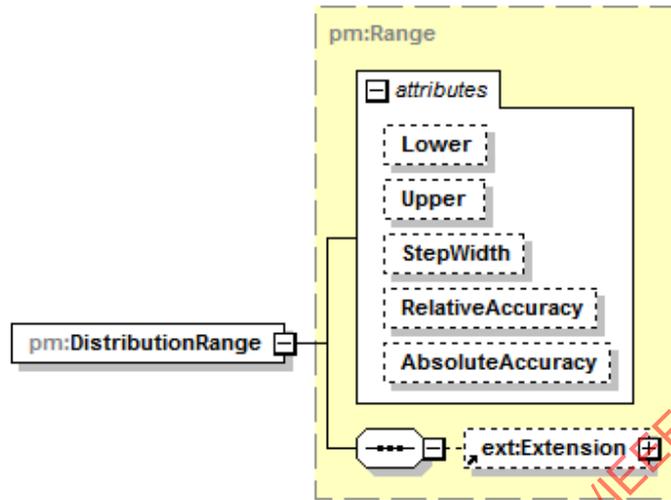
Documentation The CODED VALUE that is used for domain values (x axis).

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B.206 DistributionSampleArrayMetricDescriptor/DistributionRange

Type: element



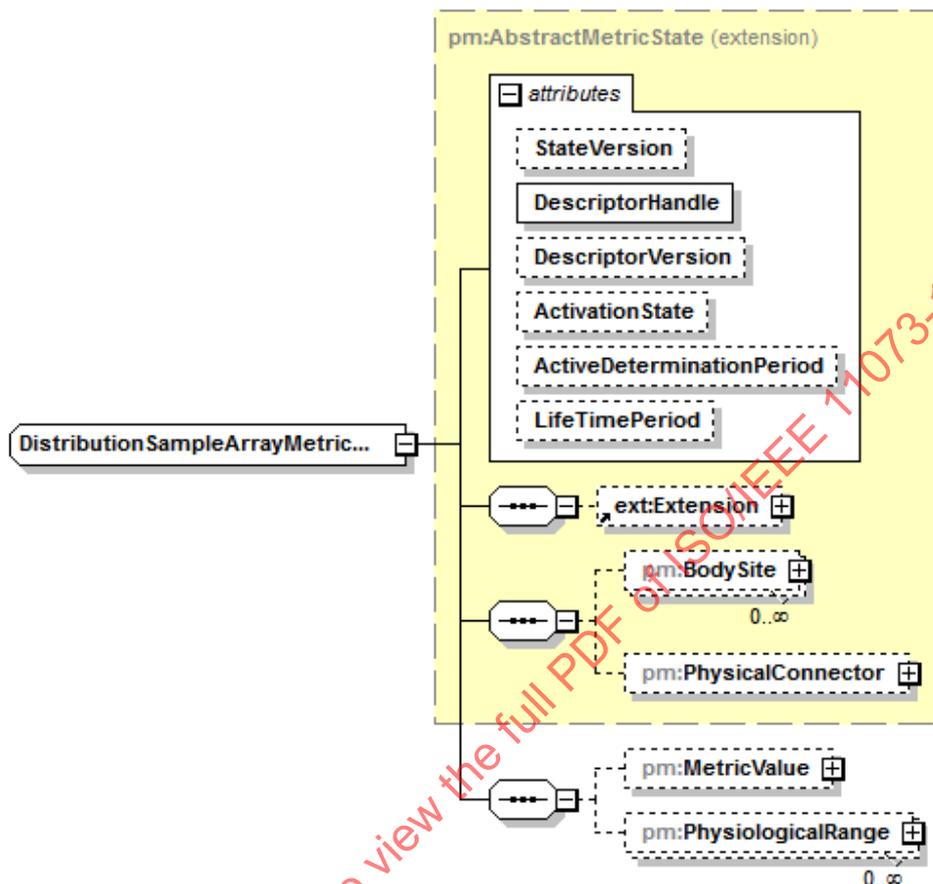
Type **pm:Range**

Type pm:Range			
Attributes	Name	Type	Use
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional
<hr/>			
Documentation	Minimum and maximum domain values.		

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B.207 DistributionSampleArrayMetricState

Type: complexType



Type extension of **pm:AbstractMetricState**

- Children
- tns:Extension**
 - pm:BodySite**
 - pm:PhysicalConnector**
 - pm:MetricValue**
 - pm:PhysiologicalRange**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>ActiveDeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional

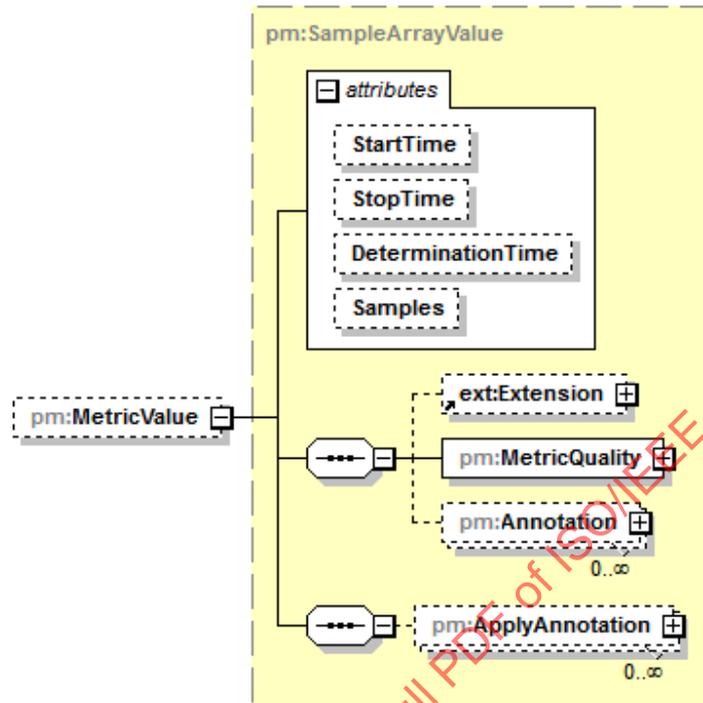
Documentation State of a distribution sample array METRIC descriptor. It contains a list of sample values. This sample array is used to transport spatial range information.

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B.208 DistributionSampleArrayMetricState/MetricValue

Type: element



Type **pm:SampleArrayValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:MetricQuality
pm:Annotation
pm:ApplyAnnotation

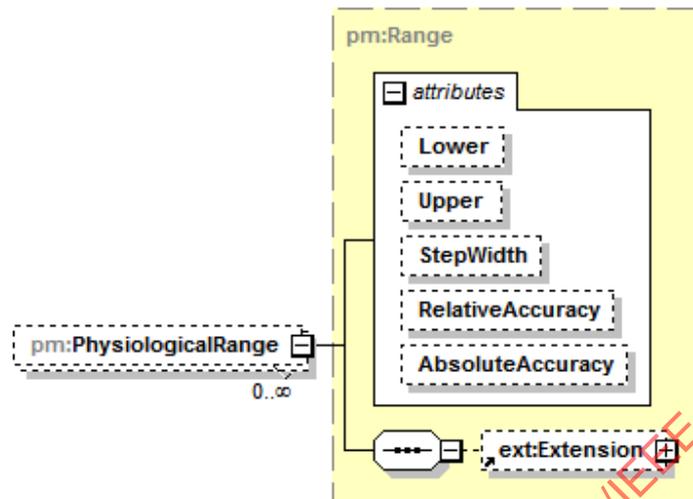
Attributes	Name	Type	Use
	<u>StartTime</u>	pm:Timestamp	optional
	<u>StopTime</u>	pm:Timestamp	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional
	<u>Samples</u>	pm:RealTimeValueType	optional

Documentation OPTIONAL current value of the METRIC.

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B.209 DistributionSampleArrayMetricState/PhysiologicalRange

Type: element



Type **pm:Range**

<i>Properties</i>	Min. occurrence:	0	
	Max. occurrence:	unbounded	
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional
<i>Documentation</i>	The physiological reasonable range of determined values.		
	NOTE—This is not an alarming range.		

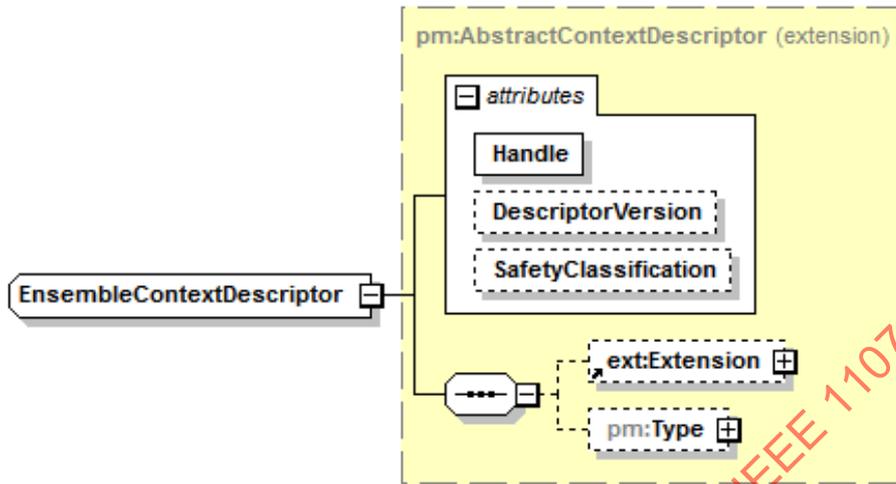
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B.210 EnsembleContextDescriptor

Type: complexType



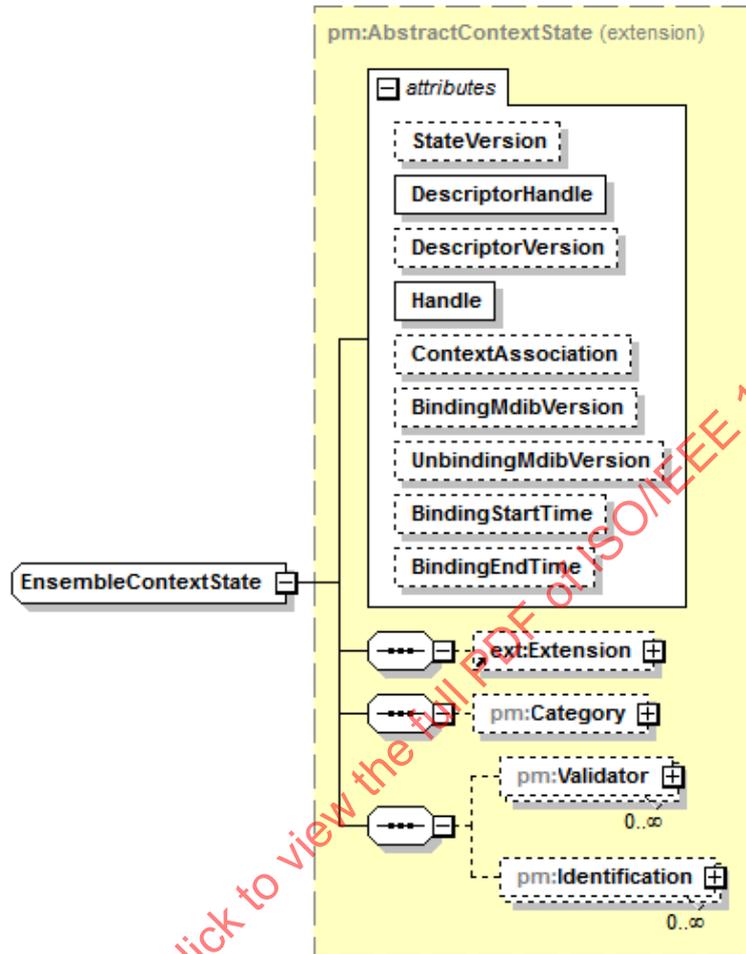
Type extension of **pm:AbstractContextDescriptor**

<i>Children</i>	<u>tns:Extension</u> <u>pm:Type</u>												
<i>Attributes</i>	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td><u>Handle</u></td> <td>pm:Handle</td> <td>required</td> </tr> <tr> <td><u>DescriptorVersion</u></td> <td>pm:VersionCounter</td> <td>optional</td> </tr> <tr> <td><u>SafetyClassification</u></td> <td>pm:SafetyClassification</td> <td>optional</td> </tr> </tbody> </table>	Name	Type	Use	<u>Handle</u>	pm:Handle	required	<u>DescriptorVersion</u>	pm:VersionCounter	optional	<u>SafetyClassification</u>	pm:SafetyClassification	optional
Name	Type	Use											
<u>Handle</u>	pm:Handle	required											
<u>DescriptorVersion</u>	pm:VersionCounter	optional											
<u>SafetyClassification</u>	pm:SafetyClassification	optional											
<i>Documentation</i>	Context descriptor to specify that the MDS is able to provide ensemble information.												

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B.211 EnsembleContextState

Type: complexType



Type extension of **pm:AbstractContextState**

Children **tns:Extension**
pm:Category
pm:Validator
pm:Identification

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdbVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdbVersion</u>	pm:ReferencedVersion	optional
	<u>BindingStartTime</u>	pm:Timestamp	optional
	<u>BindingEndTime</u>	pm:Timestamp	optional

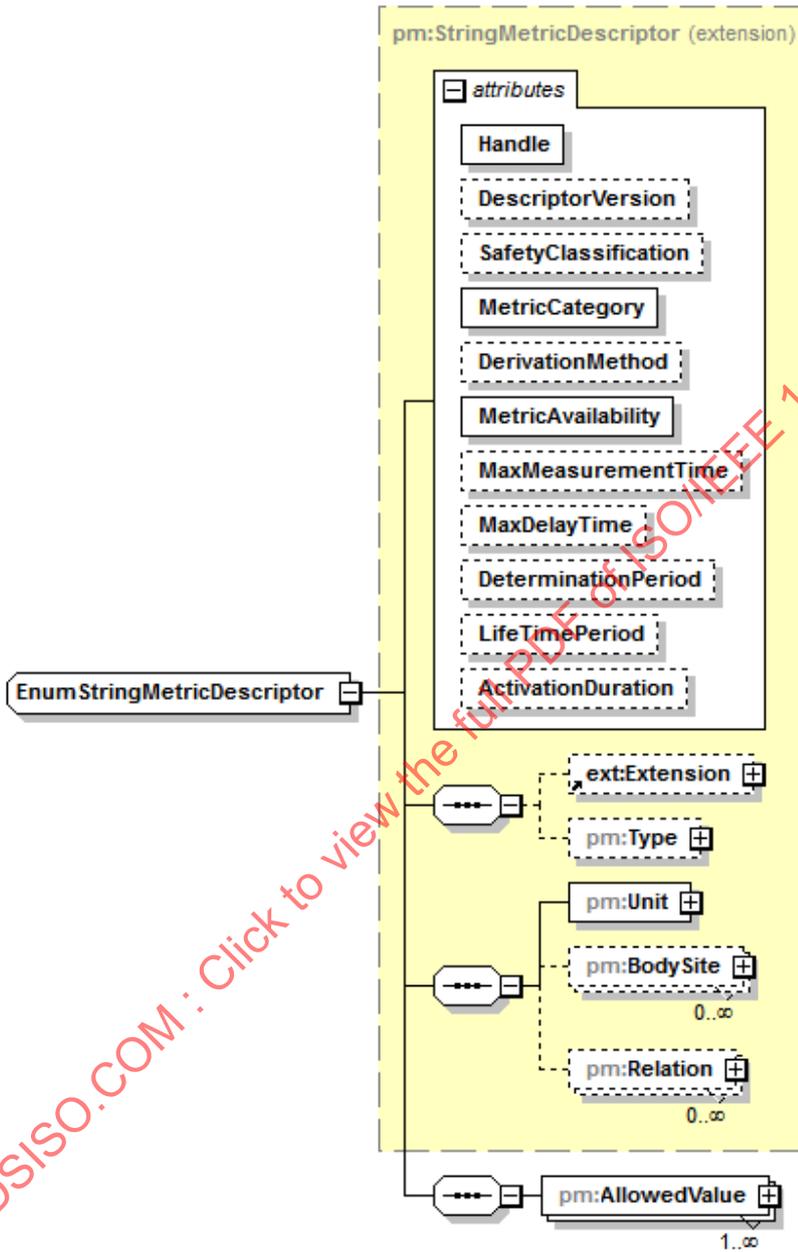
Documentation A context state that identifies an ensemble of POC MEDICAL DEVICES. How the ensemble is grouped and what meaning is conveyed by the ensemble are determined by other means.

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B.212 EnumStringMetricDescriptor

Type: complexType



Type extension of **pm:StringMetricDescriptor**

- Children
- [tns:Extension](#)
 - [pm:Type](#)
 - [pm:Unit](#)
 - [pm:BodySite](#)
 - [pm:Relation](#)
 - [pm:AllowedValue](#)

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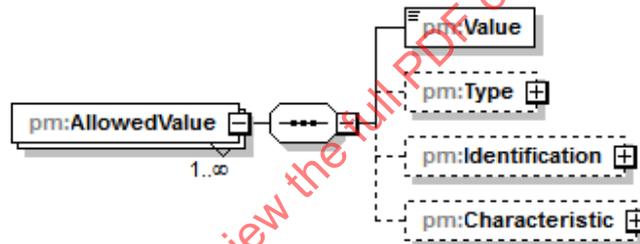
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MetricCategory</u>	pm:MetricCategory	required
	<u>DerivationMethod</u>	pm:DerivationMethod	optional
	<u>MetricAvailability</u>	pm:MetricAvailability	required
	<u>MaxMeasurementTime</u>	xsd:duration	optional
	<u>MaxDelayTime</u>	xsd:duration	optional
	<u>DeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional
	<u>ActivationDuration</u>	xsd:duration	optional

Documentation An enumerated string METRIC represents a textual status or annotation information with a constrained set of possible values.

Example: a ventilation mode.

B.213 EnumStringMetricDescriptor/AllowedValue

Type: element



Properties Min. occurrence: 1
Max. occurrence: unbounded

Children pm:Value
pm:Type
pm:Identification
pm:Characteristic

Documentation List of values that the enumerated string METRIC accepts as a valid value.

B.214 EnumStringMetricDescriptor/AllowedValue/Value

Type: element



Type xsd:string

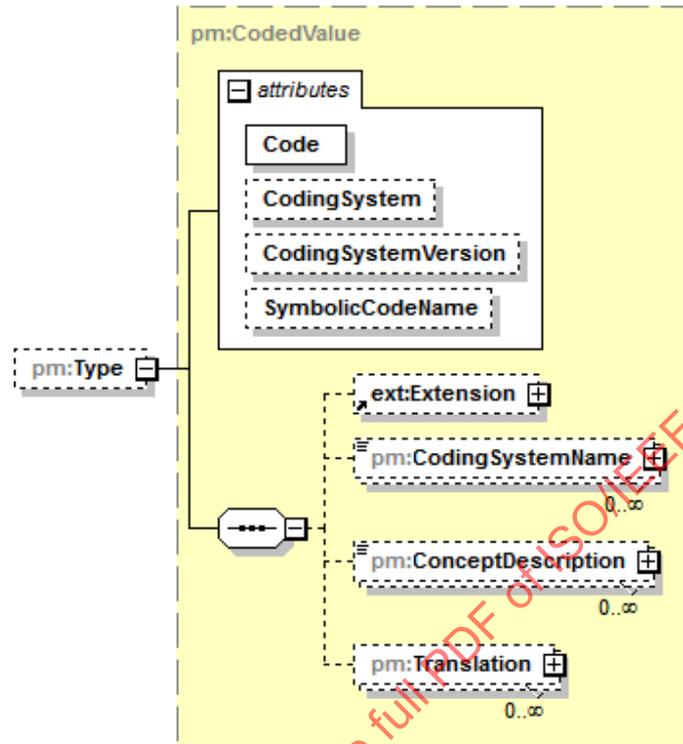
Documentation Accepted string value.

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B.215 EnumStringMetricDescriptor/AllowedValue/Type

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

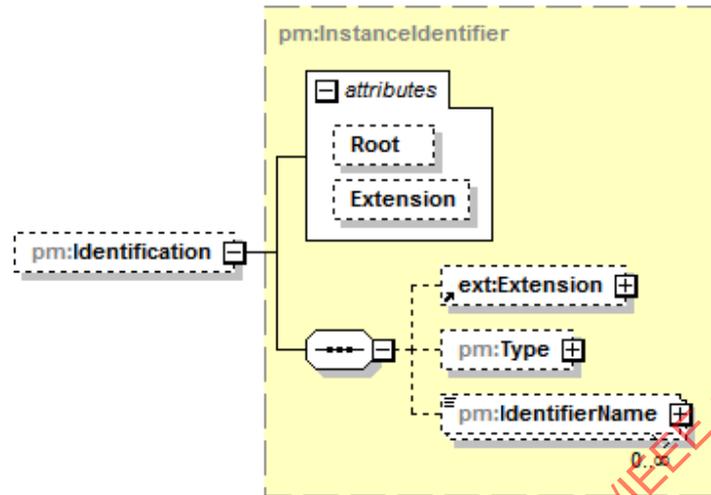
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation OPTIONAL pm:CodedValue to semantically describe the allowed value.

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B.216 EnumStringMetricDescriptor/AllowedValue/Identification

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: 1

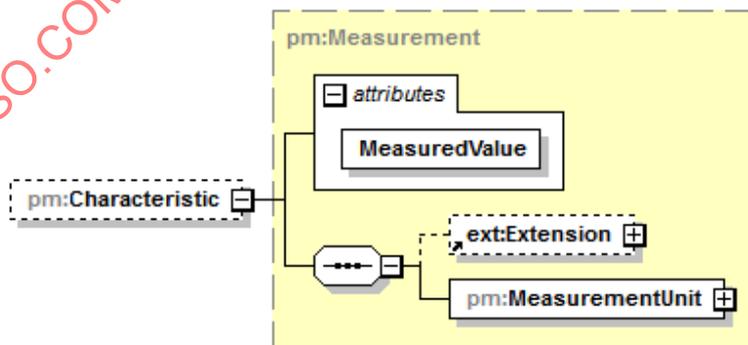
Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation OPTIONAL identification to apply instance identifiers to each allowed value.

B.217 EnumStringMetricDescriptor/AllowedValue/Characteristic

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

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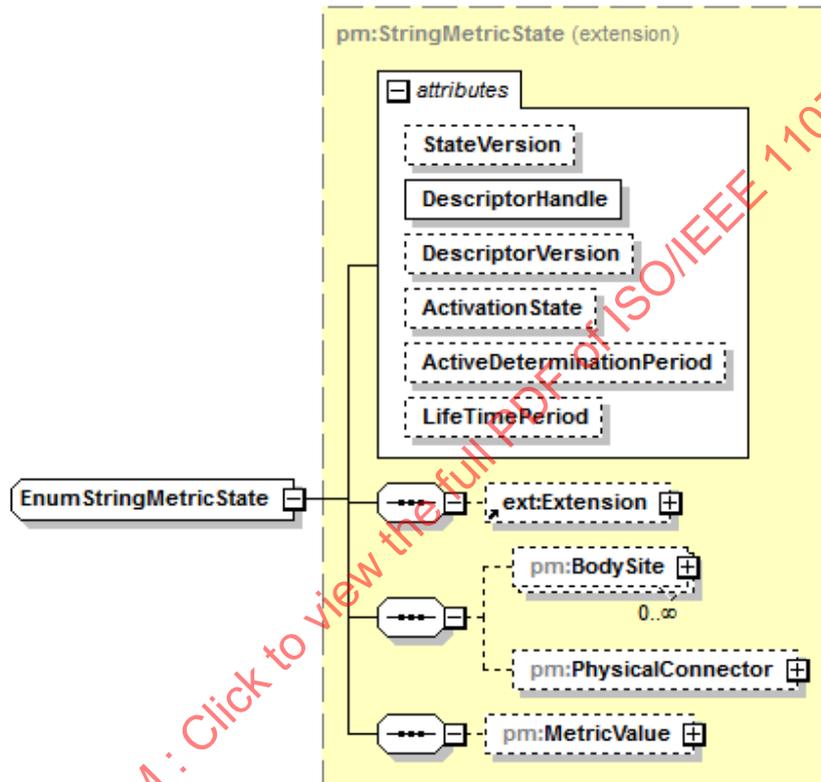
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation OPTIONAL field to attach a dimensional measurement to each allowed value.

B.218 EnumStringMetricState

Type: complexType



Type extension of **pm:StringMetricState**

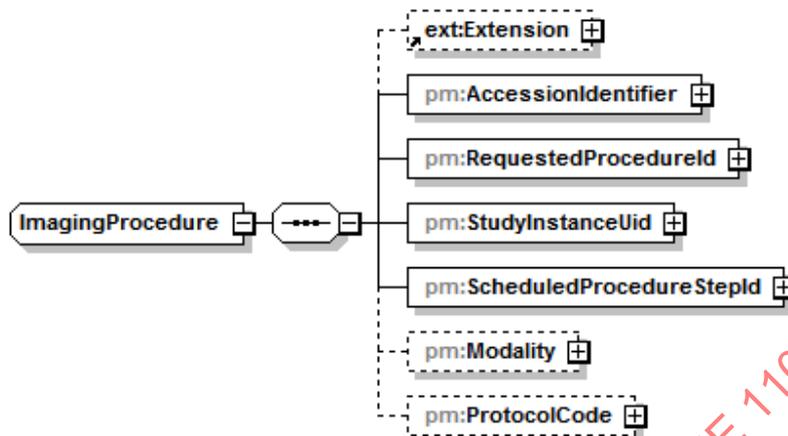
Children **tns:Extension**
pm:BodySite
pm:PhysicalConnector
pm:MetricValue

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>ActiveDeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional

Documentation State of an enumerated string METRIC.

B.219 ImagingProcedure

Type: complexType



Children tns:Extension
pm:AccessionIdentifier
pm:RequestedProcedureId
pm:StudyInstanceUid
pm:ScheduledProcedureStepId
pm:Modality
pm:ProtocolCode

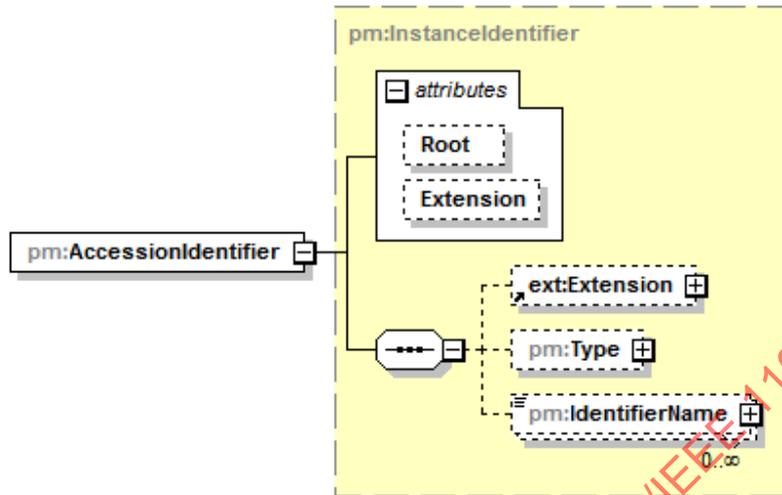
Documentation ImagingProcedure provides identifiers used by the Digital Imaging and Communications in Medicine (DICOM) and Health Language Level Seven International (HL7) sets of standards to identify the requested imaging procedures resulting from an order in a the hospital. Often these identifiers are created/assigned by the main hospital information system or departmental information systems and are taken over into any medical images by DICOM equipment in the context of this procedure.

The listed ELEMENTs have been taken over from the IHE Radiology Technical Framework's RAD-4 transaction ("Procedure Scheduled") and reuses the identifiers listed for the HL7 Version 2.5.1 IPC segment group of the OBR segment. Therefore, it is recommended to comply to the underlying HL7 and DICOM data types in order to have seamless integration with other clinical IT such as DICOM modalities or image archives (PACS).

In order to comply to the hierarchy behind the given identifiers, the following rules (taken from IHE) SHALL apply: if a Requested Procedure is comprised of multiple Scheduled Procedure Steps and/or if a Scheduled Procedure Step is comprised of multiple Protocol Codes, each applicable Scheduled Procedure Step / Protocol Code combination is included as a separate ProcedureDetails structure, i.e., the complex type "ProcedureDetails" occurs the same amount of times as there are different Scheduled Procedure Step IDs plus the amount of different Scheduled Procedure Step / Protocol Code combinations.

B.220 ImagingProcedure/AccessionIdentifier

Type: element



Type **pm:InstanceIdentifier**

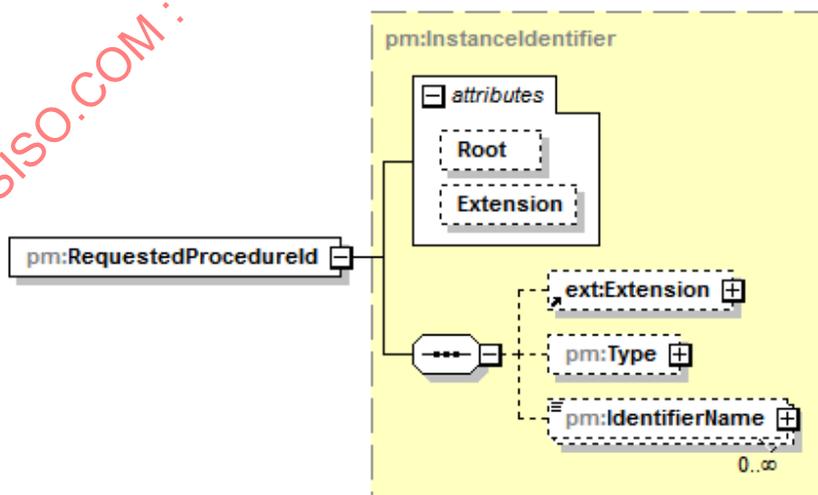
Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<i>Root</i>	xsd:anyURI	optional
	<i>Extension</i>	xsd:string	optional

Documentation The Accession Identifier (in DICOM "Accession ID") is an identifier of an "Imaging Service Request", and is (in this ProcedureDetails context) at the top of the hierarchy. A limit of sixteen (16) characters is required to allow compatibility with DICOM.

B.221 ImagingProcedure/RequestedProcedureId

Type: element



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Type **pm:InstanceIdentifier**

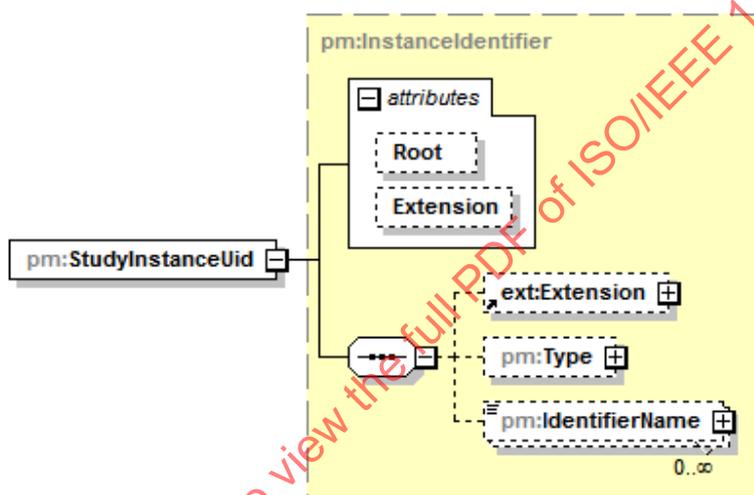
Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation An pm:ImagingProcedure/pm:AccessionIdentifier can result in various Requested Procedures, each identified uniquely (within the context of the pm:ImagingProcedure/pm:AccessionIdentifier) through a RequestedProcedureID. A limit of sixteen (16) characters is required to allow compatibility with DICOM.

B.222 ImagingProcedure/StudyInstanceUid

Type: element



Type **pm:InstanceIdentifier**

Children **tns:Extension**
pm:Type
pm:IdentifierName

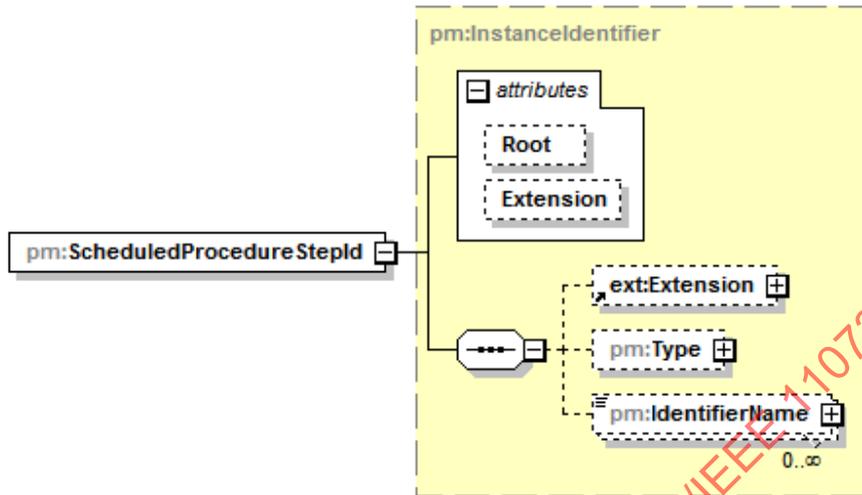
Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation The Study Instance UID is a world-wide unique identifier used by DICOM modalities to group together images in a so-called Study. This grouping is REQUIRED. Under the Study, the modality creates one or more so-called Series which again contain the images. The Series identification ("Series Instance UID") is part of the Procedure Details which refer to a planning process, since a modality is responsible to decide how many Series are created and how their identifiers should look like.

A limit of sixty-four (64) characters is required to allow compatibility with DICOM, with only numbers and dot characters permitted (e.g., 1.2.134124.4.12.34).

B.223 ImagingProcedure/ScheduledProcedureStepId

Type: element



Type **pm:InstanceIdentifier**

Children **tns:Extension**
pm:Type
pm:IdentifierName

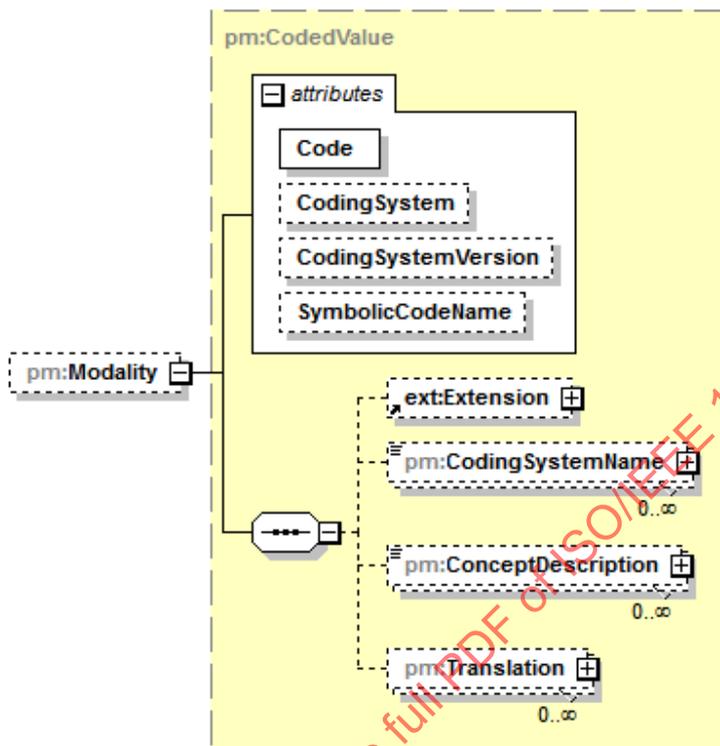
Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Under a Study (i.e., a Study Instance UID), a Procedure reflected by these ProcedureDetails can be planned in a finer granularity by scheduling different steps that should be performed (usually at a DICOM modality), the so-called "Scheduled Procedure Step"s. Each of these steps is identified by a Scheduled Procedure Step ID. A limit of sixteen (16) characters is required to allow compatibility with DICOM.

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B.224 ImagingProcedure/Modality

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation The field modality describes the type of equipment (usually DICOM equipment) used. DICOM offers a list of short identifiers for different device categories, e.g., CT for "Computer Tomography" or US for "Ultrasound". It is advised to follow the list of terms defined in the DICOM standard part 3. A limit of sixteen (16) characters for the first component is required to allow compatibility with DICOM.

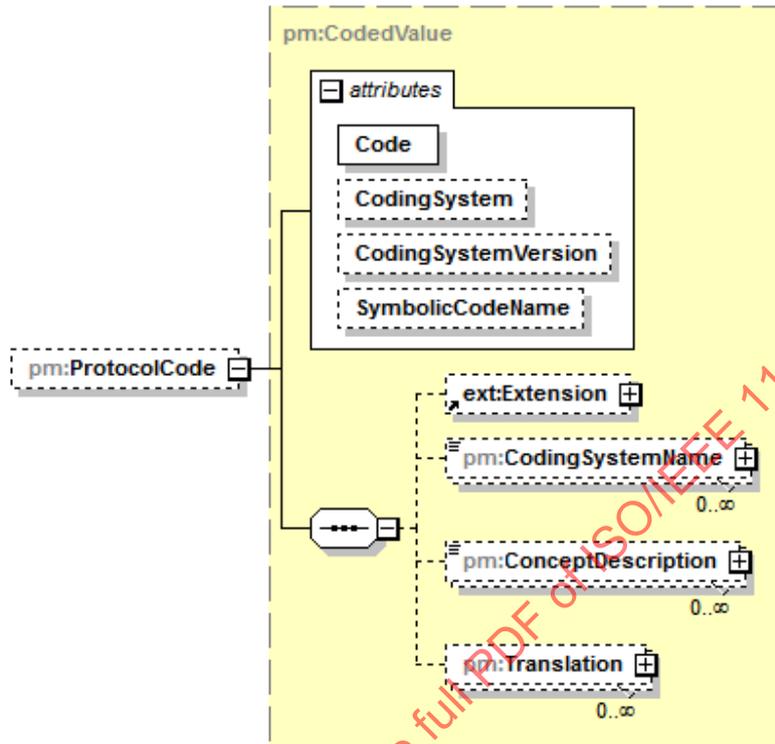
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B.225 ImagingProcedure/ProtocolCode

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

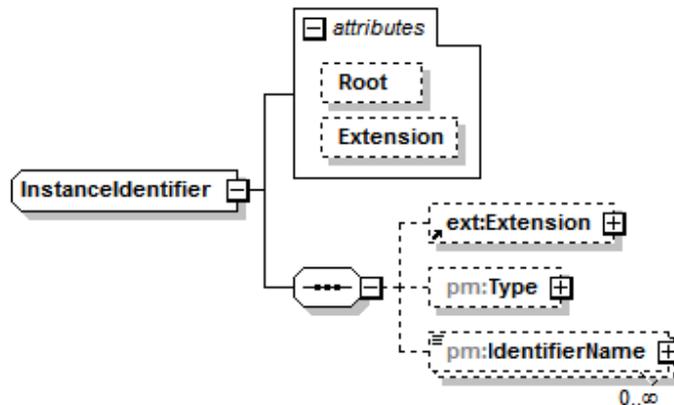
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Below each Scheduled Procedure Step the work can be defined in more detail by defining one or more Protocol Codes under it. A limit of sixteen (16) characters for the first component and sixty-four (64) characters for the second component is required to allow compatibility with DICOM.

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B.226 InstanceIdentifier

Type: complexType



Children tns:Extension
pm:Type
pm:IdentifierName

Used by GetContextStatesByIdentification/Identification
OperationInvokedReport/ReportPart/InvocationSource
ImagingProcedure/AccessionIdentifier
ApprovedJurisdictions/ApprovedJurisdiction
AbstractDeviceComponentDescriptor/ProductionSpecification/ComponentId
WorkflowContextState/WorkflowDetail/PerformedOrderDetail/FillerOrderNumber
AbstractMetricDescriptor/Relation/Identification
EnumStringMetricDescriptor/AllowedValue/Identification
AbstractContextState/Identification
PersonReference/Identification
LocationReference/Identification
MdsDescriptor/MetaData/Udi/Issuer
MdsDescriptor/MetaData/Udi/Jurisdiction
WorkflowContextState/WorkflowDetail/RequestedOrderDetail/PlacerOrderNumber
ImagingProcedure/RequestedProcedureId
ImagingProcedure/ScheduledProcedureStepId
ImagingProcedure/StudyInstanceUid
AbstractContextState/Validator
WorkflowContextState/WorkflowDetail/VisitNumber
OperatingJurisdiction

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation An identifier that uniquely identifies a thing or object.

Examples: object identifiers for medical record numbers, order ids, location ids, etc. InstanceIdentifier is defined in accordance to “Specifying Identity” [B4].

./@Root and ./@Extension of an instance identifier do not identify the type of the object being identified, or the type of the association between the object and the identifier - they only form the identifier itself. The identifier type SHALL be expressed by ./Type.

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B.227 InstanceIdentifier/@Root

Type: attribute

Type restriction of **xsd:anyURI**

Constraints	Kind	Value
	minLength	1

Documentation A unique identifier that guarantees the global uniqueness of the instance identifier. Root alone is allowed to build the entire instance identifier.

If ./@Extension is present, Root is the unique identifier for the "namespace" of the identifier in ./@Extension.

In situations where ./@Extension is known, but Root is not known, the implied value of a nonexistent Root SHALL match the value defined in R0135.

NOTE—Example: a POC MEDICAL DEVICE with an attached simple bar code scanner could create a new instance identifier with an unknown root and an extension that is set to the bar code number. Root is then applied later in time.

B.228 InstanceIdentifier/@Extension

Type: attribute

Type restriction of **xsd:string**

Constraints	Kind	Value
	minLength	1

Documentation A character string as a unique identifier within the scope of pm:InstanceIdentifier/pm:Root. If a non-null Extension exists, pm:InstanceIdentifier/pm:Root specifies a namespace ("assigning authority" or "identifier type").

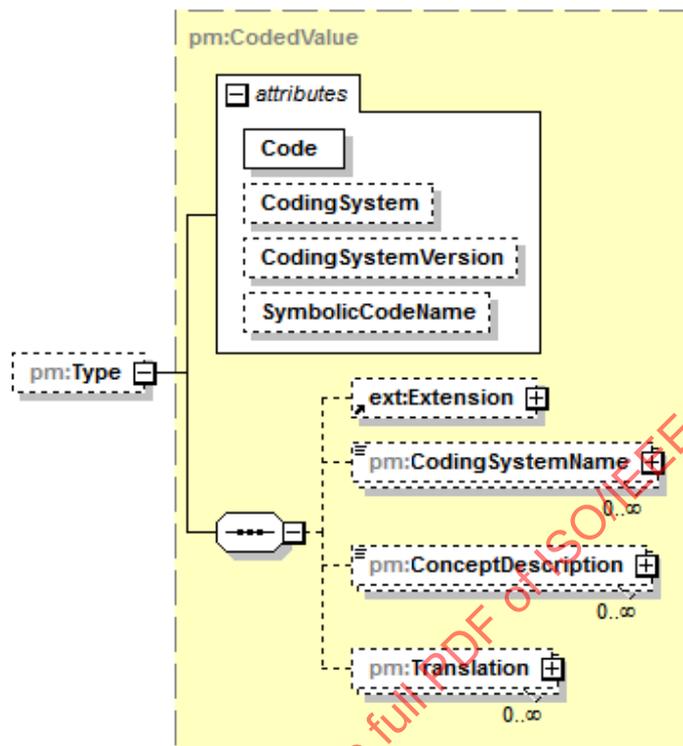
R5008: Extension MAY be empty if pm:InstanceIdentifier/pm:Root is the complete unique identifier.

R5009: If pm:InstanceIdentifier/pm:Root is not a complete unique identifier and Extension is not known, then Extension SHALL be populated with a null-flavor "Unknown".

NOTE—How the null-flavor "Unknown" is encoded, depends on the use-case and type of pm:InstanceIdentifier/pm:Root URI.

B.229 InstanceIdentifier/Type

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Type designates the type of the instance identifier, e.g., whether it is an MRN, license number, visit number.

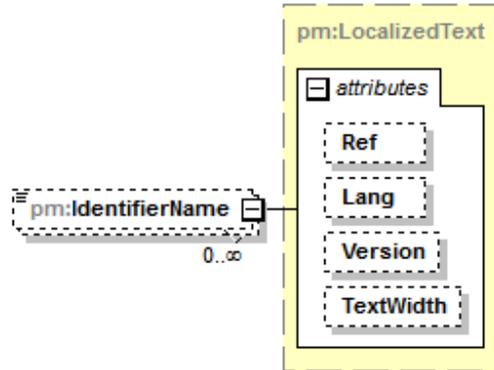
Since it is possible that semantic meaning of an instance identifier is comprehensively conveyed using the encompassing XML ELEMENTS, Type is OPTIONAL.

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B.230 InstanceIdentifier/IdentifierName

Type: element



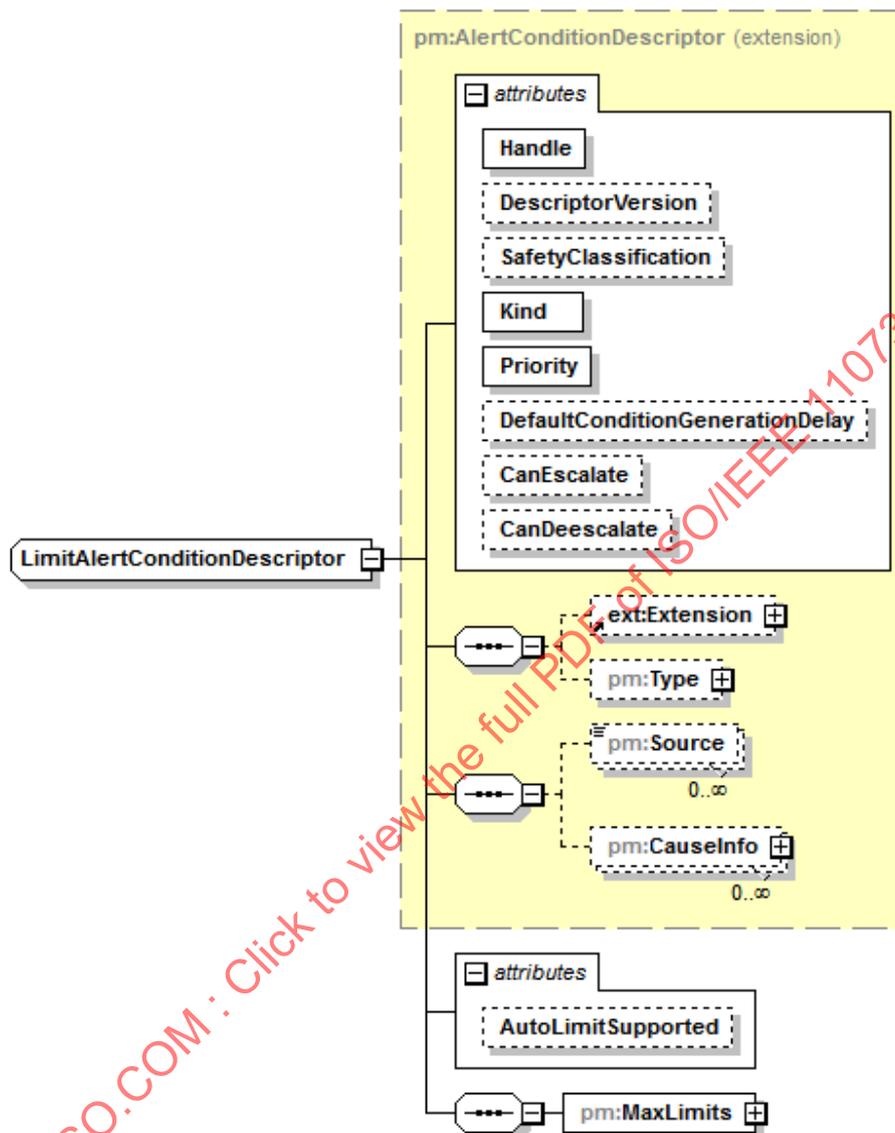
Type **pm:LocalizedText**

<i>Properties</i>		Min. occurrence:	0
		Max. occurrence:	unbounded
<i>Constraints</i>		<i>Kind</i>	<i>Value</i>
		minLength	0
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional
<i>Documentation</i>		IdentifierName is a localized human-readable name for the namespace represented in ./@Root.	
<p>NOTE—IdentifierName has no computational value and hence can never modify the meaning of ./@Root. The purpose of IdentifierName is to assist an unaided human interpreter of an instance identifier value to interpret the identifier. Applications ought not to perform any decision-making, matching, filtering or other processing based on this presence or value of this property. It is for display and development assistance only.</p>			

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B.231 LimitAlertConditionDescriptor

Type: complexType



Type extension of **pm:AlertConditionDescriptor**

- Children
- ins:Extension**
 - pm:Type**
 - pm:Source**
 - pm:CauseInfo**
 - pm:MaxLimits**

Attributes	Name	Type	Use
	<i>Handle</i>	pm:Handle	required
	<i>DescriptorVersion</i>	pm:VersionCounter	optional
	<i>SafetyClassification</i>	pm:SafetyClassification	optional
	<i>Kind</i>	pm:AlertConditionKind	required
	<i>Priority</i>	pm:AlertConditionPriority	required

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<u>DefaultConditionGenerationDelay</u>	xsd:duration	optional
<u>CanEscalate</u>	pm:AlertConditionPriority	optional
<u>CanDeescalate</u>	pm:AlertConditionPriority	optional
<u>AutoLimitSupported</u>	xsd:boolean	optional

Documentation LimitAlertConditionDescriptor is a specialization of an ALERT CONDITION that is active if at least one limit for a referenced METRIC has been violated.

B.232 LimitAlertConditionDescriptor/@AutoLimitSupported

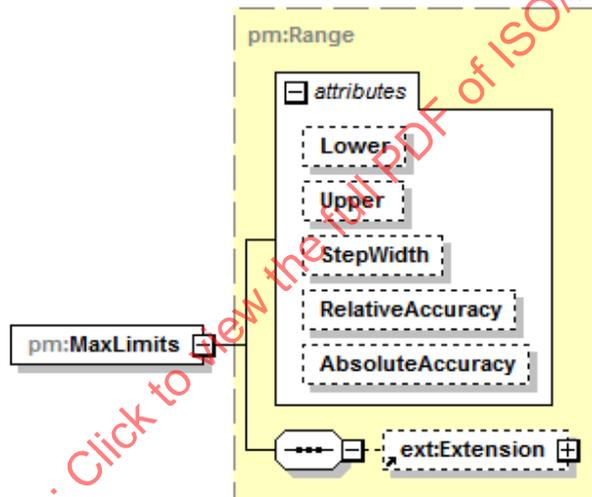
Type: attribute

Type **xsd:boolean**

Documentation AutoLimitSupported indicates whether (true) or not (false) a limit ALERT CONDITION provides support for automatic limit adaption. The implied value SHALL be "false".

B.233 LimitAlertConditionDescriptor/MaxLimits

Type: element



Type **pm:Range**

Attributes	Name	Type	Use
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional

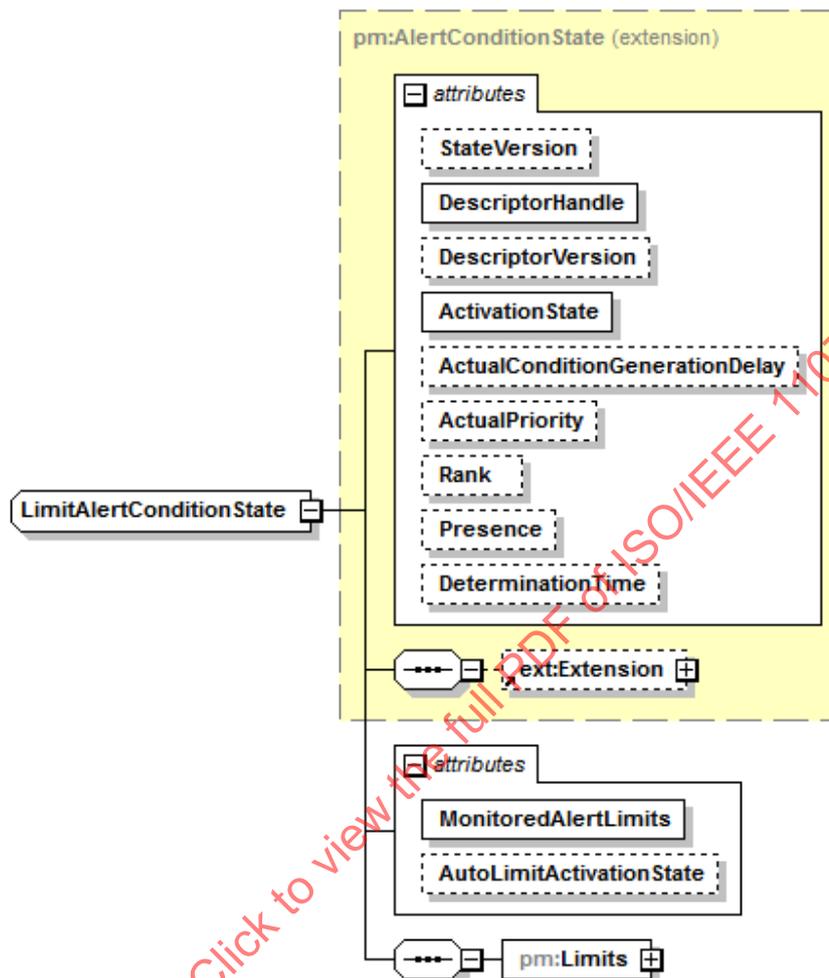
Documentation The maximum possible range for the limit bounds.

Example: the ECG values can be measured in a specific range. At some point the measured values are afflicted with noise, which makes them not valid for limits. Therefore, the maximum allowed range can be restricted.

The unit of the limits in pm:Range SHALL be the unit of the referenced pm:AlertConditionDescriptor/pm:Source.

B.234 LimitAlertConditionState

Type: complexType



Type extension of **pm:AlertConditionState**

Children **tns:Extension**
pm:Limits

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:AlertActivation	required
	<u>ActualConditionGenerationDelay</u>	xsd:duration	optional
	<u>ActualPriority</u>	pm:AlertConditionPriority	optional
	<u>Rank</u>	xsd:int	optional
	<u>Presence</u>	xsd:boolean	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional
	<u>MonitoredAlertLimits</u>	pm:AlertConditionMonitoredLimits	required
	<u>AutoLimitActivationState</u>	pm:AlertActivation	optional

Documentation A state of a limit ALERT CONDITION.

B.235 LimitAlertConditionState/@MonitoredAlertLimits

Type: attribute

Type **pm:AlertConditionMonitoredLimits**

Constraints	Kind	Value	Documentation
	enumeration	All	Both alert limits are monitored.
	enumeration	LoOff	LoOff = Low-Off. Low-limit violation detection is either currently turned off if the state possesses a low-limit value or is not supported at all.
	enumeration	HiOff	HiOff = Hi-Off. High-limit violation detection is either currently turned off if the state possesses a high-limit value or is not supported at all.
	enumeration	None	No alert limits are monitored.

NOTE—This flag is not equal to the activation state "Off" that pm:AlertConditionState/@ActivationState provides, although the result with regard to alert signalization is the same.

Documentation Monitored alert limits of the limit ALERT CONDITION. See pm:AlertConditionMonitoredLimits

NOTE—If the pm:AlertConditionState/@ActivationState ATTRIBUTE is not set to "On", the presence of the limit ALERT CONDITION is not detected. From a consumer perspective this is equivalent to the case when the pm:AlertConditionState/@ActivationState ATTRIBUTE is "On" and pm:AlertConditionState/@MonitoredAlertLimits is "None". The difference is that in the latter case the source for the ALERT CONDITION is still supervised, but the presence flag is not generated even if the limits are violated.

B.236 LimitAlertConditionState/@AutoLimitActivationState

Type: attribute

Type **pm:AlertActivation**

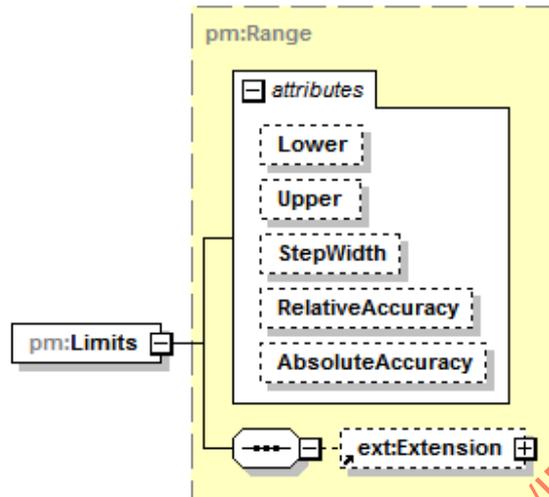
Constraints	Kind	Value	Documentation
	enumeration	On	The ALERT SYSTEM ELEMENT is operating.
	enumeration	Off	The ALERT SYSTEM ELEMENT is not operating.
	enumeration	Psd	Psd = Paused. The ALERT SYSTEM ELEMENT is temporarily not operating.

Documentation Indicates if the limits for the limit ALERT CONDITION are adjusted automatically.

"On": limit is adjusted automatically
 "Off": limit is not adjusted automatically
 "Psd": limit is temporarily not adjusted automatically

B.237 LimitAlertConditionState/Limits

Type: element



Type **pm:Range**

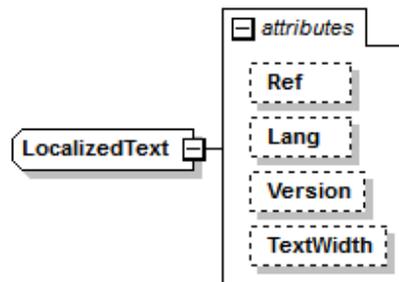
Attributes	Name	Type	Use
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional

Documentation Limit values for the pm:LimitAlertConditionState type.

The unit of the limits in pm:Range SHALL be the unit of the referenced pm:AlertConditionDescriptor/pm:Source.

B.238 LocalizedText

Type: complexType



Type extension of **pm:LocalizedTextContent**

Used by [SystemErrorReport/ReportPart/ErrorInfo](#)
[InvocationInfo/InvocationErrorMessage](#)
[GetLocalizedTextResponse/Text](#)
[CodedValue/CodingSystemName](#)
[CodedValue/ConceptDescription](#)
[CauseInfo/Description](#)
[RemedyInfo/Description](#)

ClinicalInfo/Description
CalibrationInfo/CalibrationDocumentation/Documentation
InstanceIdentifier/IdentifierName
PhysicalConnectorInfo/Label
MdsDescriptor/MetaData/Manufacturer
MdsDescriptor/MetaData/ModelName

Constraints	Kind	Value
	minLength	0

Attributes	Name	Type	Use
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional

Documentation LocalizedText is a bundled ELEMENT to reference texts in different languages or to provide a text in a specific language.

The goal of text references is to shrink the overall size of the MDIB by only providing a single reference to a text file that translates a text into multiple languages instead of flooding the MDIB with all translated texts. Referenced texts can be requested by the LOCALIZATION SERVICE. If no LOCALIZATION SERVICE exists, the application can make use of LocalizedText to represent a text in a single language.

R5047: If ./@Lang and ./@Ref are present, then the text SHALL be only available in the language specified by ./@Lang.

R5048: If ./@Lang is present and ./@Ref is not present, then ./@Lang SHALL specify the language of the LocalizedText's content. The Text is not available through the LOCALIZATION SERVICE.

R5049: If ./@Lang is not present and ./@Ref is present, then the text SHALL be available through the LOCALIZATION SERVICE.

R5050: If ./@Lang and ./@Ref are not present, then the language of the LocalizedText's content is unknown. The text SHALL NOT be available through the LOCALIZATION SERVICE.

B.239 LocalizedText/@Ref

Type: attribute

Type **pm:LocalizedTextRef**

Constraints	Kind	Value
	minLength	1

Documentation References a text in a localized text file.

Text references SHALL be unique regardless of any HANDLE name.

B.240 LocalizedText/@Lang

Type: attribute

Type **xsd:language**

Documentation	Lang specifies the language of the localized text.
----------------------	--

B.241 LocalizedText/@Version

Type: attribute

Type **pm:ReferencedVersion**

Documentation Version defines the current revision of the referenced text in the localized text file.

R5006: Texts might change over time, but references are per definition unique and typically do not change. To check if a text that is referenced by `.J@Ref` has changed, `pm:LocalizedText` SHALL include `Version` if `.J@Ref` is set.

NOTE—This saves to query a localized text file if the referencing ELEMENT has changed, but the referenced text has not. If `Version` is not given, a client has to assume that the text changes every time the referencing ELEMENT changes. In this case, the client is encouraged to query the localized text file on each modification.

R5007: To keep things simple, every translated text in a localized text file that belongs to a particular reference SHALL share the same version number.

NOTE—From this it follows that if `Version` has changed, every translation of a referenced text is obsolete even if only a single translation has changed.

B.242 LocalizedText/@TextWidth

Type: attribute

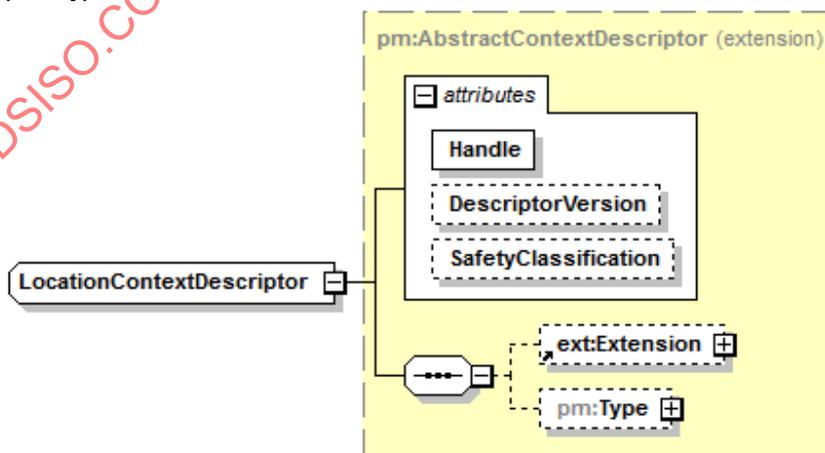
Type **pm:LocalizedTextWidth**

Constraints	Kind	Value	Documentation
	enumeration	xs	A line has 4 or less fullwidth characters.
	enumeration	s	A line has 8 or less fullwidth characters.
	enumeration	m	A line has 12 or less fullwidth characters.
	enumeration	l	A line has 16 or less fullwidth characters.
	enumeration	xl	A line has 20 or less fullwidth characters.
	enumeration	xxl	A line has 21 or more fullwidth characters.

Documentation Text width as defined in `pm:LocalizedTextWidth`.

B.243 LocationContextDescriptor

Type: complexType



Type extension of **pm:AbstractContextDescriptor**

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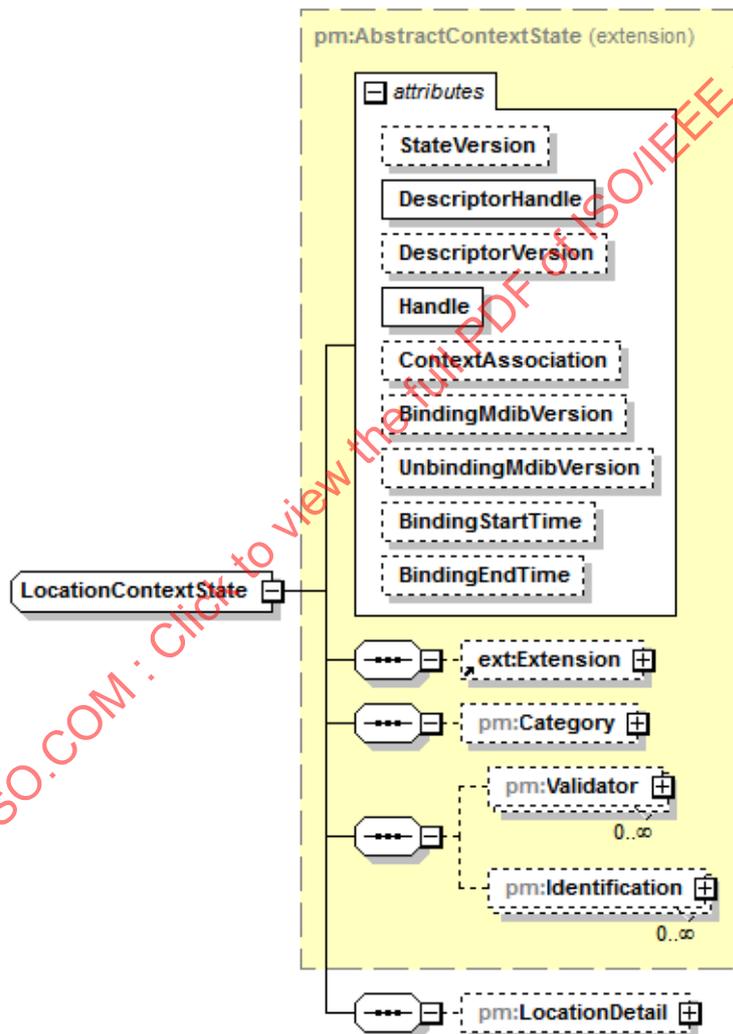
Children tns:Extension
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Context descriptor to specify that the MDS is able to provide information regarding the current spatial position.

B.244 LocationContextState

Type: complexType



Type extension of **pm:AbstractContextState**

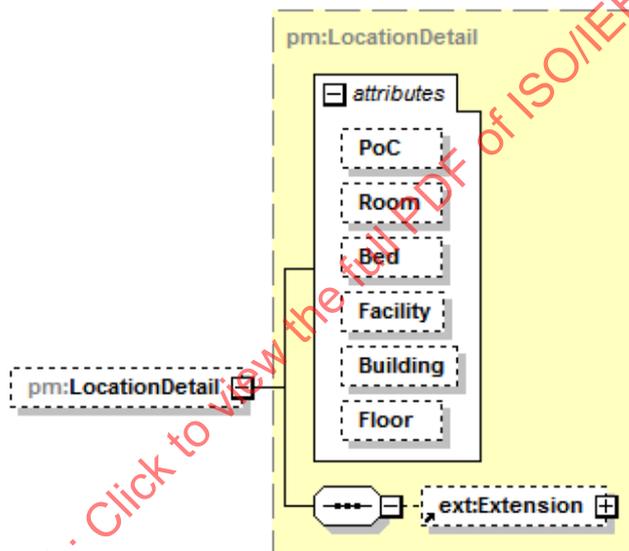
Children tns:Extension
pm:Category
pm:Validator
pm:Identification
pm:LocationDetail

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdbVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdbVersion</u>	pm:ReferencedVersion	optional
	<u>BindingStartTime</u>	pm:Timestamp	optional
	<u>BindingEndTime</u>	pm:Timestamp	optional

Documentation A context state that identifies a location in a hospital.

B.245 LocationContextState/LocationDetail

Type: element



Type **pm:LocationDetail**

Properties Min. occurrence: 0
Max. occurrence: 1

Attributes	Name	Type	Use
	<u>PoC</u>	xsd:string	optional
	<u>Room</u>	xsd:string	optional
	<u>Bed</u>	xsd:string	optional
	<u>Facility</u>	xsd:string	optional
	<u>Building</u>	xsd:string	optional
	<u>Floor</u>	xsd:string	optional

Documentation LocationDetail provides human-readable detailed location information. LocationDetail SHOULD NOT be used to form location-based logical systems of devices.

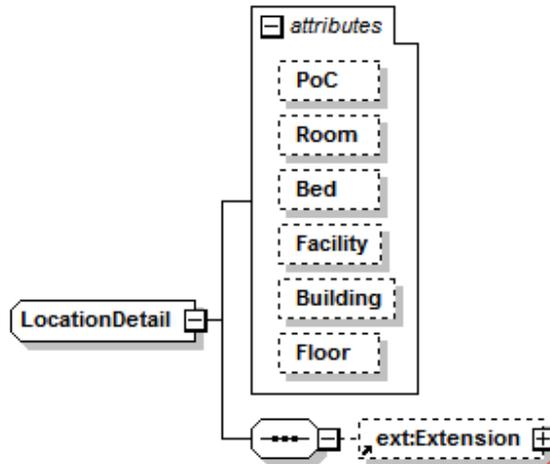
NOTE—Instead, pm:AbstractContextState/pm:Identification can be used to build logical groupings.

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B.246 LocationDetail

Type: complexType



Used by LocationContextState/LocationDetail
LocationReference/LocationDetail

Attributes	Name	Type	Use
	<u>PoC</u>	xsd:string	optional
	<u>Room</u>	xsd:string	optional
	<u>Bed</u>	xsd:string	optional
	<u>Facility</u>	xsd:string	optional
	<u>Building</u>	xsd:string	optional
	<u>Floor</u>	xsd:string	optional

Documentation Details about a location. This information is derived from the HL7 PV1-3 PL.

B.247 LocationDetail/@PoC

Type: attribute

Type xsd:string

Documentation Name of a point of care unit, e.g., nursing unit, department, or clinic.

B.248 LocationDetail/@Room

Type: attribute

Type xsd:string

Documentation Name of the room of a location.

B.249 LocationDetail/@Bed

Type: attribute

Type xsd:string

Documentation Name of the bed of a location.

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B.250 LocationDetail/@Facility

Type: attribute

Type `xsd:string`

Documentation Name of the facility of a location.

B.251 LocationDetail/@Building

Type: attribute

Type `xsd:string`

Documentation Name of the building of a location.

B.252 LocationDetail/@Floor

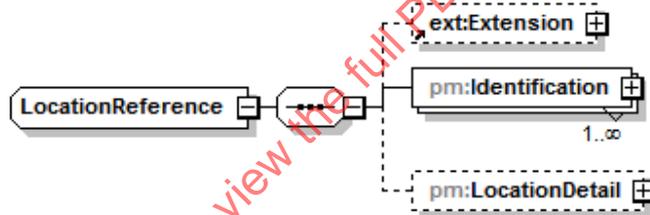
Type: attribute

Type `xsd:string`

Documentation Name of the floor of a building.

B.253 LocationReference

Type: complexType



Children [tns:Extension](#)
[pm:Identification](#)
[pm:LocationDetail](#)

Documentation A reference to an identifiable location with human readable location details.

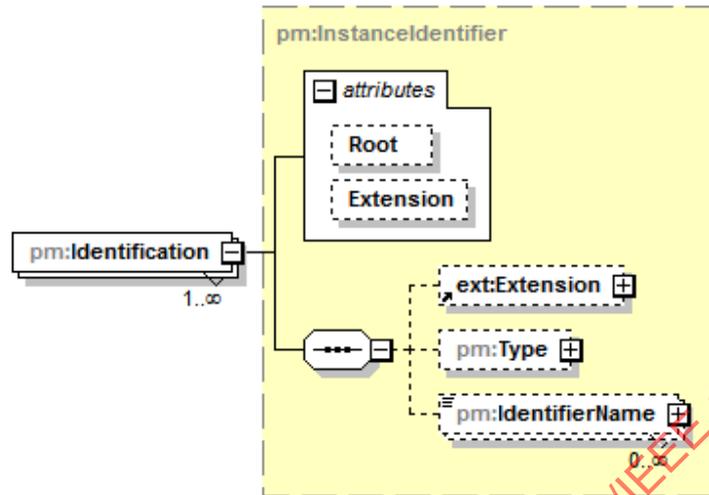
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B.254 LocationReference/Identification

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 1
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type
pm:IdentifierName

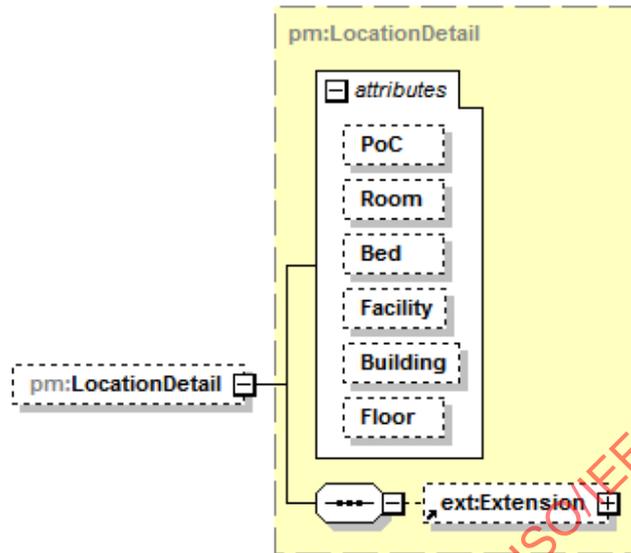
Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation The list of identifiers for the location.

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B.255 LocationReference/LocationDetail

Type: element



Type pm:LocationDetail

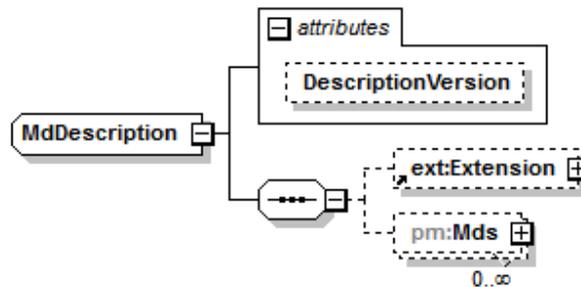
Properties Min. occurrence: 0
Max. occurrence: 1

Attributes	Name	Type	Use
	<u>PoC</u>	xsd:string	optional
	<u>Room</u>	xsd:string	optional
	<u>Bed</u>	xsd:string	optional
	<u>Facility</u>	xsd:string	optional
	<u>Building</u>	xsd:string	optional
	<u>Floor</u>	xsd:string	optional

Documentation Human readable location details which are intended for information purposes only.

B.256 MdDescription

Type: complexType



Children tns:Extension
pm:Mds

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Used by GetMdDescriptionResponse/MdDescription
Mdib/MdDescription

Attributes	Name	Type	Use
	<u>DescriptionVersion</u>	pm:VersionCounter	optional

Documentation MdDescription is the root container to represent the descriptive part of the MDIB. The descriptive part describes the capabilities provided by a POC MEDICAL DEVICE, e.g., which measurements, alerts and settings it provides. As the descriptive part does not change as frequently as the state part, it is well-known as the (almost) static part of the MDIB. The MdDescription's counterpart is pm:MdState.

B.257 MdDescription/@DescriptionVersion

Type: attribute

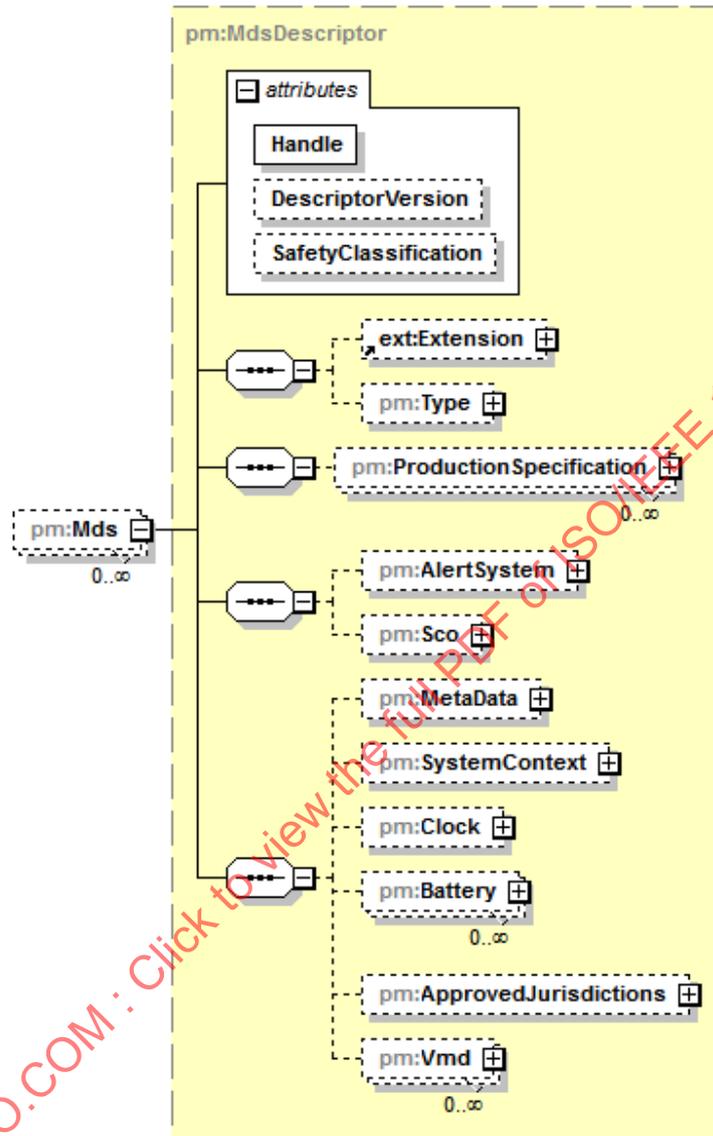
Type pm:VersionCounter

Documentation Version number of the description. The version number is incremented by one every time the descriptive part changes. The implied value SHALL be "0".

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B.258 MdDescription/Mds

Type: element



Type **pm:MdsDescriptor**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:AlertSystem
pm:Scop
pm:MetaData
pm:SystemContext
pm:Clock
pm:Battery
pm:ApprovedJurisdictions
pm:Vmd

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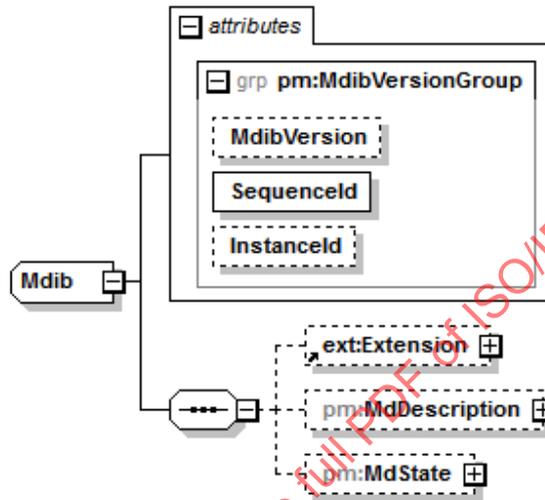
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Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation List of MDSs that are contained in the MDIB.

B.259 Mdib

Type: complexType



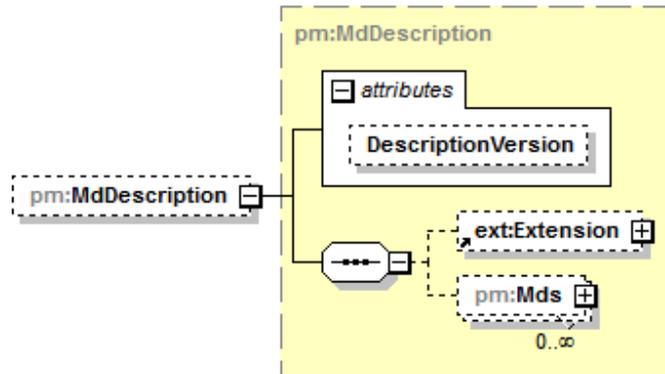
Children tns:Extension
pm:MdDescription
pm:MdState

Attributes	Name	Type	Use
	<u>MddbVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation Root object that comprises the capability description of the represented MDSs in pm:MdDescription (descriptive part) as well as the current state in pm:MdState (state part).

B.260 Mdib/MdDescription

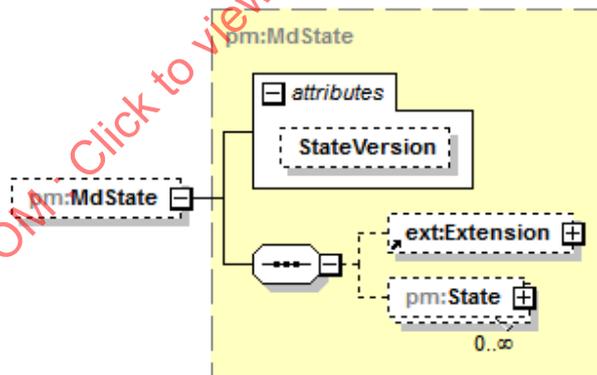
Type: element



Type	<u>pm:MdDescription</u>		
Properties	Min. occurrence:	0	
	Max. occurrence:	1	
Children	<u>tns:Extension</u> <u>pm:Mds</u>		
Attributes	Name	Type	Use
	<u>DescriptionVersion</u>	pm:VersionCounter	optional

B.261 Mdib/MdState

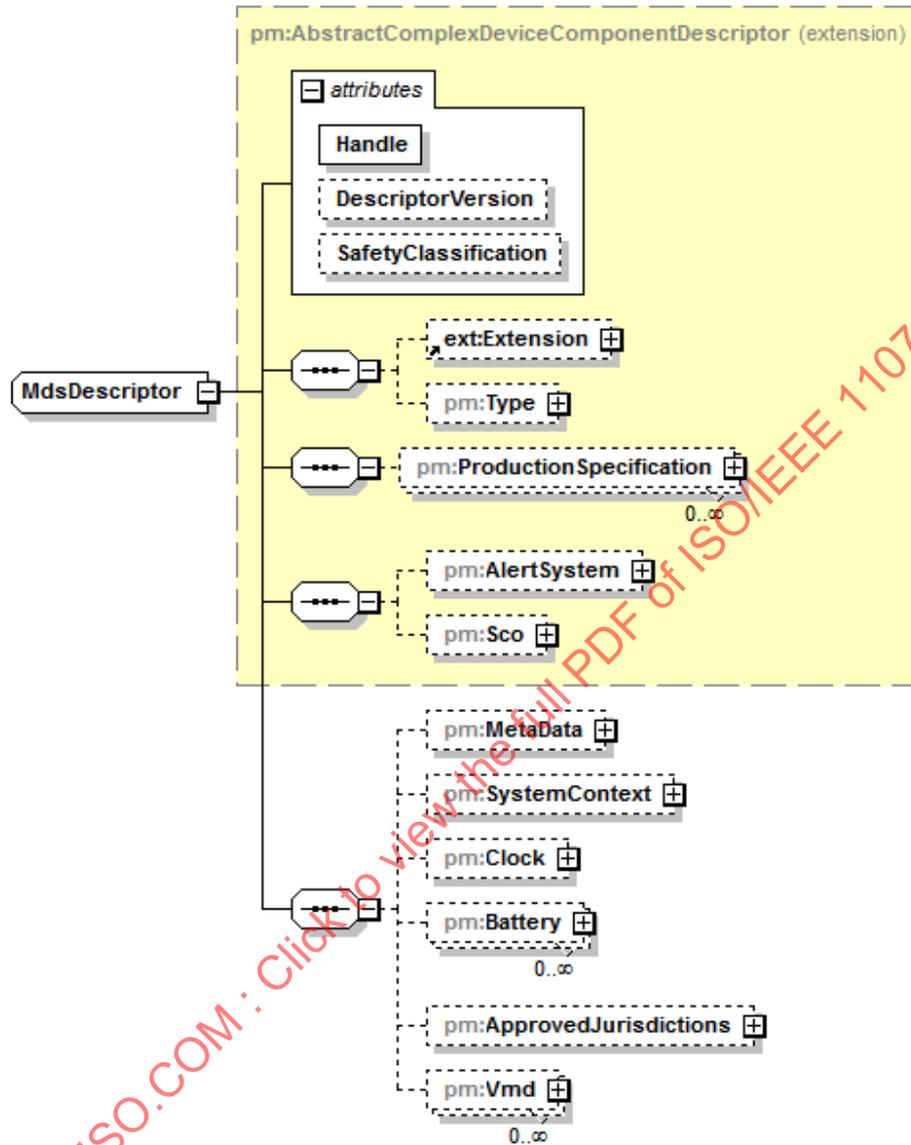
Type: element



Type	<u>pm:MdState</u>		
Properties	Min. occurrence:	0	
	Max. occurrence:	1	
Children	<u>tns:Extension</u> <u>pm:State</u>		
Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional

B.262 MdsDescriptor

Type: complexType



Type extension of **pm:AbstractComplexDeviceComponentDescriptor**

- Children
- tns:Extension**
 - pm:Type**
 - pm:ProductionSpecification**
 - pm:AlertSystem**
 - pm:Sco**
 - pm:MetaData**
 - pm:SystemContext**
 - pm:Clock**
 - pm:Battery**
 - pm:ApprovedJurisdictions**
 - pm:Vmd**

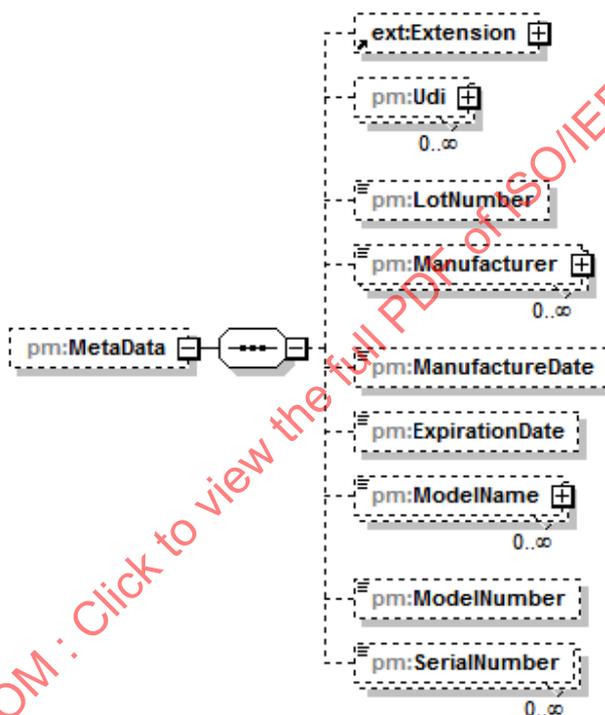
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation MdsDescriptor represents an MDS that in turn represents a POC MEDICAL DEVICE such as an anesthesia workstation. It contains an abstraction of the hardware specification of a POC MEDICAL DEVICE plus a list of VMDs, contextual information and clock object.

NOTE—The IEEE 11073-10201 has different specializations that are all representable by MdsDescriptor.

B.263 MdsDescriptor/MetaData

Type: element



Properties	Min. occurrence:	0
	Max. occurrence:	1

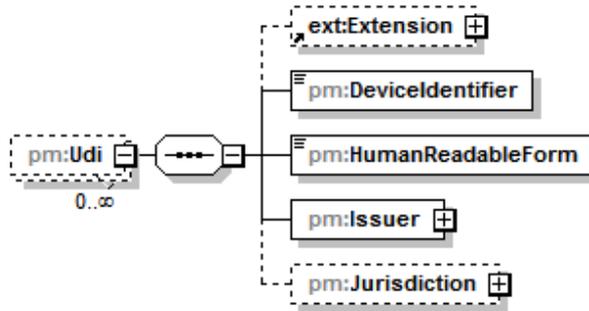
Children

- tns:Extension
- pm:Udi
- pm:LotNumber
- pm:Manufacturer
- pm:ManufactureDate
- pm:ExpirationDate
- pm:ModelName
- pm:ModelNumber
- pm:SerialNumber

Documentation Describes POC MEDICAL DEVICE meta data.

B.264 MdsDescriptor/MetaData/Udi

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Children tns:Extension
pm:DeviceIdentifier
pm:HumanReadableForm
pm:Issuer
pm:Jurisdiction

Documentation UDI fragments as defined by the FDA.

NOTE 1—The amount of ELEMENTs is unbounded in order to support the provision of UDIs from different jurisdictions.
NOTE 2—If needed, the UDI's distinct identification code can be inserted as an extension to the MetaData object.

B.265 MdsDescriptor/MetaData/Udi/DeviceIdentifier

Type: element

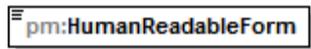


Type xsd:string

Documentation A mandatory, fixed portion of a UDI that identifies the labeler and the specific version or model of a device.

B.266 MdsDescriptor/MetaData/Udi/HumanReadableForm

Type: element

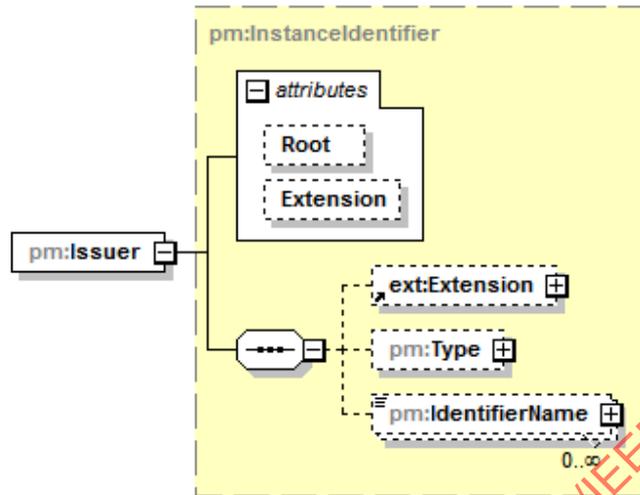


Type xsd:string

Documentation UDI human readable form as printed on the barcode.

B.267 MdsDescriptor/MetaData/Udi/Issuer

Type: element



Type **pm:InstanceIdentifier**

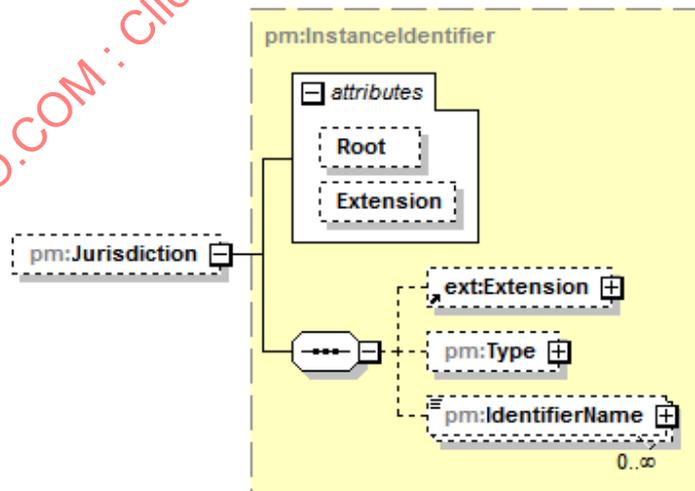
Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Organization that has issued the UDI

B.268 MdsDescriptor/MetaData/Udi/Jurisdiction

Type: element



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Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm>Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Jurisdiction that the UDI is valid for. If no value is defined, then the UDI is not bound to a specific jurisdiction.

B.269 MdsDescriptor/MetaData/LotNumber

Type: element



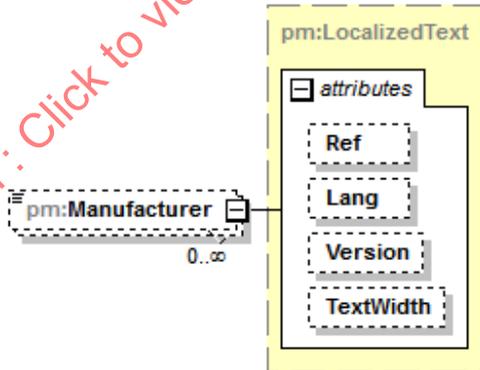
Type **xsd:string**

Properties Min. occurrence: 0
Max. occurrence: 1

Documentation OPTIONAL lot number of manufacturer.

B.270 MdsDescriptor/MetaData/Manufacturer

Type: element



Type **pm:LocalizedText**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Constraints	Kind	Value
	minLength	0

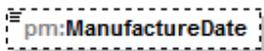
Attributes	Name	Type	Use
	<u>Ref</u>	pm:LocalizedTextRef	optional

<u>Lang</u>	xsd:language	optional
<u>Version</u>	pm:ReferencedVersion	optional
<u>TextWidth</u>	pm:LocalizedTextWidth	optional

Documentation OPTIONAL texts that describe the manufacturer name.

B.271 MdsDescriptor/MetaData/ManufactureDate

Type: element



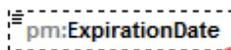
Type **xsd:dateTime**

<i>Properties</i>	Min. occurrence: 0
	Max. occurrence: 1

Documentation OPTIONAL date when the device was made.

B.272 MdsDescriptor/MetaData/ExpirationDate

Type: element



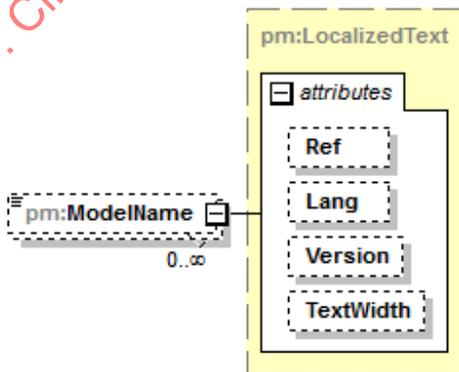
Type **xsd:dateTime**

<i>Properties</i>	Min. occurrence: 0
	Max. occurrence: 1

Documentation OPTIONAL date and time of expiry of the device (if applicable).

B.273 MdsDescriptor/MetaData/ModelName

Type: element



Type **pm:LocalizedText**

<i>Properties</i>	Min. occurrence: 0
	Max. occurrence: unbounded

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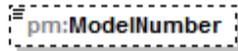
Constraints	Kind	Value
	minLength	0

Attributes	Name	Type	Use
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional

Documentation OPTIONAL texts that describe the model name.

B.274 MdsDescriptor/MetaData/ModelNumber

Type: element



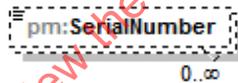
Type **xsd:string**

Properties	Min. occurrence:	0
	Max. occurrence:	1

Documentation OPTIONAL model number of the MDS.

B.275 MdsDescriptor/MetaData/SerialNumber

Type: element



Type **xsd:string**

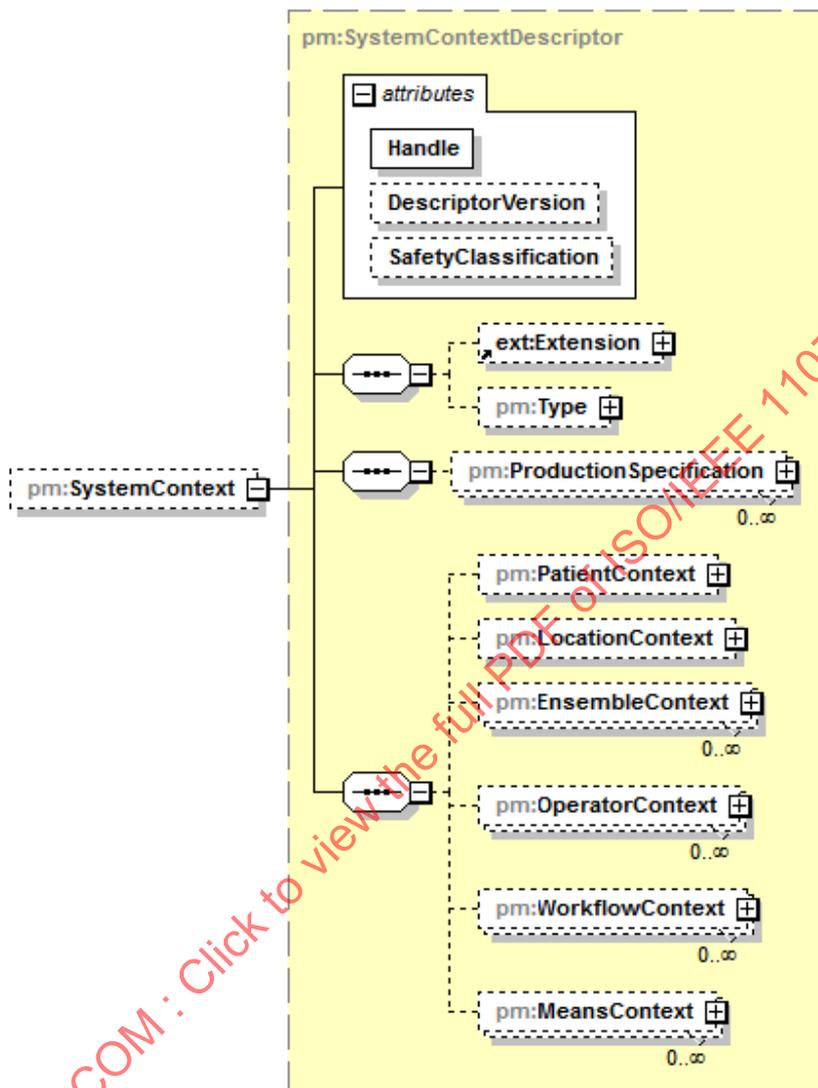
Properties	Min. occurrence:	0
	Max. occurrence:	unbounded

Documentation OPTIONAL serial numbers of the system.

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B.276 MdsDescriptor/SystemContext

Type: element



Type **pm:SystemContextDescriptor**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:PatientContext
pm:LocationContext
pm:EnsembleContext
pm:OperatorContext
pm:WorkflowContext
pm:MeansContext

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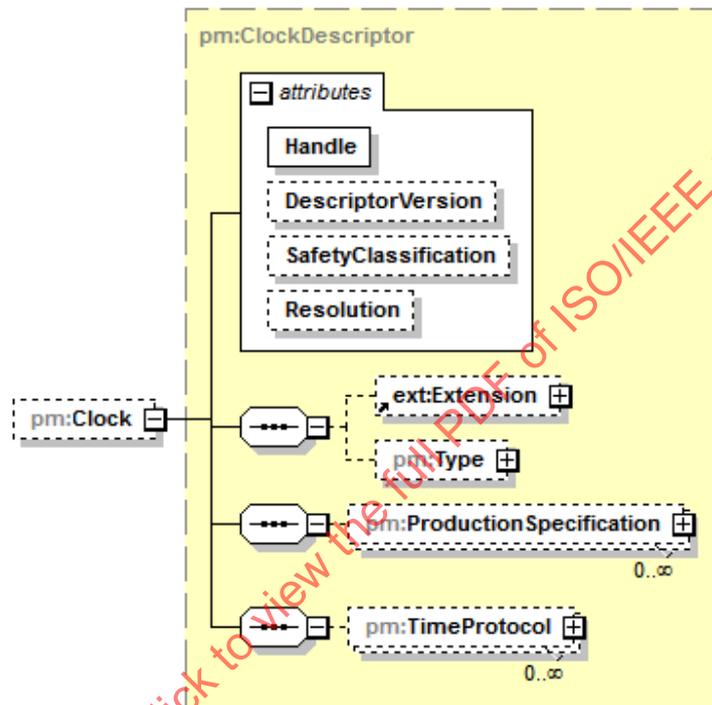
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Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation See pm:SystemContextDescriptor.

B.277 MdsDescriptor/Clock

Type: element



Type **pm:ClockDescriptor**

Properties Min. occurrence: 0
Max. occurrence: 1

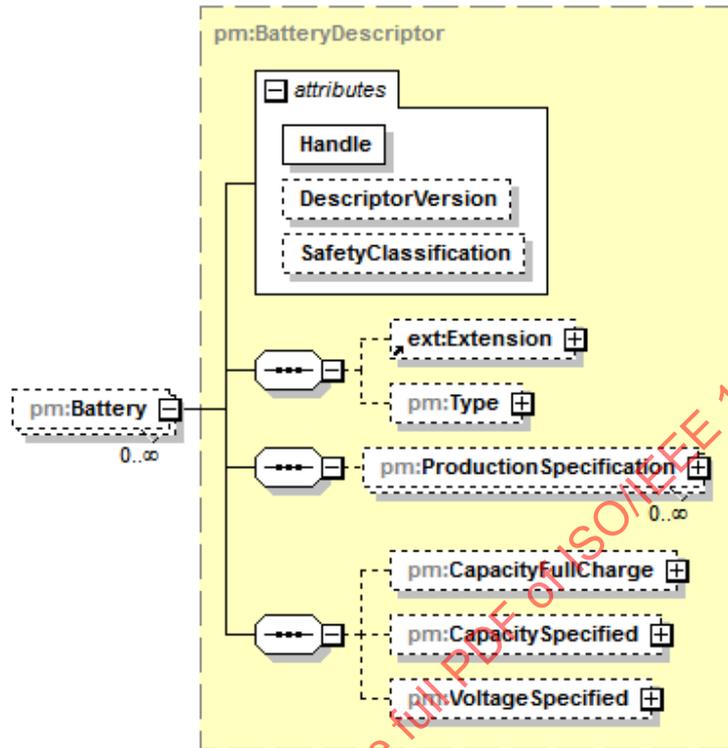
Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:TimeProtocol

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>Resolution</u>	xsd:duration	optional

Documentation If supported, an MDS inserts date/time capabilities here.

B.278 MdsDescriptor/Battery

Type: element



Type **pm:BatteryDescriptor**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:CapacityFullCharge
pm:CapacitySpecified
pm:VoltageSpecified

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation If supported, an MDS inserts battery capabilities here.

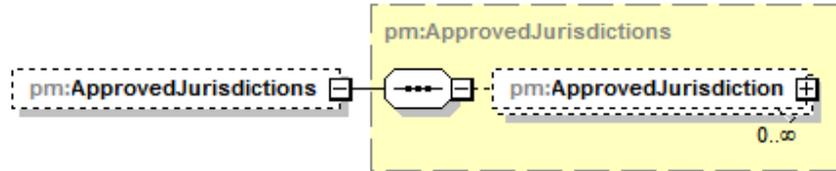
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B.279 MdsDescriptor/ApprovedJurisdictions

Type: element



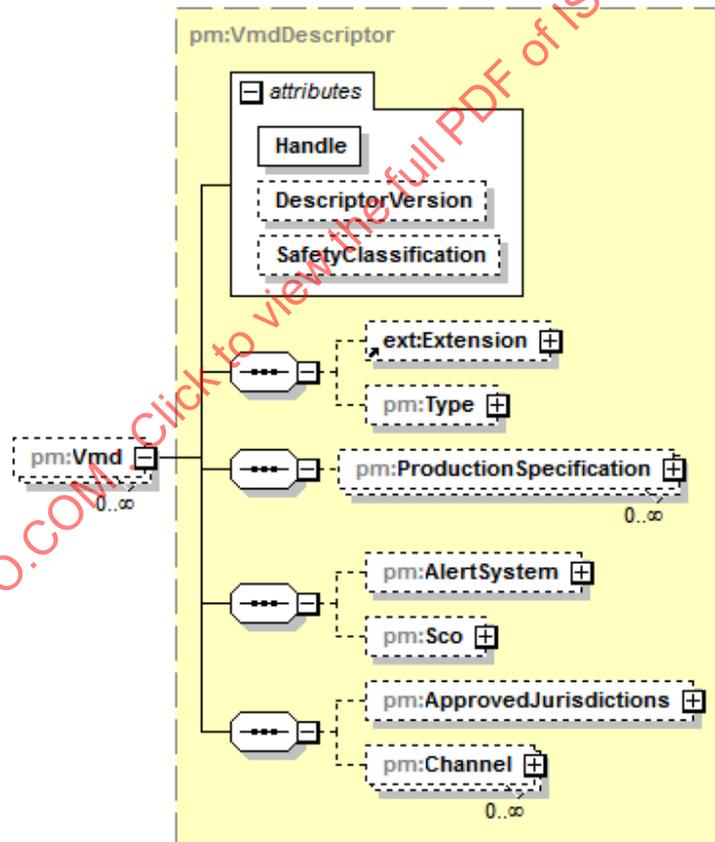
Type **pm:ApprovedJurisdictions**

Properties Min. occurrence: 0
Max. occurrence: 1

Documentation List of regions in which the the MDS is approved to be operated. If the list does not contain any entries, then the MDS is not approved for any region. If the list is not specified, then the MDS is approved to be operated in any region.

B.280 MdsDescriptor/Vmd

Type: element



Type **pm:VmdDescriptor**

Properties Min. occurrence: 0
Max. occurrence: unbounded

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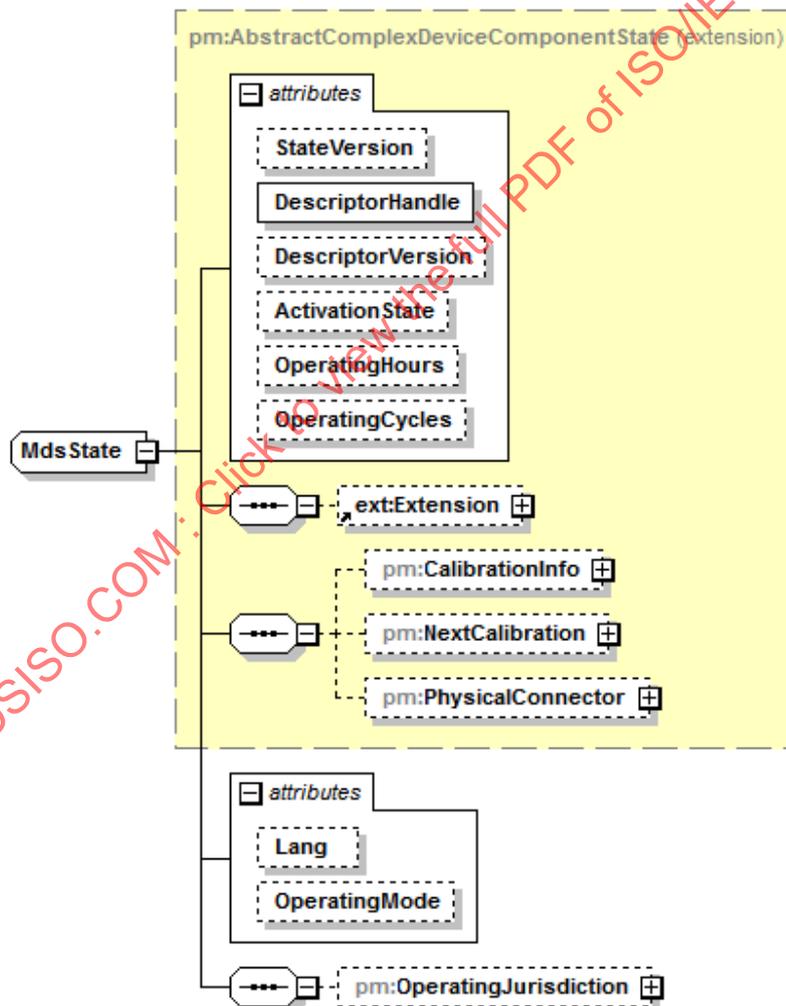
Children [tns:Extension](#)
[pm:Type](#)
[pm:ProductionSpecification](#)
[pm:AlertSystem](#)
[pm:SCO](#)
[pm:ApprovedJurisdictions](#)
[pm:Channel](#)

Attributes	Name	Type	Use
	Handle	pm:Handle	required
	DescriptorVersion	pm:VersionCounter	optional
	SafetyClassification	pm:SafetyClassification	optional

Documentation Ordered list of VMDs that belongs to the MDS. The list is ordered by the position of the VMD in the list where the ELEMENT with a lower list index has a higher clinical relevance than any entry with a higher list index. The SERVICE PROVIDER defines the clinical relevance and MAY reorder the list at any time.

B.281 MdsState

Type: complexType



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Type extension of **pm:AbstractComplexDeviceComponentState**

Children **tns:Extension**
pm:CalibrationInfo
pm:NextCalibration
pm:PhysicalConnector
pm:OperatingJurisdiction

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional
	<u>Lang</u>	xsd:language	optional
	<u>OperatingMode</u>	pm:MdsOperatingMode	optional

Documentation Definition of the state of an pm:MdsDescriptor.

B.282 MdsState/@Lang

Type: attribute

Type **xsd:language**

Documentation The current locale information that is configured for an MDS in accordance with RFC 5646 (see <http://tools.ietf.org/html/rfc5646>). For example, this is the language that is used for display purposes on the UI. The implied value SHALL be "en".

B.283 MdsState/@OperatingMode

Type: attribute

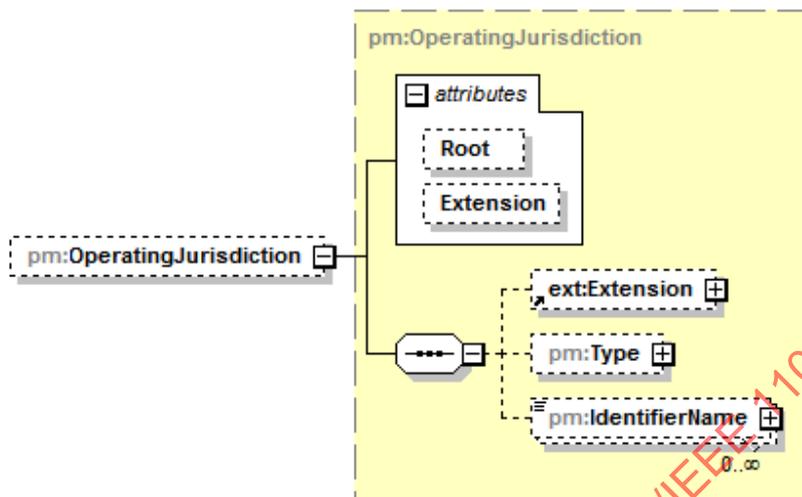
Type **pm:MdsOperatingMode**

Constraints	Kind	Value	Documentation
	enumeration	Nml	Nml = Normal. The POC MEDICAL DEVICE operates in a mode that supports the fulfillment of its clinical functions.
	enumeration	Dmo	Dmo = Demo. The POC MEDICAL DEVICE operates in a mode that is intended for demonstration purposes only. Arbitrary values are generated.
	enumeration	Srv	Srv = Service. The POC MEDICAL DEVICE operates in a mode that is intended for services purposes only.
	enumeration	Mtn	MTN = Maintenance. The POC MEDICAL DEVICE operates in a mode that is intended for maintenance purposes only.

Documentation The operating mode of an MDS. Typically, an MDS operates in normal mode, so the implied value SHALL be "Nml".

B.284 MdsState/OperatingJurisdiction

Type: element



Type **pm:OperatingJurisdiction**

Properties Min. occurrence: 0
Max. occurrence: 1

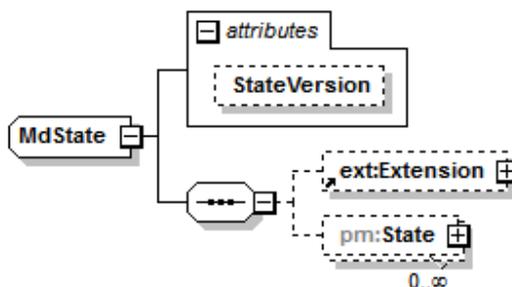
Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<i>Root</i>	xsd:anyURI	optional
	<i>Extension</i>	xsd:string	optional

Documentation The current region information that is configured for the MDS. See also pm:OperatingJurisdiction. OperatingJurisdiction SHALL NOT be inserted if there is no pm:MdsDescriptor/pm:ApprovedJurisdictions list present.

B.285 MdState

Type: complexType



Children **tns:Extension**
pm:State

Used by **GetMdStateResponse/MdState**
Mdib/MdState

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Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional

Documentation MdState is the root container to represent the state part of the MDIB. The state part describes the values provided by a POC MEDICAL DEVICE, e.g., which measurement or alert values as well as patient demographics it provides. As the state part most often changes very frequently, it is well-known as the dynamic part of the MDIB. The MdState's counterpart is pm:MdDescription.

B.286 MdState/@StateVersion

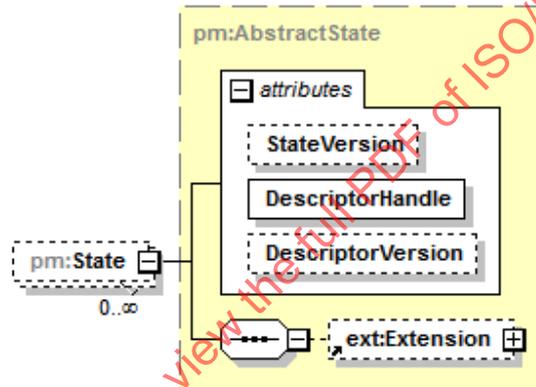
Type: attribute

Type **pm:VersionCounter**

Documentation Version number of the states. The version number is incremented by one every time the state part changes. The implied value SHALL be "0".

B.287 MdState/State

Type: element



Type **pm:AbstractState**

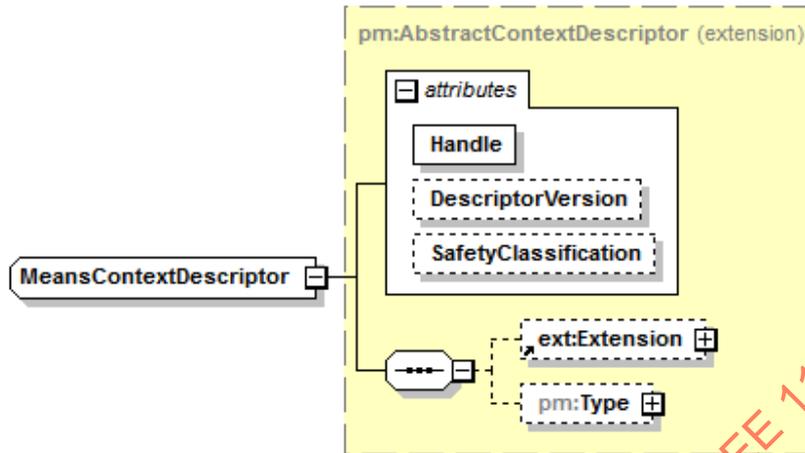
Properties Min. occurrence: 0
Max. occurrence: unbounded

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional

Documentation List of states that describe the volatile status of the objects in the MDIB.

B.288 MeansContextDescriptor

Type: complexType



Type extension of **pm:AbstractContextDescriptor**

Children **tns:Extension**
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Context descriptor to specify that the MDS is able to provide information about utilized means.

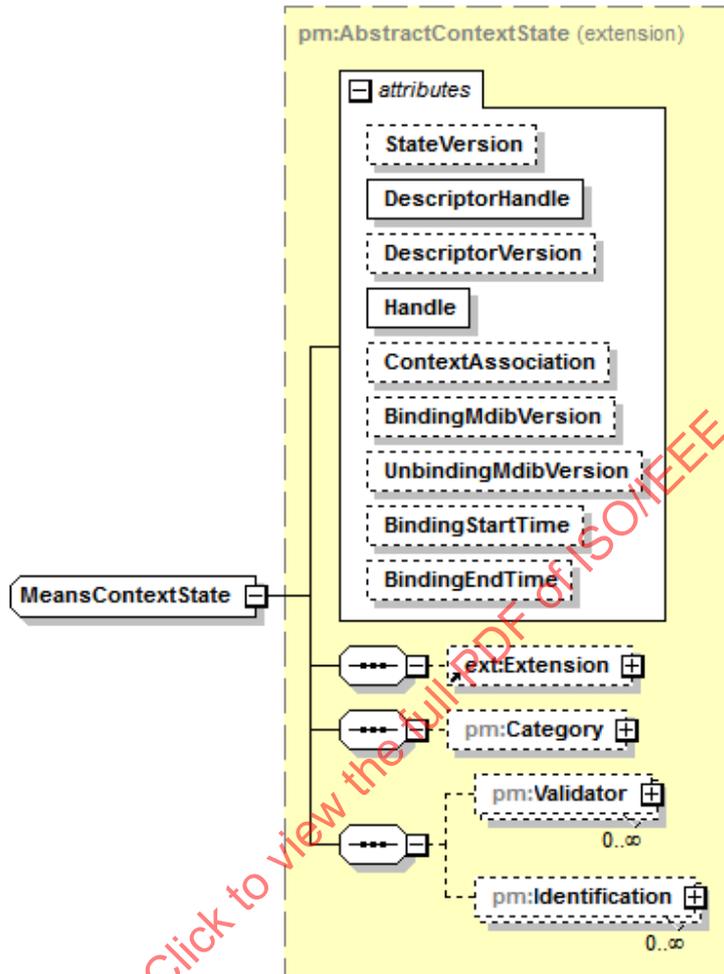
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B.289 MeansContextState

Type: complexType



Type extension of **pm:AbstractContextState**

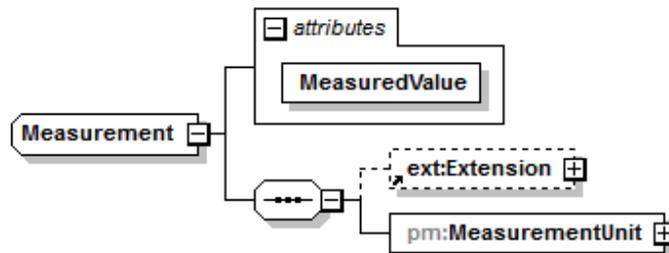
- Children
- tns:Extension**
 - pm:Category**
 - pm:Validator**
 - pm:Identification**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>BindingStartTime</u>	pm:Timestamp	optional
	<u>BindingEndTime</u>	pm:Timestamp	optional

Documentation A context state to identify a means that is utilized by an MDS or a part of it.

B.290 Measurement

Type: complexType



Children [tns:Extension](#)
[pm:MeasurementUnit](#)

Used by [NeonatalPatientDemographicsCoreData/BirthLength](#)
[NeonatalPatientDemographicsCoreData/BirthWeight](#)
[BatteryDescriptor/CapacityFullCharge](#)
[BatteryState/CapacityRemaining](#)
[BatteryDescriptor/CapacitySpecified](#)
[EnumStringMetricDescriptor/AllowedValue/Characteristic](#)
[BatteryState/Current](#)
[NeonatalPatientDemographicsCoreData/GestationalAge](#)
[NeonatalPatientDemographicsCoreData/HeadCircumference](#)
[PatientDemographicsCoreData/Height](#)
[BatteryState/RemainingBatteryTime](#)
[BatteryState/Temperature](#)
[CalibrationInfo/CalibrationDocumentation/CalibrationResult/Value](#)
[ClinicalInfo/RelatedMeasurement/Value](#)
[BatteryState/Voltage](#)
[BatteryDescriptor/VoltageSpecified](#)
[PatientDemographicsCoreData/Weight](#)

Attributes	Name	Type	Use
	MeasuredValue	xsd:decimal	required

Documentation Measurement describes a measurement and is used only for stateful object attributes that do not have a reference to a descriptor object.

Example: Weight of a patient.

B.291 Measurement@MeasuredValue

Type: attribute

Type **xsd:decimal**

Documentation The value of pm:Measurement.

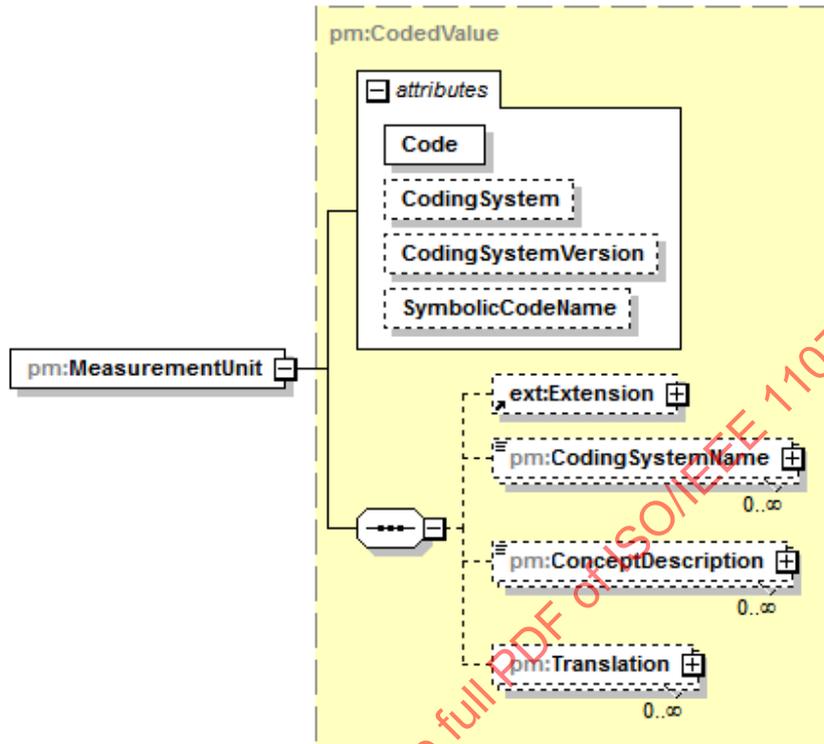
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B.292 Measurement/MeasurementUnit

Type: element



Type **pm:CodedValue**

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

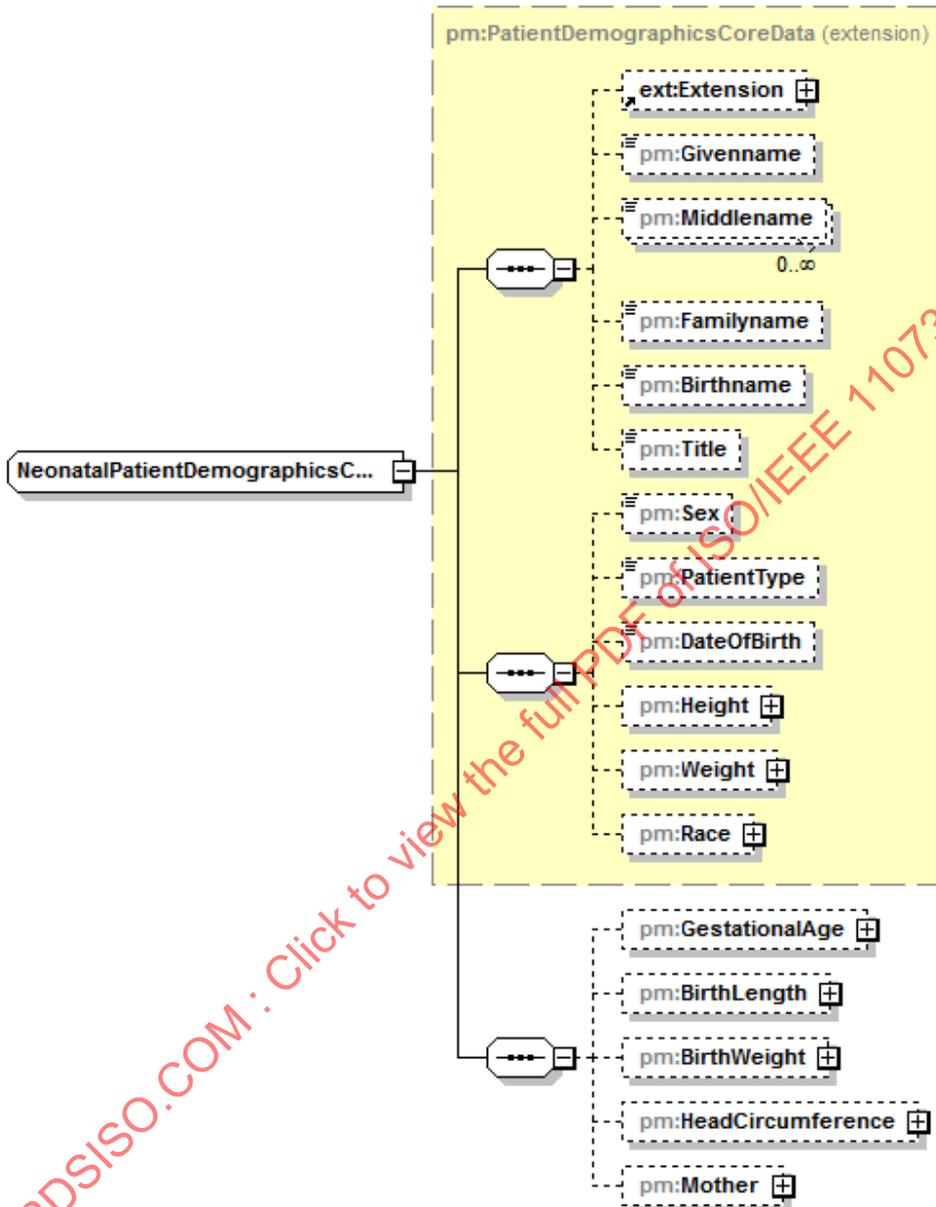
Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation The unit (dimension) of pm:Measurement.

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B.293 NeonatalPatientDemographicsCoreData

Type: complexType



Type extension of **pm:PatientDemographicsCoreData**

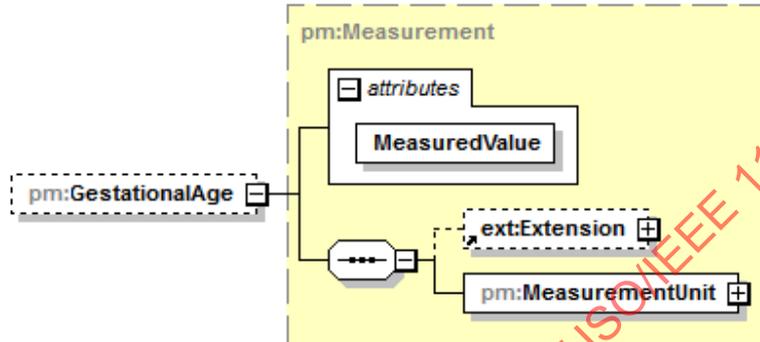
- Children
- tns:Extension
 - pm:Givenname
 - pm:Middlename
 - pm:Familyname
 - pm:Birthname
 - pm>Title
 - pm:Sex
 - pm:PatientType
 - pm:DateOfBirth
 - pm:Height
 - pm:Weight
 - pm:Race

pm:GestationalAge
pm:BirthLength
pm:BirthWeight
pm:HeadCircumference
pm:Mother

Documentation NeonatalPatientDemographicsCoreData constitutes patient demographics for neonates.

B.294 NeonatalPatientDemographicsCoreData/GestationalAge

Type: element



Type pm:Measurement

Properties Min. occurrence: 0
 Max. occurrence: 1

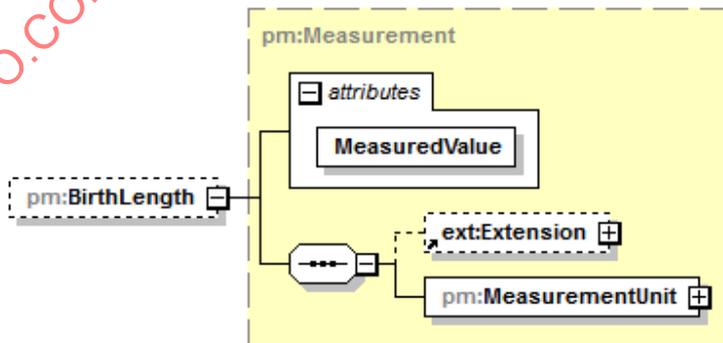
Children tns:Extension
pm:MeasurementUnit

<i>Attributes</i>	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Gestational age.

B.295 NeonatalPatientDemographicsCoreData/BirthLength

Type: element



Type pm:Measurement

Properties Min. occurrence: 0
 Max. occurrence: 1

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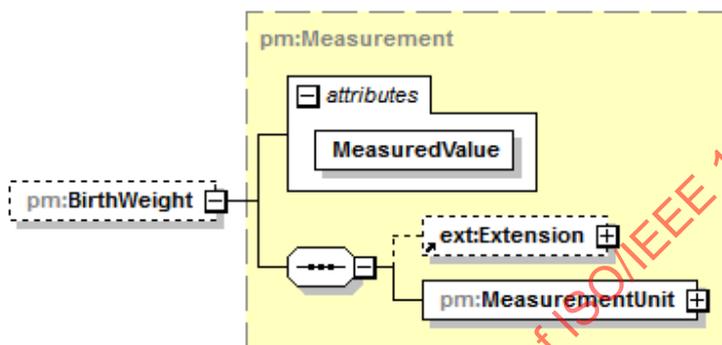
Children tns:Extension
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Patient length at birth time.

B.296 NeonatalPatientDemographicsCoreData/BirthWeight

Type: element



Type pm:Measurement

Properties	Min. occurrence:	0
	Max. occurrence:	1

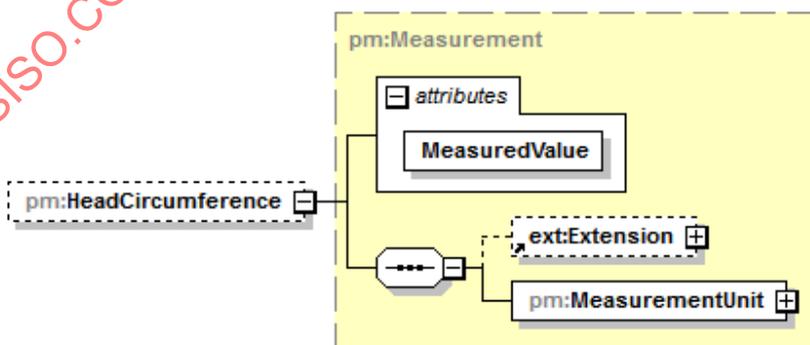
Children tns:Extension
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Patient weight at birth time.

B.297 NeonatalPatientDemographicsCoreData/HeadCircumference

Type: element



Type pm:Measurement

Properties	Min. occurrence:	0
	Max. occurrence:	1

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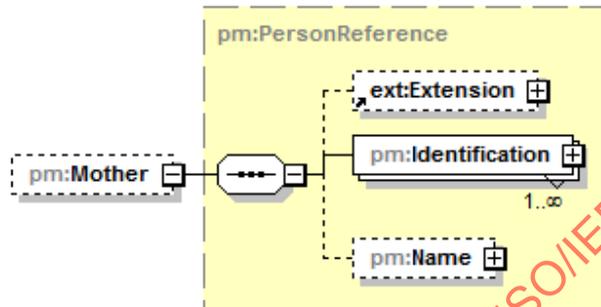
Children tns:Extension
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Head circumference at birth time.

B.298 NeonatalPatientDemographicsCoreData/Mother

Type: element



Type pm:PersonReference

<i>Properties</i>	Min. occurrence: 0
	Max. occurrence: 1

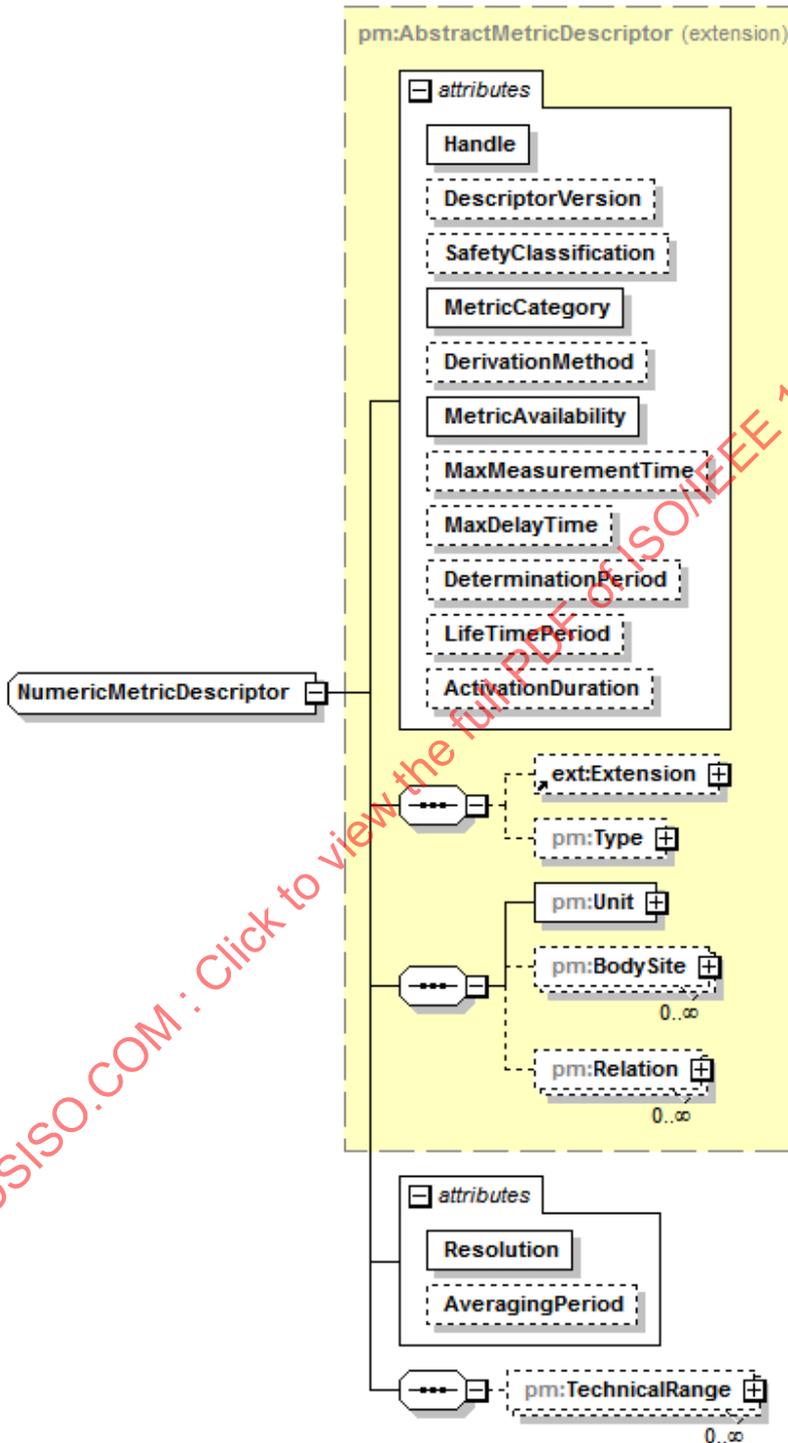
Children tns:Extension
pm:Identification
pm:Name

Documentation Information about the mother of the neonate.

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B.299 NumericMetricDescriptor

Type: complexType



Type extension of `pm:AbstractMetricDescriptor`

Children `tns:Extension`
`pm:Type`

pm:Unit
pm:BodySite
pm:Relation
pm:TechnicalRange

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MetricCategory</u>	pm:MetricCategory	required
	<u>DerivationMethod</u>	pm:DerivationMethod	optional
	<u>MetricAvailability</u>	pm:MetricAvailability	required
	<u>MaxMeasurementTime</u>	xsd:duration	optional
	<u>MaxDelayTime</u>	xsd:duration	optional
	<u>DeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional
	<u>ActivationDuration</u>	xsd:duration	optional
	<u>Resolution</u>	xsd:decimal	required
	<u>AveragingPeriod</u>	xsd:duration	optional

Documentation Specification of a METRIC descriptor type that represents a single numerical measurement and status information. Example: a heart rate measurement.

B.300 NumericMetricDescriptor/@Resolution

Type: attribute

Type **xsd:decimal**

Documentation The resolution of the means to determine the METRIC's value. The resolution is the minimum determinable difference between two determined values.

B.301 NumericMetricDescriptor/@AveragingPeriod

Type: attribute

Type **xsd:duration**

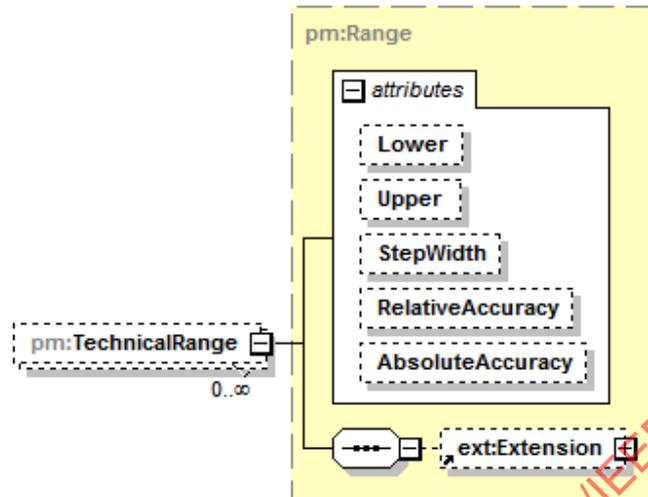
Documentation Timespan from where the measured values are used to determine the METRIC's value by averaging with some algorithm.

NOTE—The averaging period defined in the descriptor might be not the currently active averaging period. The active averaging period is part of pm:NumericMetricState.

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B.302 NumericMetricDescriptor/TechnicalRange

Type: element



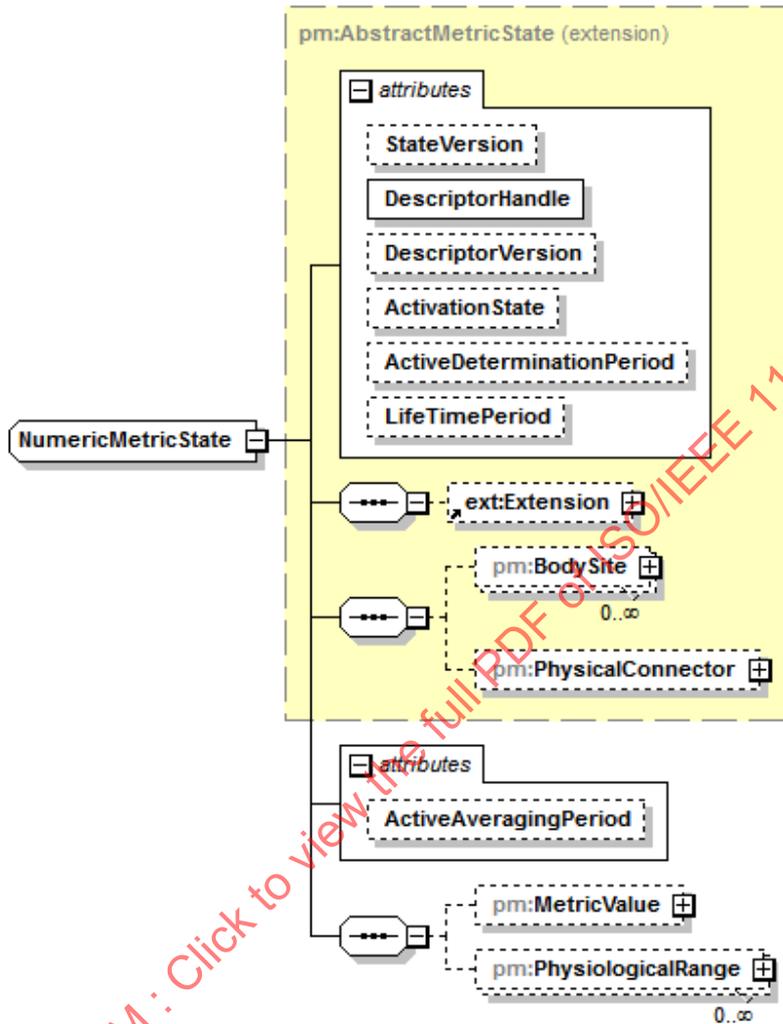
Type **pm:Range**

<i>Properties</i>	Min. occurrence:	0	
	Max. occurrence:	unbounded	
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional
<i>Documentation</i>	The technical possible range of determined values.		

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B.303 NumericMetricState

Type: complexType



Type extension of **pm:AbstractMetricState**

- Children
- tns:Extension**
 - pm:BodySite**
 - pm:PhysicalConnector**
 - pm:MetricValue**
 - pm:PhysiologicalRange**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>ActiveDeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional
	<u>ActiveAveragingPeriod</u>	xsd:duration	optional

Documentation State of a numeric METRIC.

B.304 NumericMetricState/@ActiveAveragingPeriod

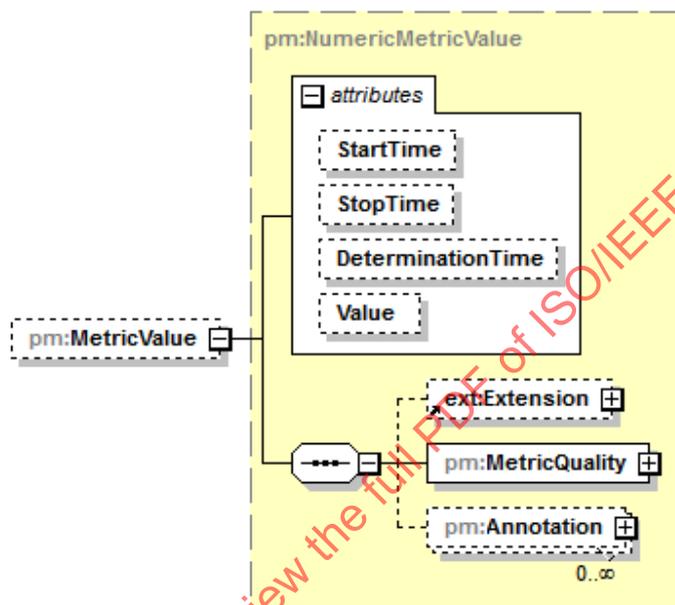
Type: attribute

Type `xsd:duration`

Documentation OPTIONAL information of the currently active time period used to average values if it is different from the default value that is defined in the descriptor.

B.305 NumericMetricState/MetricValue

Type: element



Type `pm:NumericMetricValue`

Properties Min. occurrence: 0
Max. occurrence:

Children tns:Extension
pm:MetricQuality
pm:Annotation

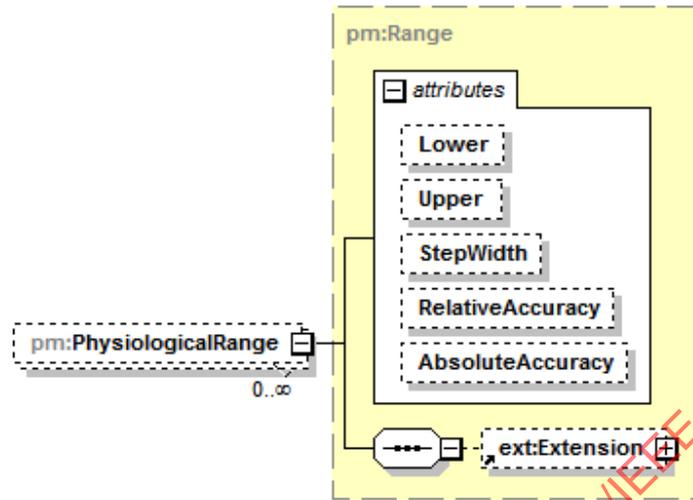
Attributes	Name	Type	Use
	<u>StartTime</u>	<code>pm:Timestamp</code>	optional
	<u>StopTime</u>	<code>pm:Timestamp</code>	optional
	<u>DeterminationTime</u>	<code>pm:Timestamp</code>	optional
	<u>Value</u>	<code>xsd:decimal</code>	optional

Documentation OPTIONAL current value of the METRIC.

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B.306 NumericMetricState/PhysiologicalRange

Type: element



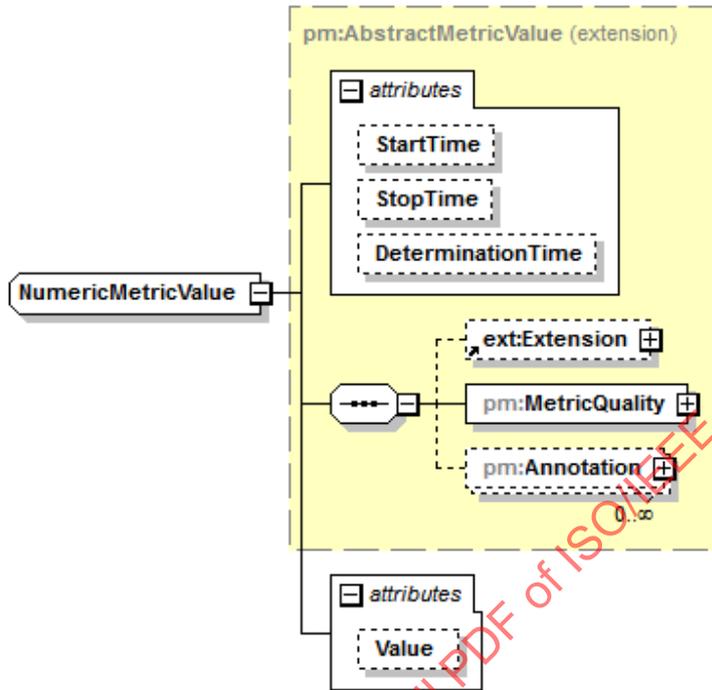
Type **pm:Range**

<i>Properties</i>	Min. occurrence:	0	
	Max. occurrence:	unbounded	
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional
<i>Documentation</i>	The physiological reasonable range of determined values.		
	NOTE—This is not an alarming range.		

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B.307 NumericMetricValue

Type: complexType



Type extension of **pm:AbstractMetricValue**

Children **tns:Extension**
pm:MetricQuality
pm:Annotation

Attributes	Name	Type	Use
	<u>StartTime</u>	pm:Timestamp	optional
	<u>StopTime</u>	pm:Timestamp	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional
	<u>Value</u>	xsd:decimal	optional

Documentation Numeric value of a METRIC state.

B.308 NumericMetricValue/@Value

Type: attribute

Type xsd:decimal

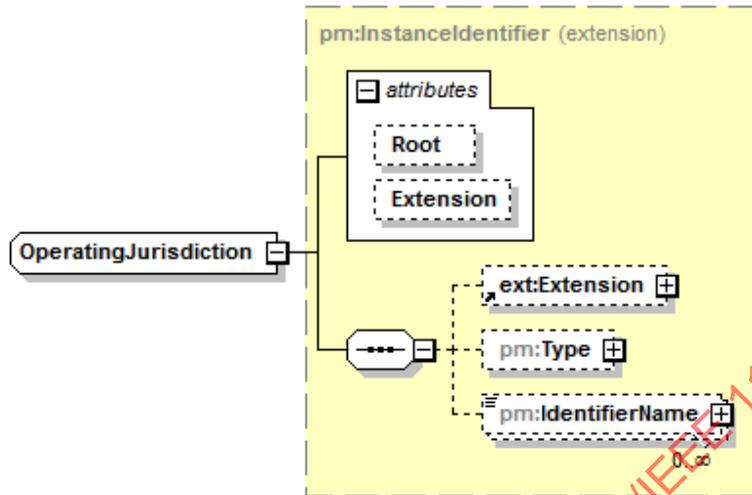
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B.309 OperatingJurisdiction

Type: complexType



Type extension of **pm:InstanceIdentifier**

Children **tns:Extension**
pm:Type
pm:IdentifierName

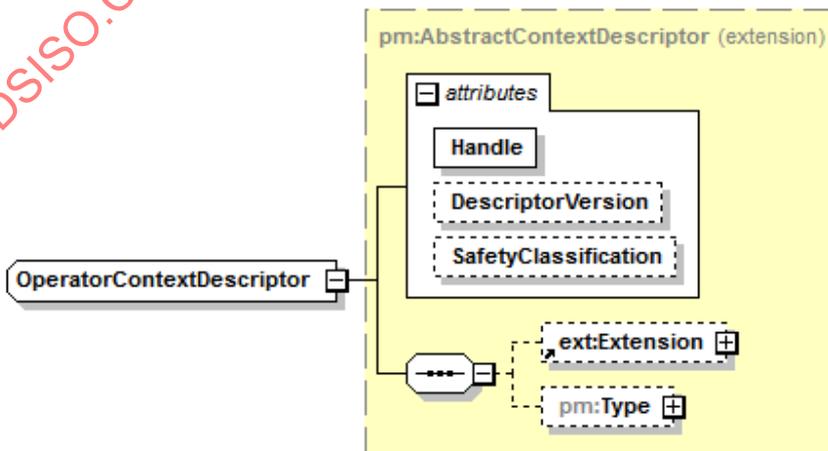
Used by **MdsState/OperatingJurisdiction**
VmdState/OperatingJurisdiction

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation The current region information that is configured for a component. The preferred root SHOULD be <https://unstats.un.org/unsd/methodology/m49>, which addresses the "Standard country or area codes for statistical use (M49)". Example: a root of "https://unstats.un.org/unsd/methodology/m49" with an extension value of "276" addresses Germany.

B.310 OperatorContextDescriptor

Type: complexType

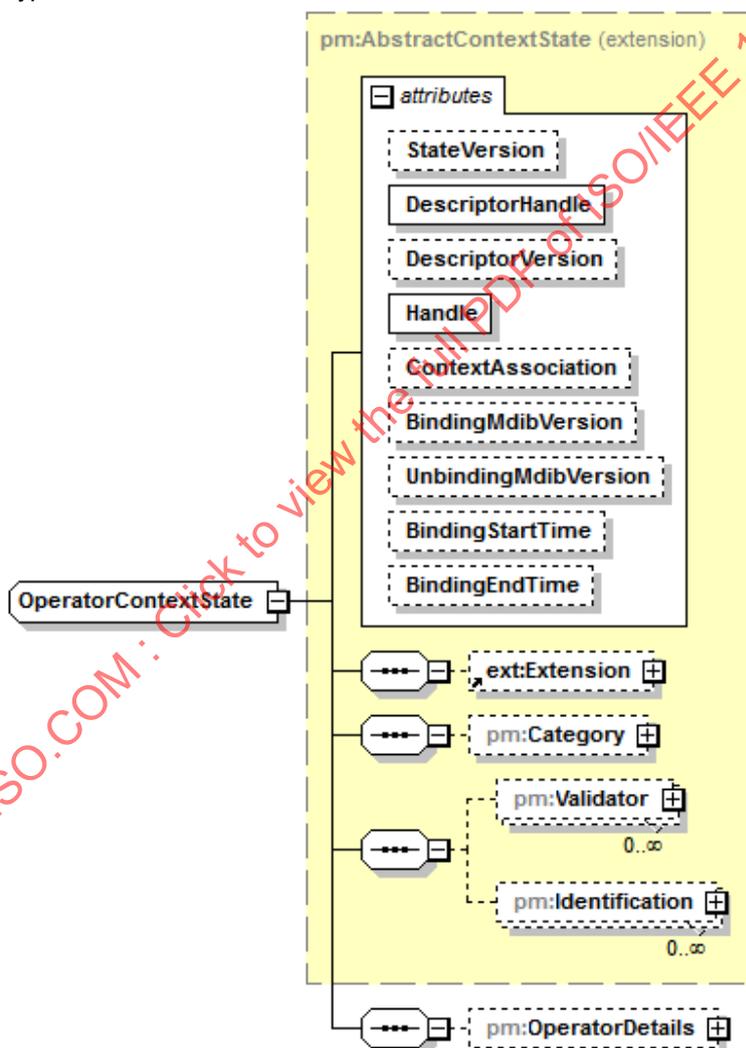


Type extension of **pm:AbstractContextDescriptor**

Children	tns:Extension pm:Type												
Attributes	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td><u>Handle</u></td> <td>pm:Handle</td> <td>required</td> </tr> <tr> <td><u>DescriptorVersion</u></td> <td>pm:VersionCounter</td> <td>optional</td> </tr> <tr> <td><u>SafetyClassification</u></td> <td>pm:SafetyClassification</td> <td>optional</td> </tr> </tbody> </table>	Name	Type	Use	<u>Handle</u>	pm:Handle	required	<u>DescriptorVersion</u>	pm:VersionCounter	optional	<u>SafetyClassification</u>	pm:SafetyClassification	optional
Name	Type	Use											
<u>Handle</u>	pm:Handle	required											
<u>DescriptorVersion</u>	pm:VersionCounter	optional											
<u>SafetyClassification</u>	pm:SafetyClassification	optional											
Documentation	Context descriptor to specify that the MDS is able to provide operator information.												

B.311 OperatorContextState

Type: complexType



Type extension of **pm:AbstractContextState**

Children	tns:Extension pm:Category pm:Validator
----------	---

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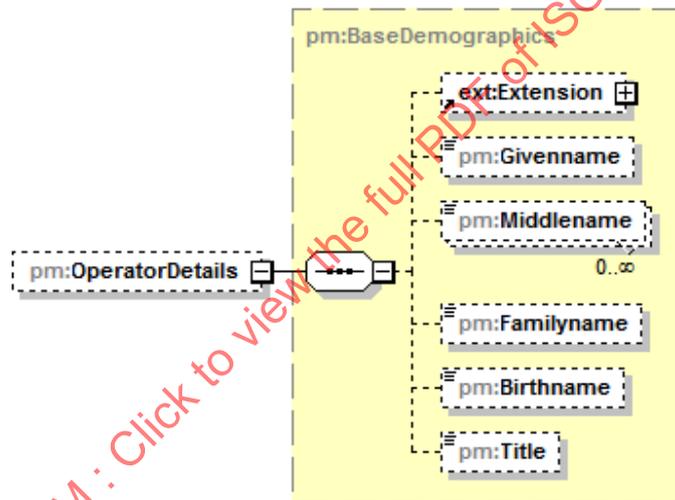
pm:Identification
pm:OperatorDetails

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>BindingStartTime</u>	pm:Timestamp	optional
	<u>BindingEndTime</u>	pm:Timestamp	optional

Documentation A context state that identifies an operator of an MDS or a part of it.

B.312 OperatorContextState/OperatorDetails

Type: element



Type **pm:BaseDemographics**

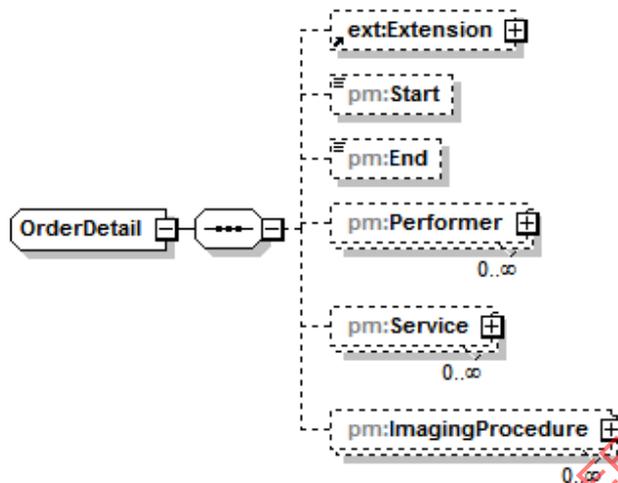
Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Givenname
pm:Middlename
pm:Familyname
pm:Birthname
pm:Title

Documentation Human-readable details (i.e., name) about the operator.

B.313 OrderDetail

Type: complexType



Children [tns:Extension](#)
[pm:Start](#)
[pm:End](#)
[pm:Performer](#)
[pm:Service](#)
[pm:ImagingProcedure](#)

Used by [WorkflowContextState/WorkflowDetail/PerformedOrderDetail](#)
[WorkflowContextState/WorkflowDetail/RequestedOrderDetail](#)

Documentation Details of an order that will be performed or that has been performed.

B.314 OrderDetail/Start

Type: element



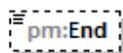
Type `xsd:dateTime`

Properties Min. occurrence: 0
 Max. occurrence: 1

Documentation Data for start of requested/performed procedure.

B.315 OrderDetail/End

Type: element



Type `xsd:dateTime`

Properties Min. occurrence: 0
 Max. occurrence: 1

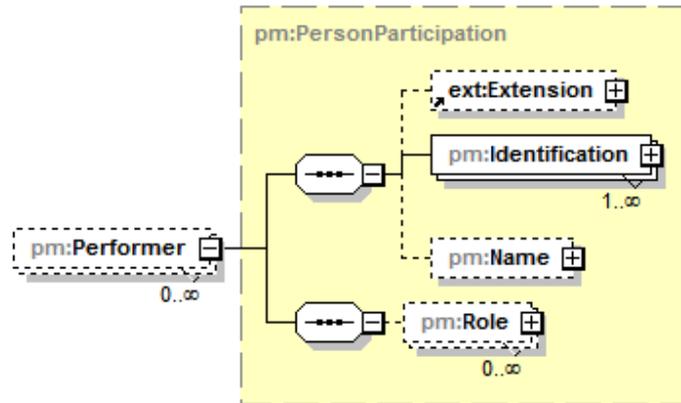
Documentation Data for end of requested/performed procedure.

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B.316 OrderDetail/Performer

Type: element



Type **pm:PersonParticipation**

Properties Min. occurrence: 0
Max. occurrence: unbounded

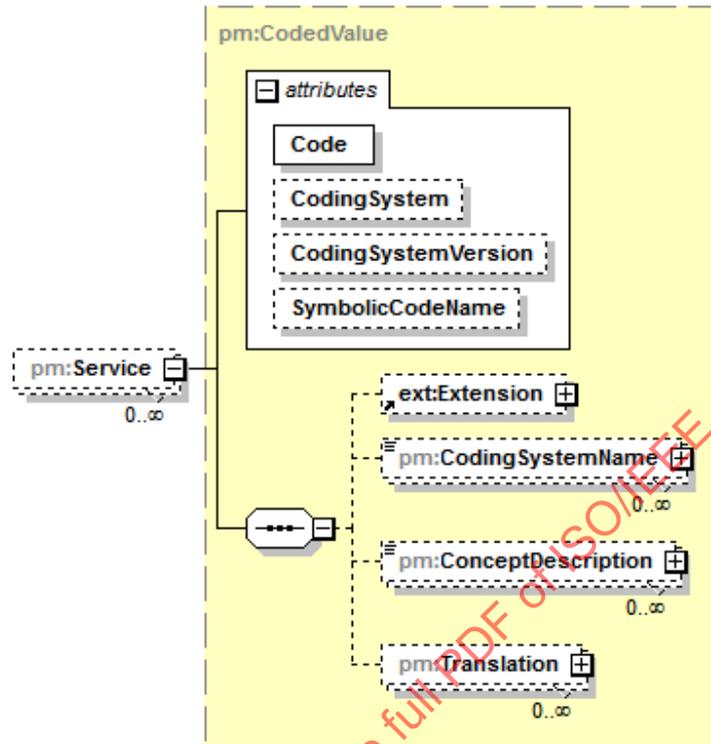
Children **tns:Extension**
pm:Identification
pm:Name
pm:Role

Documentation Names with roles of attending staff.

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B.317 OrderDetail/Service

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Identifier and textual descriptions of requested/performed procedures

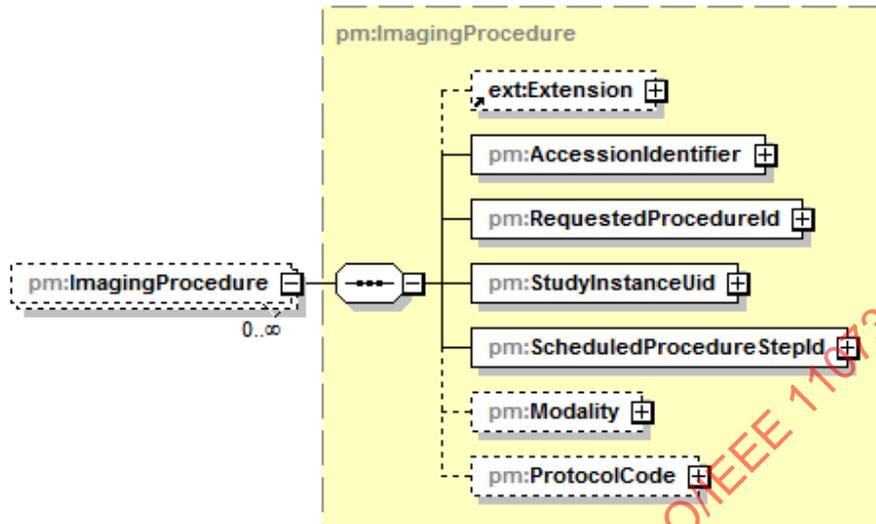
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B.318 OrderDetail/ImagingProcedure

Type: element



Type **pm:ImagingProcedure**

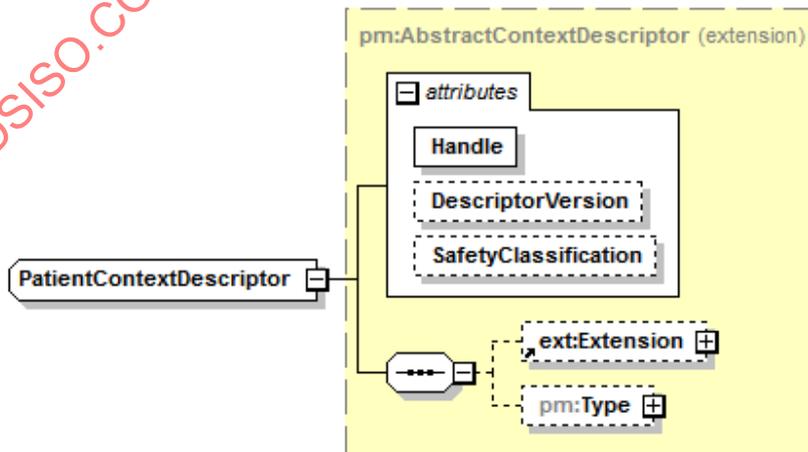
Properties Min. occurrence: 0
Max. occurrence: unbounded

Children tns:Extension
pm:AccessionIdentifier
pm:RequestedProcedureId
pm:StudyInstanceUid
pm:ScheduledProcedureStepId
pm:Modality
pm:ProtocolCode

Documentation ImagingProcedure provide identifiers used by the DICOM and HL7 standard to identify the requested imaging procedures resulting from an order in the hospital.

B.319 PatientContextDescriptor

Type: complexType



Type extension of **pm:AbstractContextDescriptor**

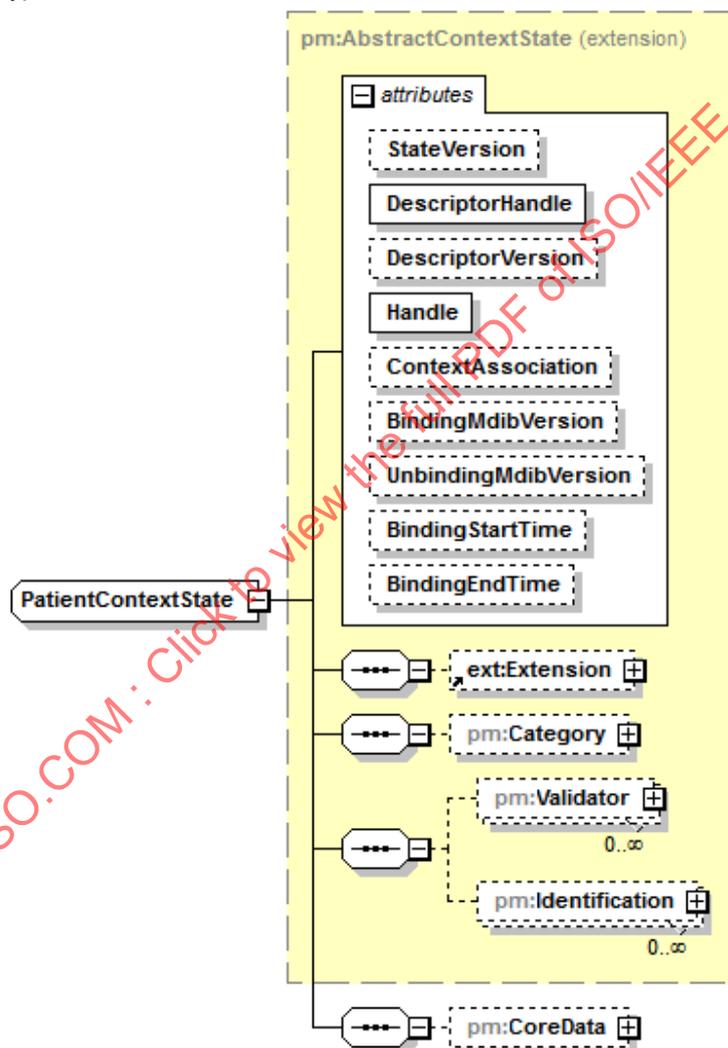
Children tns:Extension
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Context descriptor to specify that the MDS possesses a patient-device association.

B.320 PatientContextState

Type: complexType



Type extension of **pm:AbstractContextState**

Children tns:Extension
pm:Category
pm:Validator
pm:Identification
pm:CoreData

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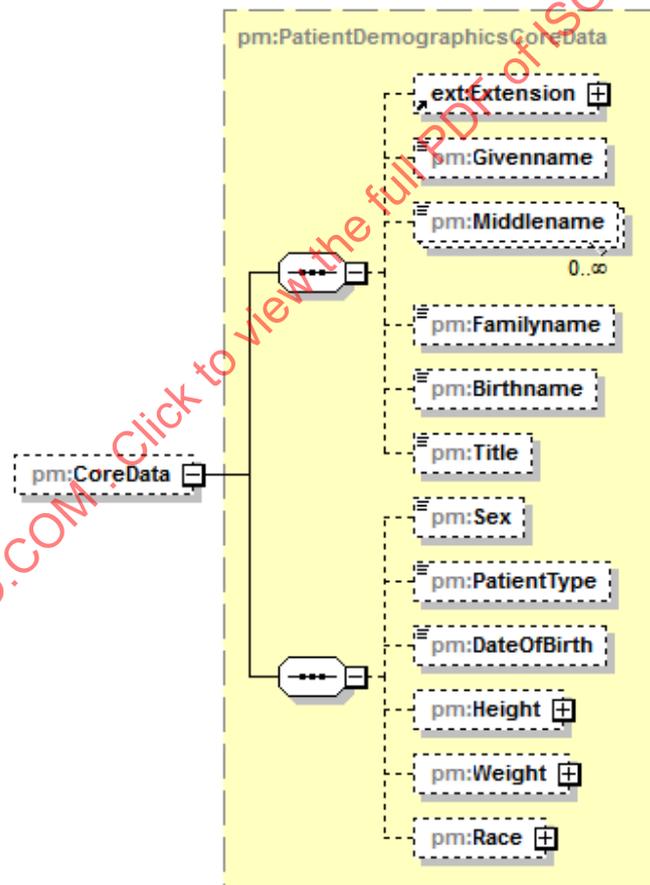
Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdbVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdbVersion</u>	pm:ReferencedVersion	optional
	<u>BindingStartTime</u>	pm:Timestamp	optional
	<u>BindingEndTime</u>	pm:Timestamp	optional

Documentation Observed information about a patient, e.g., demographics.

NOTE—PatientContextState contains information that is typical for a header in an anamnesis questionnaire.

B.321 PatientContextState/CoreData

Type: element



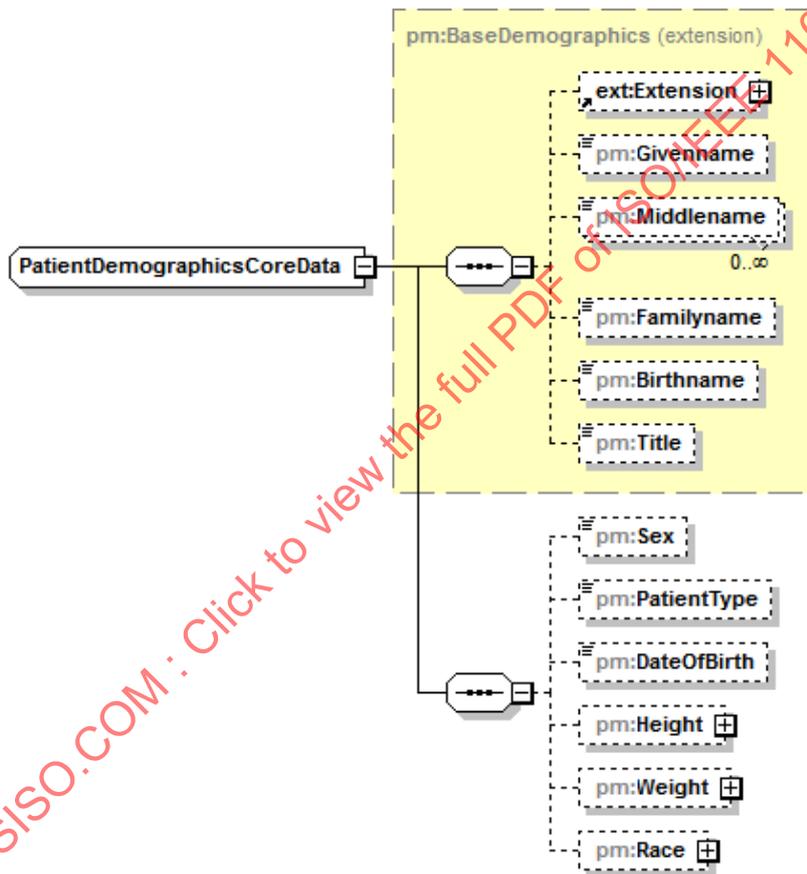
Type **pm:PatientDemographicsCoreData**

Properties Min. occurrence: 0
Max. occurrence: 1

Children tns:Extension
pm:Givenname
pm:Middlename
pm:Familyname
pm:Birthname
pm:Title
pm:Sex
pm:PatientType
pm:DateOfBirth
pm:Height
pm:Weight
pm:Race

B.322 PatientDemographicsCoreData

Type: complexType



Type extension of **pm:BaseDemographics**

Children tns:Extension
pm:Givenname
pm:Middlename
pm:Familyname
pm:Birthname
pm:Title
pm:Sex
pm:PatientType
pm:DateOfBirth
pm:Height
pm:Weight
pm:Race

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Used by PatientContextState/CoreData
NeonatalPatientDemographicsCoreData

Documentation The patient demographics data as defined in ISO/IEEE 11073-10201:2004 (6.10.1 Patient Demographics object).

R5012: If the POC MEDICAL DEVICE itself has patient-related observations (e.g., weight, height) as in- or output, these SHOULD be modelled as METRICS.

NOTE—In contrast to PatientDemographicsCoreData, METRICS provide a sophisticated observation description, e.g., regarding quality and time-related attributes.

R5013: The pm:PatientDemographicsCoreData type is intended to be used for information purposes only. Whenever a value is available, it is considered as valid. Invalid values SHALL not be transmitted.

B.323 PatientDemographicsCoreData/Sex

Type: element



Type pm:Sex

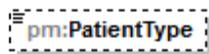
Properties Min. occurrence: 0
Max. occurrence: 1

Constraints	Kind	Value	Documentation
	enumeration	Unspec	Unspec = Unspecified. Sex is not designated.
	enumeration	M	M = Male. Indicates a male patient.
	enumeration	F	F = Female. Indicates a female patient.
	enumeration	Unkn	Unkn = Unknown. Indicates that the sex is unknown for different reasons.

Documentation Sex of the patient.

B.324 PatientDemographicsCoreData/PatientType

Type: element



Type pm:PatientType

Properties Min. occurrence: 0
Max. occurrence: 1

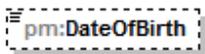
Constraints	Kind	Value	Documentation
	enumeration	Unspec	Unspec = Unspecified. Unspecified type.
	enumeration	Ad	Ad = Adult. Indicates an adult patient.
	enumeration	Ado	Ado = Adolescent. Indicates an adolescent patient with approximate age range of 12 years to 21 years.
	enumeration	Ped	Ped = Pediatric. Indicates a pediatric patient with approximate age range of 2 years to 12 years.
	enumeration	Inf	Inf = Infant. Indicates an infant patient with approximate age range of 1 month to 2 years.
	enumeration	Neo	Neo = Neonatal. Indicates a neonatal patient with approximate age range of birth to 1 month.

enumeration Oth Oth = Other. The patient type is designated by some other means.

Documentation Category of the patient. It refers to the ISO/IEEE 11073-10201:2004 PatientType.

B.325 PatientDemographicsCoreData/DateOfBirth

Type: element



Type union of xsd:dateTime xsd:date xsd:gYearMonth xsd:gYear

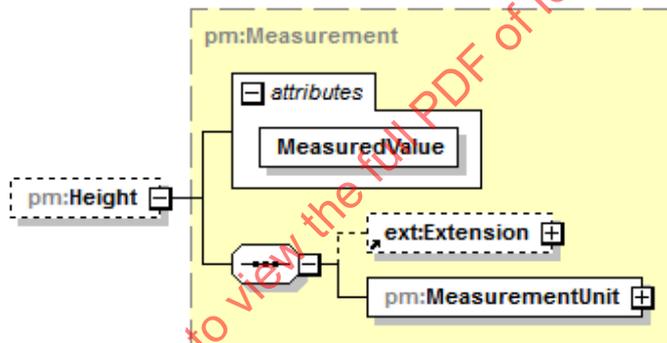
Properties Min. occurrence: 0
Max. occurrence: 1

Documentation Date of birth of the patient.

If the timepoint of birth matters, the value SHALL be populated with a time zone.

B.326 PatientDemographicsCoreData/Height

Type: element



Type pm:Measurement

Properties Min. occurrence: 0
Max. occurrence: 1

Children tns:Extension
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Height of the patient.

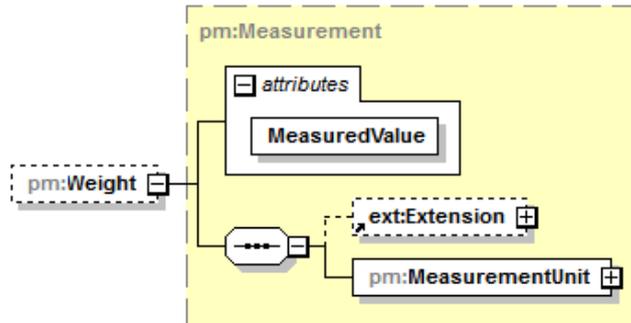
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B.327 PatientDemographicsCoreData/Weight

Type: element



Type **pm:Measurement**

Properties Min. occurrence: 0
Max. occurrence: 1

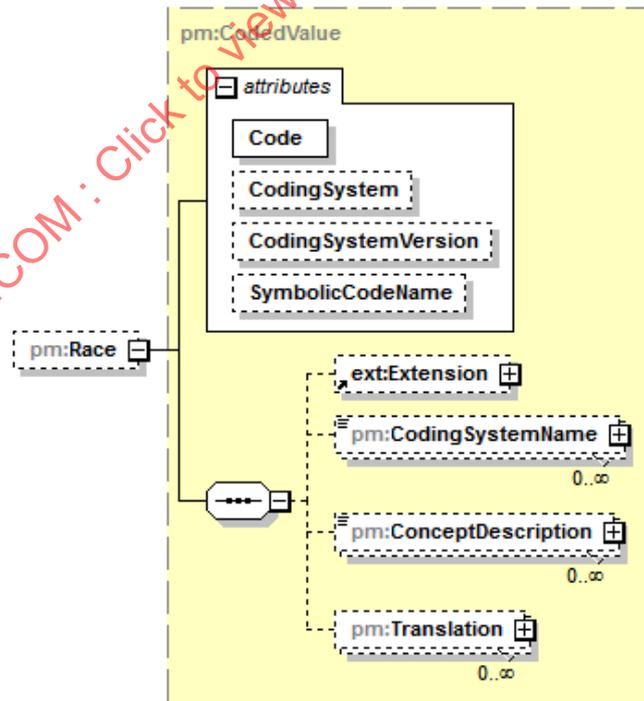
Children **tns:Extension**
pm:MeasurementUnit

Attributes	Name	Type	Use
	<u>MeasuredValue</u>	xsd:decimal	required

Documentation Weight of the patient.

B.328 PatientDemographicsCoreData/Race

Type: element

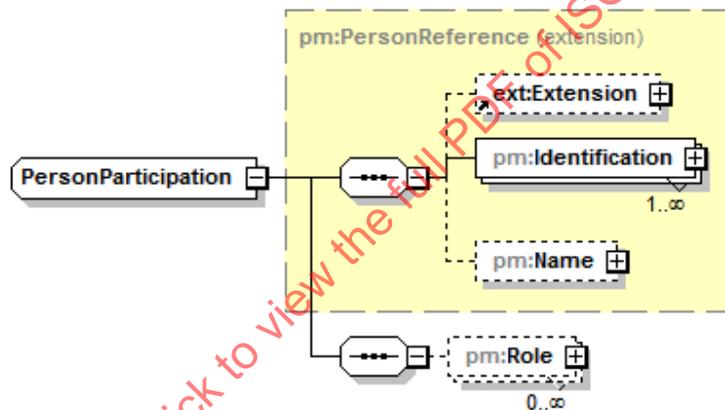


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<i>Type</i> pm:CodedValue			
<i>Properties</i>	Min. occurrence:	0	
	Max. occurrence:	1	
<i>Children</i>	tns:Extension		
	pm:CodingSystemName		
	pm:ConceptDescription		
	pm:Translation		
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional
<i>Documentation</i>	Race of the patient.		

B.329 PersonParticipation

Type: complexType



<i>Type</i>	extension of pm:PersonReference		
<i>Children</i>	tns:Extension		
	pm:Identification		
	pm:Name		
	pm:Role		
<i>Documentation</i>	A reference to an identifiable person with a name that participates in a role.		

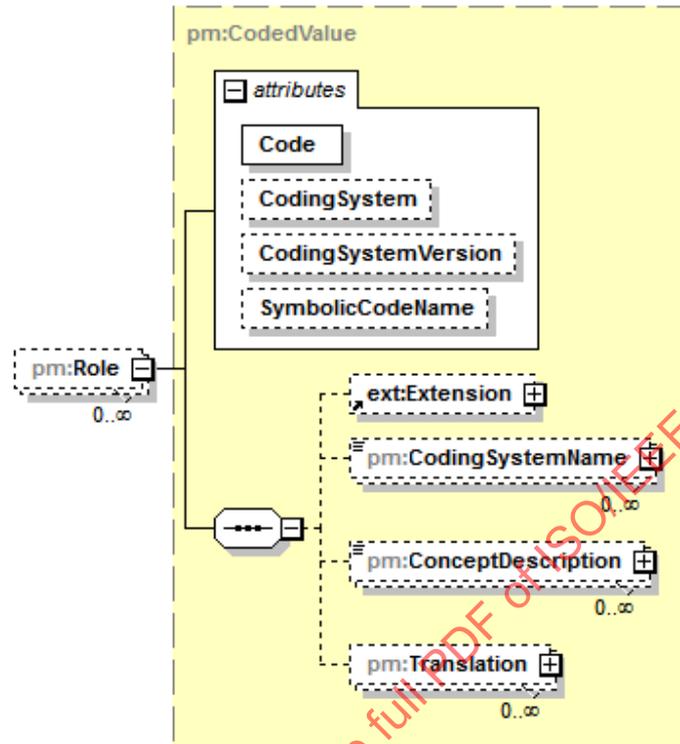
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B.330 PersonParticipation/Role

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: unbounded

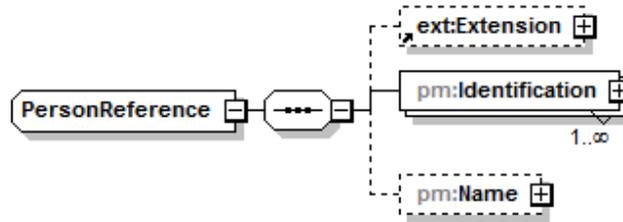
Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Roles the referenced person acts in the relationship.

B.331 PersonReference

Type: complexType



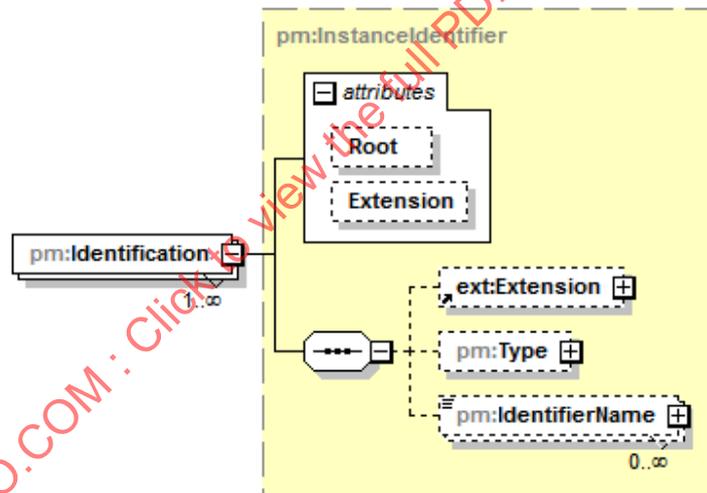
Children tns:Extension
pm:Identification
pm:Name

Used by NeonatalPatientDemographicsCoreData/Mother
WorkflowContextState/WorkflowDetail/Patient
WorkflowContextState/WorkflowDetail/RequestedOrderDetail/ReferringPhysician
WorkflowContextState/WorkflowDetail/RequestedOrderDetail/RequestingPhysician
PersonParticipation

Documentation A reference to an identifiable person with a name.

B.332 PersonReference/Identification

Type: element



Type pm:InstanceIdentifier

Properties Min. occurrence: 1
Max. occurrence: unbounded

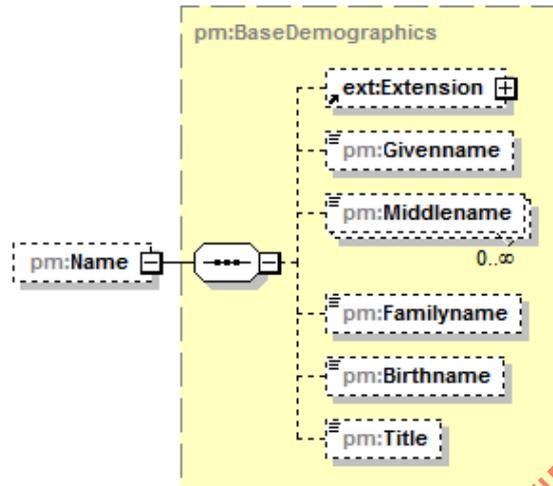
Children tns:Extension
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation The list of identifiers for the person.

B.333 PersonReference/Name

Type: element



Type **pm:BaseDemographics**

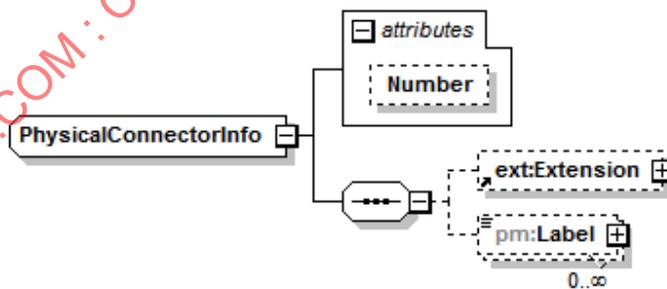
Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Givenname
pm:Middlename
pm:Familyname
pm:Birthname
pm:Title

Documentation The name of the person.

B.334 PhysicalConnectorInfo

Type: complexType



Children **tns:Extension**
pm:Label

Used by **AbstractDeviceComponentState/PhysicalConnector**
AbstractMetricState/PhysicalConnector

Attributes	Name	Type	Use
	<u>Number</u>	xsd:int	optional

Documentation PhysicalConnectorInfo defines a number in order to allow to guide the clinical user for a failure, e.g., in case of a disconnection of a sensor or an ultrasonic handpiece.

B.335 PhysicalConnectorInfo/@Number

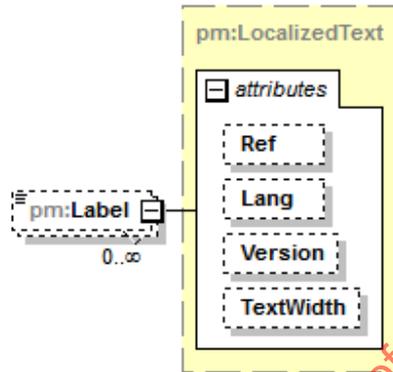
Type: attribute

Type `xsd:int`

Documentation Number designates the connector number of the physical connector.

B.336 PhysicalConnectorInfo/Label

Type: element



Type `pm:LocalizedText`

Properties Min. occurrence: 0
Max. occurrence: unbounded

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>
	<code>minLength</code>	0

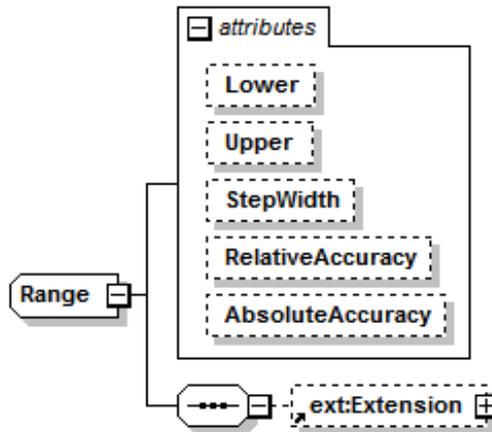
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u><code>Ref</code></u>	<code>pm:LocalizedTextRef</code>	optional
	<u><code>Lang</code></u>	<code>xsd:language</code>	optional
	<u><code>Version</code></u>	<code>pm:ReferencedVersion</code>	optional
	<u><code>TextWidth</code></u>	<code>pm:LocalizedTextWidth</code>	optional

Documentation A human-readable label that describes the physical connector.

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B.337 Range

Type: complexType



Used by [SetValueOperationState/AllowedRange](#)
[DistributionSampleArrayMetricDescriptor/DistributionRange](#)
[LimitAlertConditionState/Limits](#)
[LimitAlertConditionDescriptor/MaxLimits](#)
[NumericMetricState/PhysiologicalRange](#)
[RealTimeSampleArrayMetricState/PhysiologicalRange](#)
[DistributionSampleArrayMetricState/PhysiologicalRange](#)
[ClinicalInfo/RelatedMeasurement/ReferenceRange/Range](#)
[NumericMetricDescriptor/TechnicalRange](#)
[RealTimeSampleArrayMetricDescriptor/TechnicalRange](#)
[DistributionSampleArrayMetricDescriptor/TechnicalRange](#)

Attributes	Name	Type	Use
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional

Documentation A range of decimal values which provides a lower and an upper bound as well as a step width.

B.338 Range/@Lower

Type: attribute

Type xsd:decimal

Documentation The including lower bound of the range.

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B.339 Range/@Upper

Type: attribute

Type `xsd:decimal`

Documentation The including upper bound of the range.

B.340 Range/@StepWidth

Type: attribute

Type `xsd:decimal`

Documentation The numerical distance between two values in the range of the given upper and lower bound.

B.341 Range/@RelativeAccuracy

Type: attribute

Type `xsd:decimal`

Documentation Maximum relative error in relation to the correct value within the given range.

B.342 Range/@AbsoluteAccuracy

Type: attribute

Type `xsd:decimal`

Documentation Maximum absolute error in relation to the correct value within the given range.

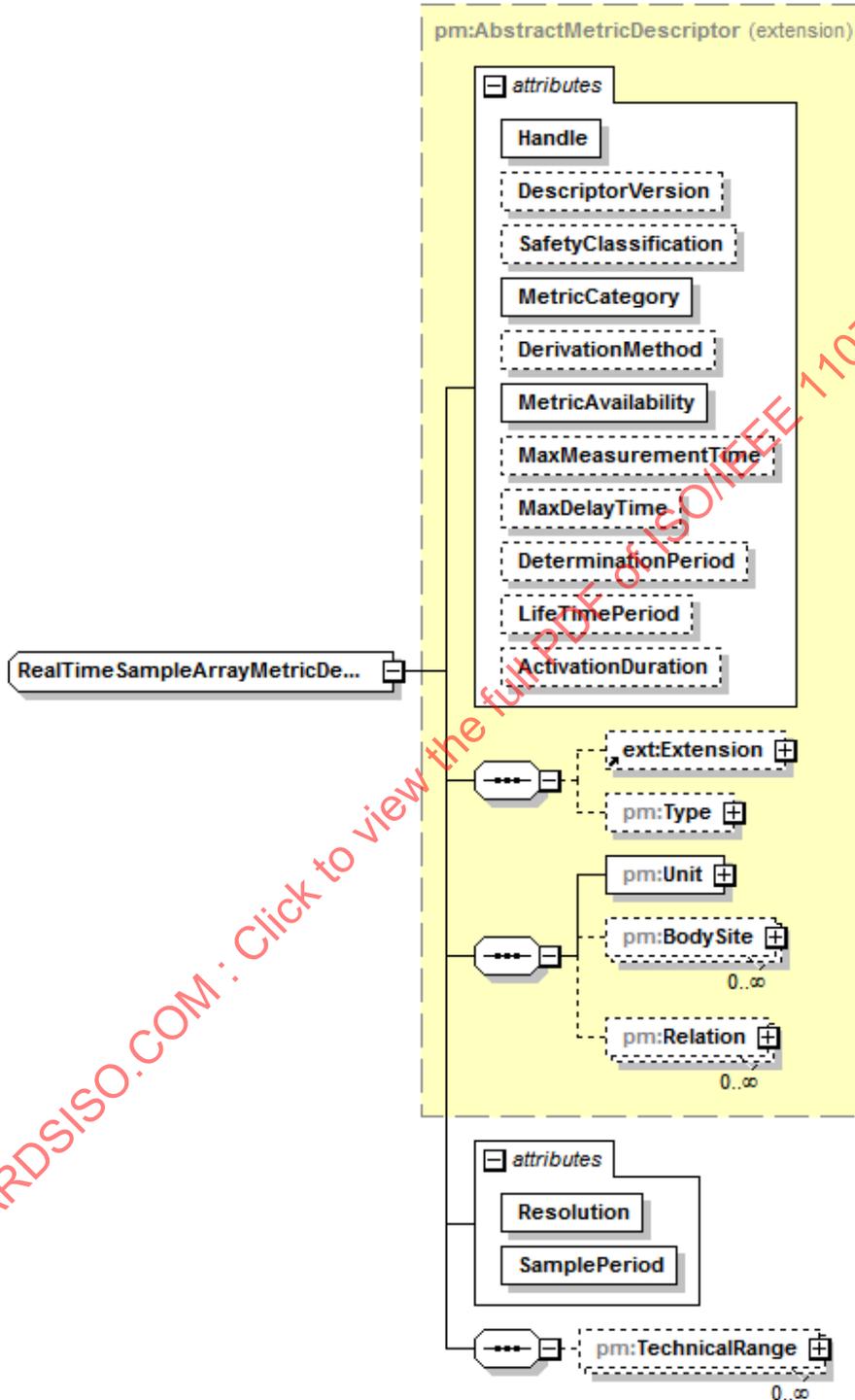
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B.343 RealTimeSampleArrayMetricDescriptor

Type: complexType



Type extension of **pm:AbstractMetricDescriptor**

Children **tns:Extension**
pm:Type
pm:Unit
pm:BodySite
pm:Relation
pm:TechnicalRange

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MetricCategory</u>	pm:MetricCategory	required
	<u>DerivationMethod</u>	pm:DerivationMethod	optional
	<u>MetricAvailability</u>	pm:MetricAvailability	required
	<u>MaxMeasurementTime</u>	xsd:duration	optional
	<u>MaxDelayTime</u>	xsd:duration	optional
	<u>DeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional
	<u>ActivationDuration</u>	xsd:duration	optional
	<u>Resolution</u>	xsd:decimal	required
	<u>SamplePeriod</u>	xsd:duration	required

Documentation Declares a sample array that represents a real-time continuous waveform. An example would be an electrocardiogram (ECG) real-time wave.

B.344 RealTimeSampleArrayMetricDescriptor/@Resolution

Type: attribute

Type **xsd:decimal**

Documentation The resolution of the means to determine the METRIC's value. The Resolution is the minimum determinable difference between two determined values.

B.345 RealTimeSampleArrayMetricDescriptor/@SamplePeriod

Type: attribute

Type **xsd:duration**

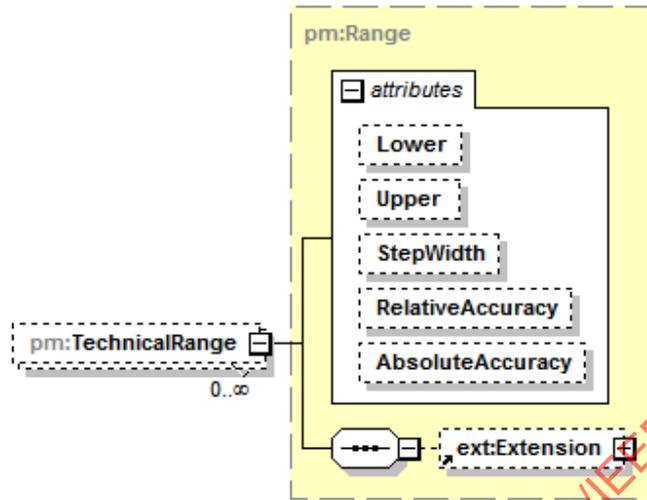
Documentation The sample period of the real-time sample array, i.e., how often waveform samples are generated. SamplePeriod is always given as a period between samples, e.g., 5 milliseconds.

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B.346 RealTimeSampleArrayMetricDescriptor/TechnicalRange

Type: element



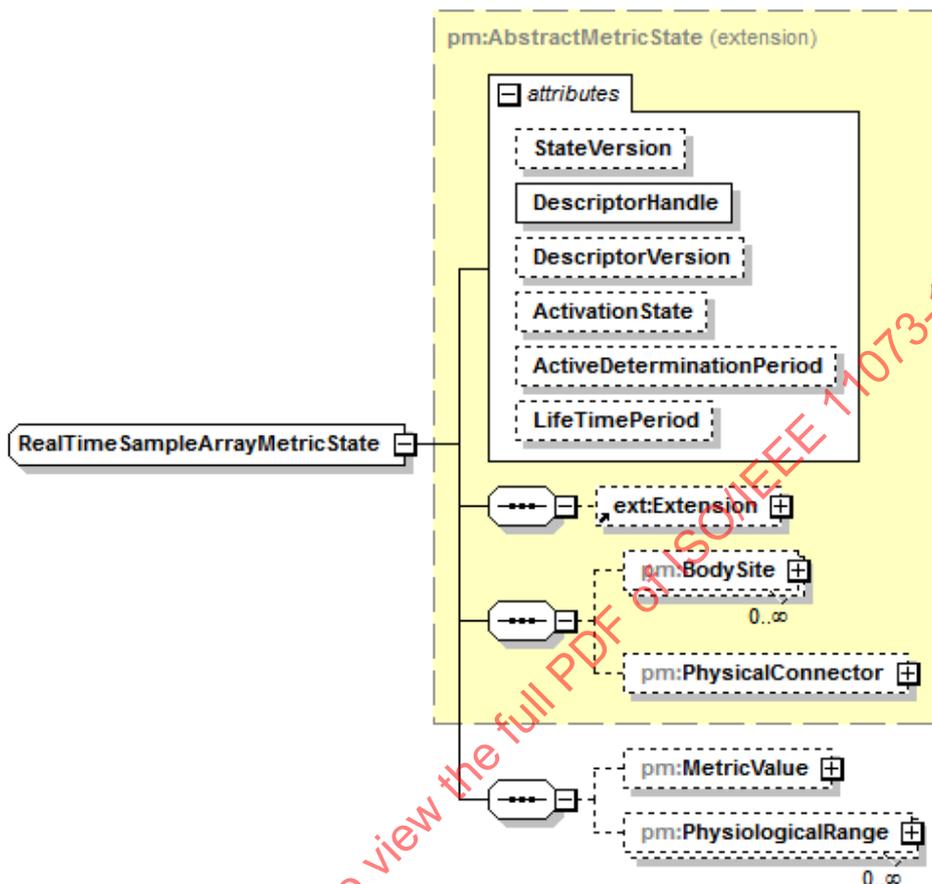
Type **pm:Range**

<i>Properties</i>	Min. occurrence:	0	
	Max. occurrence:	unbounded	
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional
<i>Documentation</i>	The maximum range of the values of the real-time sample array.		

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B.347 RealTimeSampleArrayMetricState

Type: complexType



Type extension of **pm:AbstractMetricState**

- Children
- tns:Extension**
 - pm:BodySite**
 - pm:PhysicalConnector**
 - pm:MetricValue**
 - pm:PhysiologicalRange**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>ActiveDeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional

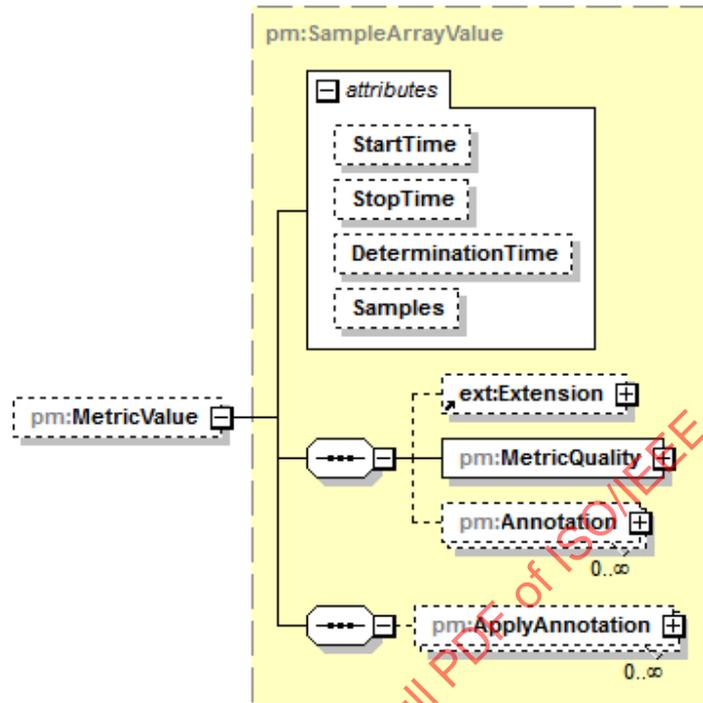
Documentation State of a stream METRIC descriptor. It contains a list of sample values. This sample array is used to transport waveform stream information.

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B.348 RealTimeSampleArrayMetricState/MetricValue

Type: element



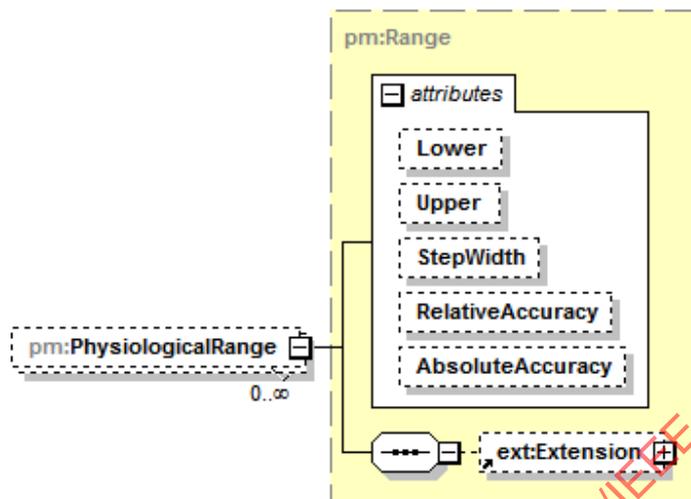
Type **pm:SampleArrayValue**

Properties		Min. occurrence: 0	
		Max. occurrence: 1	
Children		tns:Extension pm:MetricQuality pm:Annotation pm:ApplyAnnotation	
Attributes		Name	Type
		<u>StartTime</u>	pm:Timestamp optional
		<u>StopTime</u>	pm:Timestamp optional
		<u>DeterminationTime</u>	pm:Timestamp optional
		<u>Samples</u>	pm:RealTimeValueType optional
Documentation		OPTIONAL current value of the METRIC.	

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B.349 RealTimeSampleArrayMetricState/PhysiologicalRange

Type: element



Type **pm:Range**

Properties	Min. occurrence:	0
	Max. occurrence:	unbounded

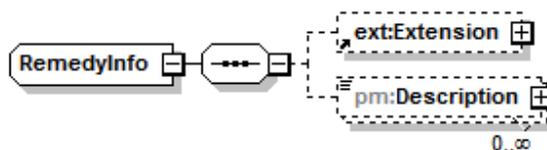
Attributes	Name	Type	Use
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional

Documentation The physiological reasonable range of determined values.

NOTE—This is not an alarming range.

B.350 RemedyInfo

Type: complexType



Children **tns:Extension**
pm:Description

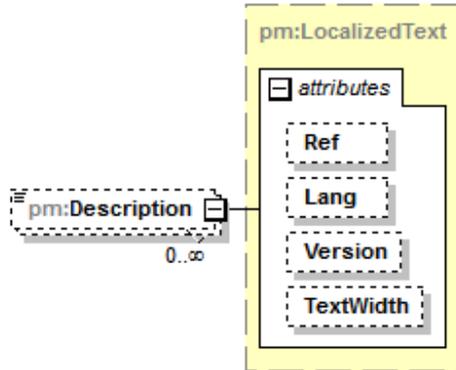
Documentation Remedy information for a cause of an ALERT CONDITION.

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B.351 RemedyInfo/Description

Type: element



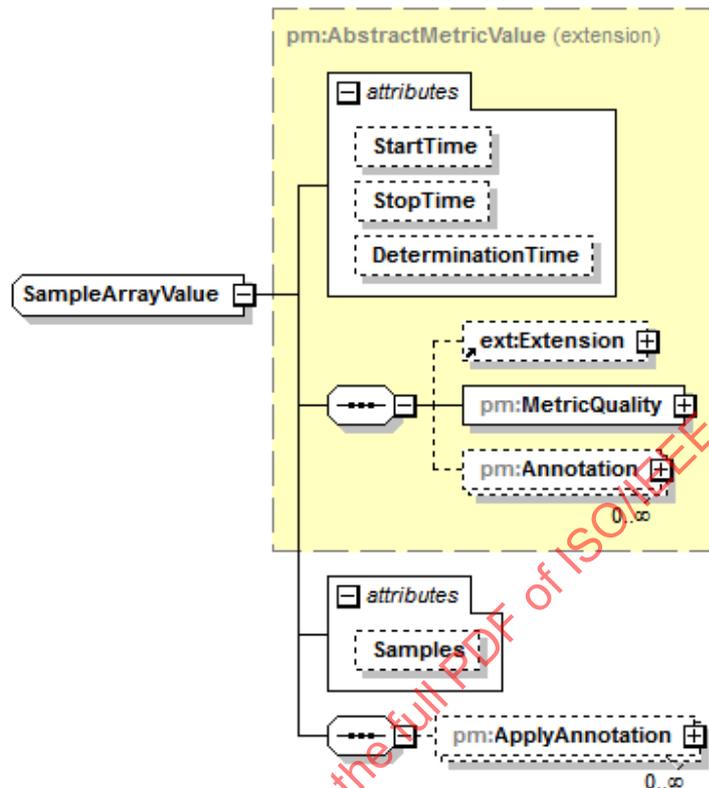
Type **pm:LocalizedText**

<i>Properties</i>		Min. occurrence:	0
		Max. occurrence:	unbounded
<i>Constraints</i>		<i>Kind</i>	<i>Value</i>
		minLength	0
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Ref</u>	pm:LocalizedTextRef	optional
	<u>Lang</u>	xsd:language	optional
	<u>Version</u>	pm:ReferencedVersion	optional
	<u>TextWidth</u>	pm:LocalizedTextWidth	optional
<i>Documentation</i>	OPTIONAL human-readable texts that describe the remedy information.		

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B.352 SampleArrayValue

Type: complexType



Type extension of **pm:AbstractMetricValue**

Children **tns:Extension**
pm:MetricQuality
pm:Annotation
pm:ApplyAnnotation

Used by **ObservedValueStream/Value/Value**
RealTimeSampleArrayMetricState/MetricValue
DistributionSampleArrayMetricState/MetricValue

Attributes	Name	Type	Use
	<u>StartTime</u>	pm:Timestamp	optional
	<u>StopTime</u>	pm:Timestamp	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional
	<u>Samples</u>	pm:RealTimeValueType	optional

Documentation Type that contains sequences of values, i.e., sample arrays.

The `.pmMetricQuality` ELEMENT relates to all samples.

NOTE 1—`pm:Timestamp` (see base: `pm:AbstractMetricValue`) refers to the first value of the array. The individual timestamps of the values can thus be computed from the sample rate (see `pm:RealTimeSampleArrayMetricDescriptor`).

NOTE 2—If `.pmMetricQuality` cannot be applied to all samples due to, e.g., some invalid values, a SERVICE PROVIDER can decide to set `.pmMetricQuality/@Validity` to "Qst" or "Inv".

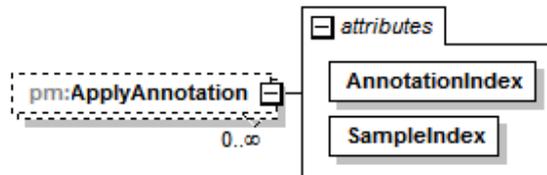
B.353 SampleArrayValue/@Samples

Type: attribute

Type **pm:RealTimeValueType**

B.354 SampleArrayValue/ApplyAnnotation

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Attributes	Name	Type	Use
	<u>AnnotationIndex</u>	xsd:unsignedInt	required
	<u>SampleIndex</u>	xsd:unsignedInt	required

Documentation Annotations MAY only apply to specific values in the real-time sample array. The ApplyAnnotation set relates annotations to sample indices. If no ApplyAnnotation ELEMENT is provided all annotations are valid for all values in the context.

B.355 SampleArrayValue/ApplyAnnotation/@AnnotationIndex

Type: attribute

Type **xsd:unsignedInt**

Documentation Index number of the annotation that is addressed by the ApplyAnnotation ELEMENT. The index number refers to the (n+1)-nth pm:AbstractMetricValue/pm:Annotation ELEMENT. Hence, numbering is zero-based.

B.356 SampleArrayValue/ApplyAnnotation/@SampleIndex

Type: attribute

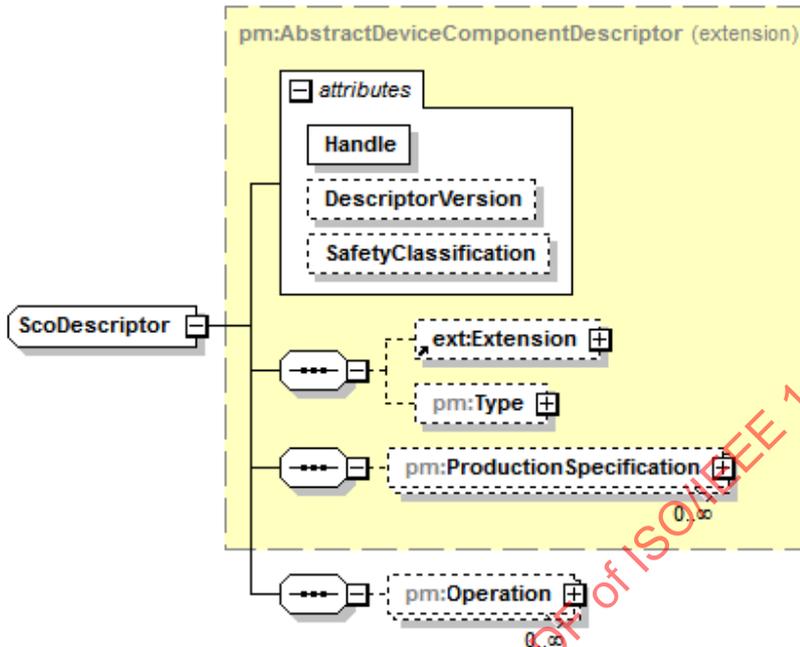
Type **xsd:unsignedInt**

Documentation Index number of the sample the defined annotation refers to. The index number addresses the (n+1)-nth number in the pm:RealTimeSampleArrayValue/pm:Samples ATTRIBUTE. Hence, numbering is zero-based.

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B.357 ScoDescriptor

Type: complexType



Type extension of **pm:AbstractDeviceComponentDescriptor**

Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:Operation

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation ScoDescriptor describes the capabilities of the SCO.

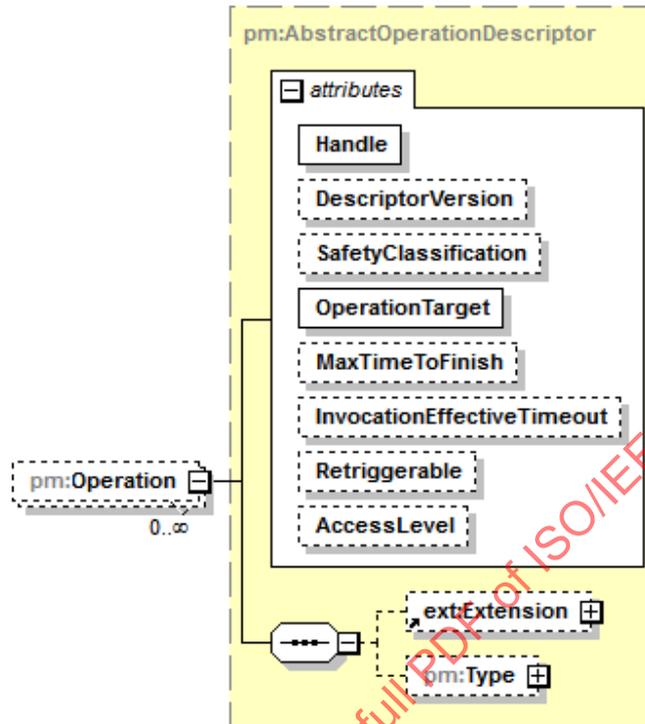
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B.358 ScoDescriptor/Operation

Type: element



Type **pm:AbstractOperationDescriptor**

Properties Min. occurrence: 0
Max. occurrence: unbounded

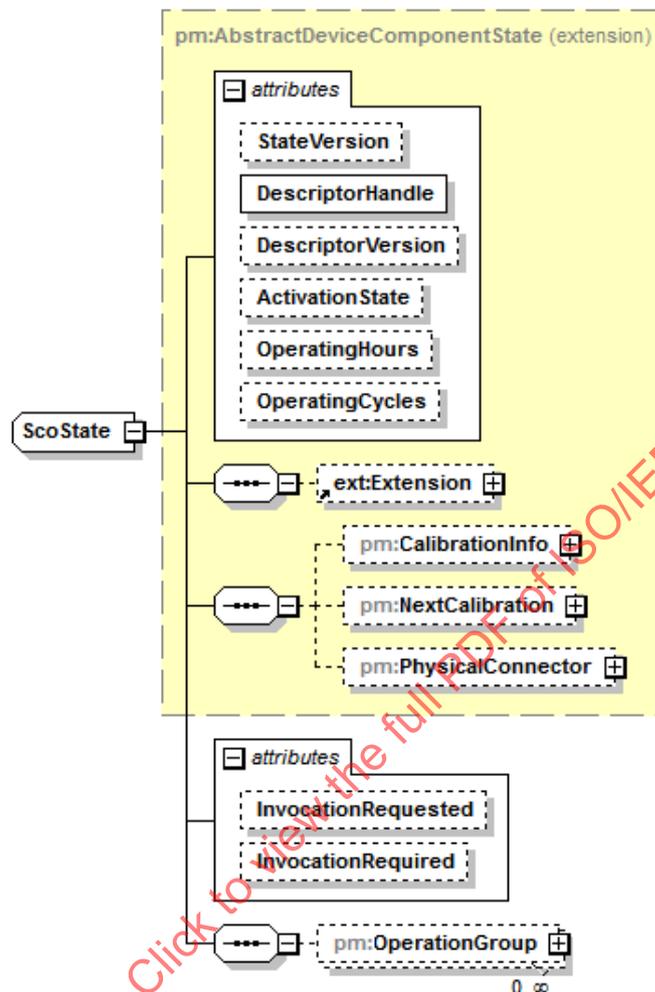
Children **tns:Extension**
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation A list of operations that are provided by the SCO. The list is ordered by the position of the operation in the list where the ELEMENT with a lower list index has a higher clinical relevance than any entry with a higher list index. The SERVICE PROVIDER defines the clinical relevance and MAY reorder the list at any time.

B.359 ScoState

Type: complexType



Type extension of **pm:AbstractDeviceComponentState**

- Children
- tns:Extension**
 - pm:CalibrationInfo**
 - pm:NextCalibration**
 - pm:PhysicalConnector**
 - pm:OperationGroup**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional
	<u>InvocationRequested</u>	pm:OperationRef	optional
	<u>InvocationRequired</u>	pm:OperationRef	optional

Documentation Corresponding state of pm:ScoDescriptor.

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B.360 ScoState/@InvocationRequested

Type: attribute

Type **pm:OperationRef**

Documentation Prioritized list of operations that are requested to be invoked by a SERVICE CONSUMER.

B.361 ScoState/@InvocationRequired

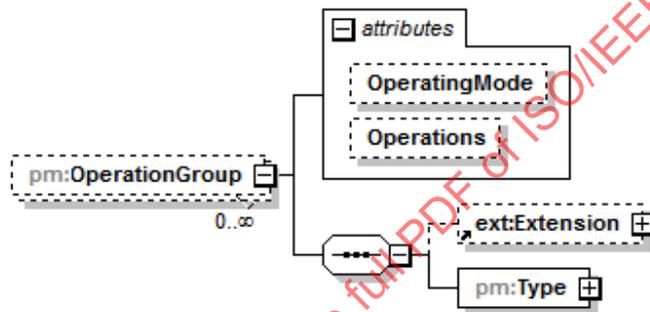
Type: attribute

Type **pm:OperationRef**

Documentation Prioritized list of operations that are required to be invoked by a SERVICE CONSUMER.

B.362 ScoState/OperationGroup

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type

Attributes	Name	Type	Use
	<u>OperatingMode</u>	pm:OperatingMode	optional
	<u>Operations</u>	pm:OperationRef	optional

Documentation OperationGroup defines groups of operations in order to allow clinical grouping and prioritization of operations.

B.363 ScoState/OperationGroup/@OperatingMode

Type: attribute

Type **pm:OperatingMode**

Constraints	Kind	Value	Documentation
	enumeration	Dis	Dis = Disabled. Object is disabled.
	enumeration	En	En = Enabled. Object is enabled
	enumeration	NA	NA = Not Available. Object is not available for interaction. This means that it is defined but currently not in a mode so that it can be interacted with.

Documentation OperatingMode defines the operating mode of the whole operation group, see also pm:OperatingMode.

B.364 ScoState/OperationGroup/@Operations

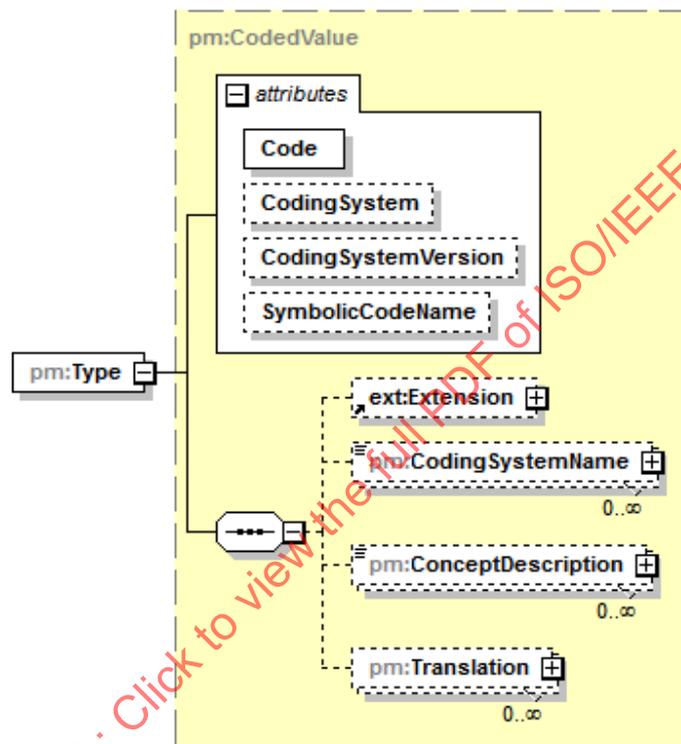
Type: attribute

Type **pm:OperationRef**

Documentation Handle references to all operations enclosed by the operation group. The list is ordered such that the entry with a lower list index has a higher clinical relevance than any entry with a higher list index. The SERVICE PROVIDER defines the clinical relevance and MAY reorder the list at any time.

B.365 ScoState/OperationGroup/Type

Type: element



Type **pm:CodedValue**

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Type semantically describes the operation group.

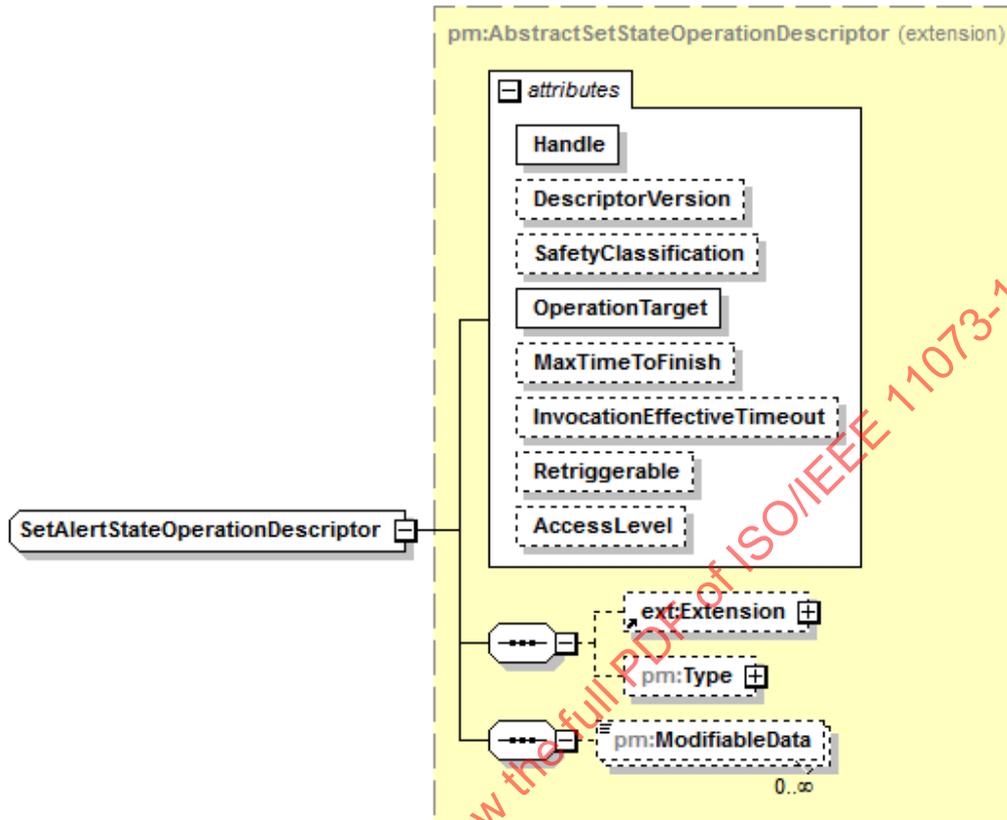
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B.366 SetAlertStateOperationDescriptor

Type: complexType



Type extension of **pm:AbstractSetStateOperationDescriptor**

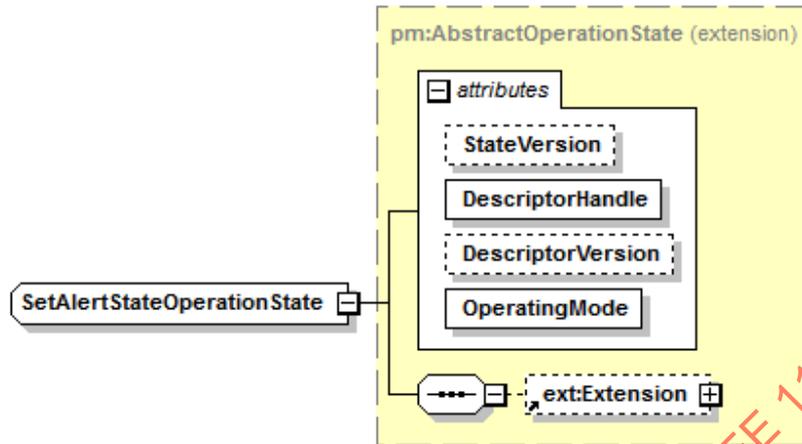
Children
tns:Extension
pm:Type
pm:ModifiableData

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation Describes an alert state set operation for a specific alert state in the MDIB that is exposed on the SCO.

B.367 SetAlertStateOperationState

Type: complexType



Type extension of **pm:AbstractOperationState**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of an alert state set operation that is exposed on the SCO.

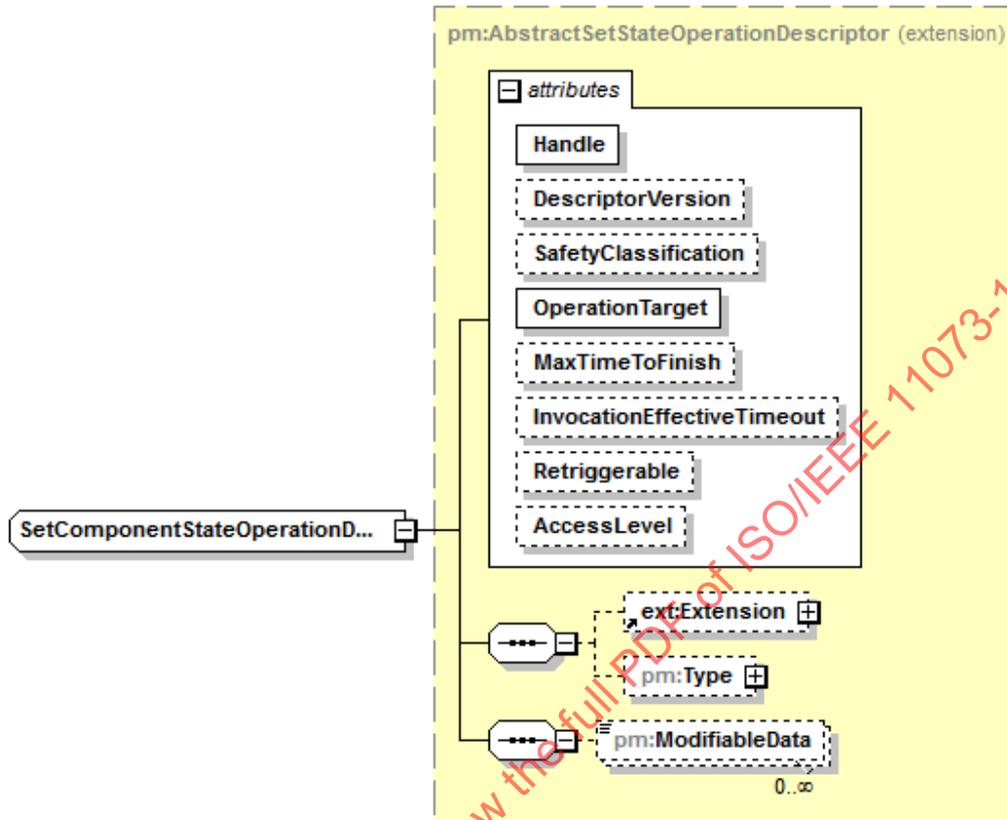
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B.368 SetComponentStateOperationDescriptor

Type: complexType



Type extension of **pm:AbstractSetStateOperationDescriptor**

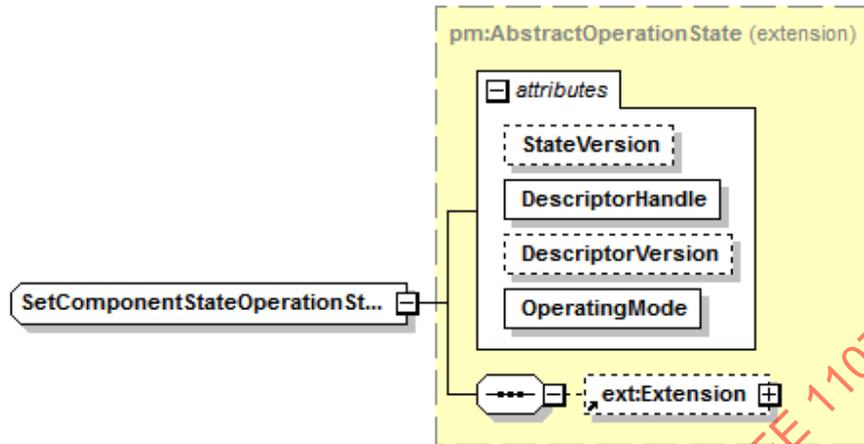
Children
tns:Extension
pm:Type
pm:ModifiableData

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation Describes a component state set operation for a specific component state in the MDIB that is exposed on the SCO.

B.369 SetComponentStateOperationState

Type: complexType



Type extension of pm:AbstractOperationState

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of a component state set operation that is exposed on the SCO.

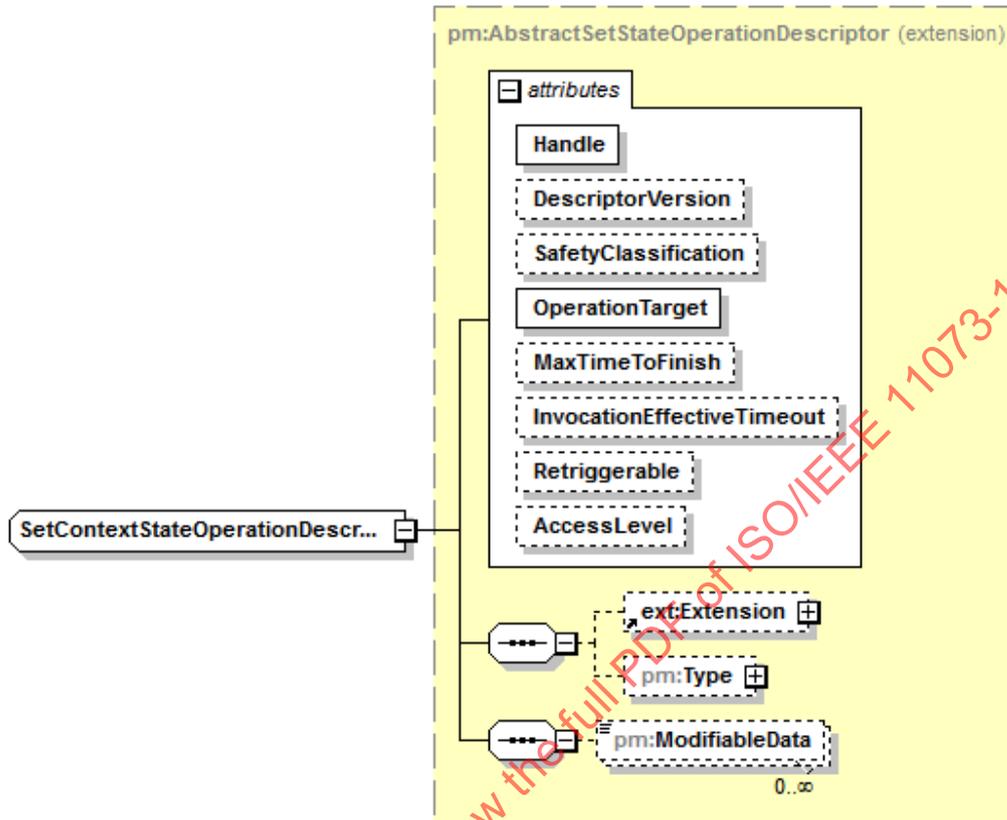
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B.370 SetContextStateOperationDescriptor

Type: complexType



Type extension of **pm:AbstractSetStateOperationDescriptor**

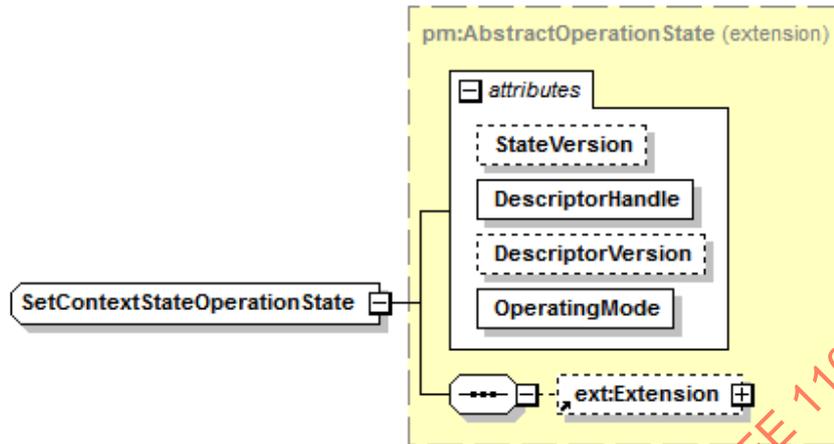
Children
tns:Extension
pm:Type
pm:ModifiableData

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation Describes a context state set operation for a specific context state in the MDIB that is exposed on SCO.

B.371 SetContextStateOperationState

Type: complexType



Type extension of **pm:AbstractOperationState**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of a context state set operation that is exposed on the SCO.

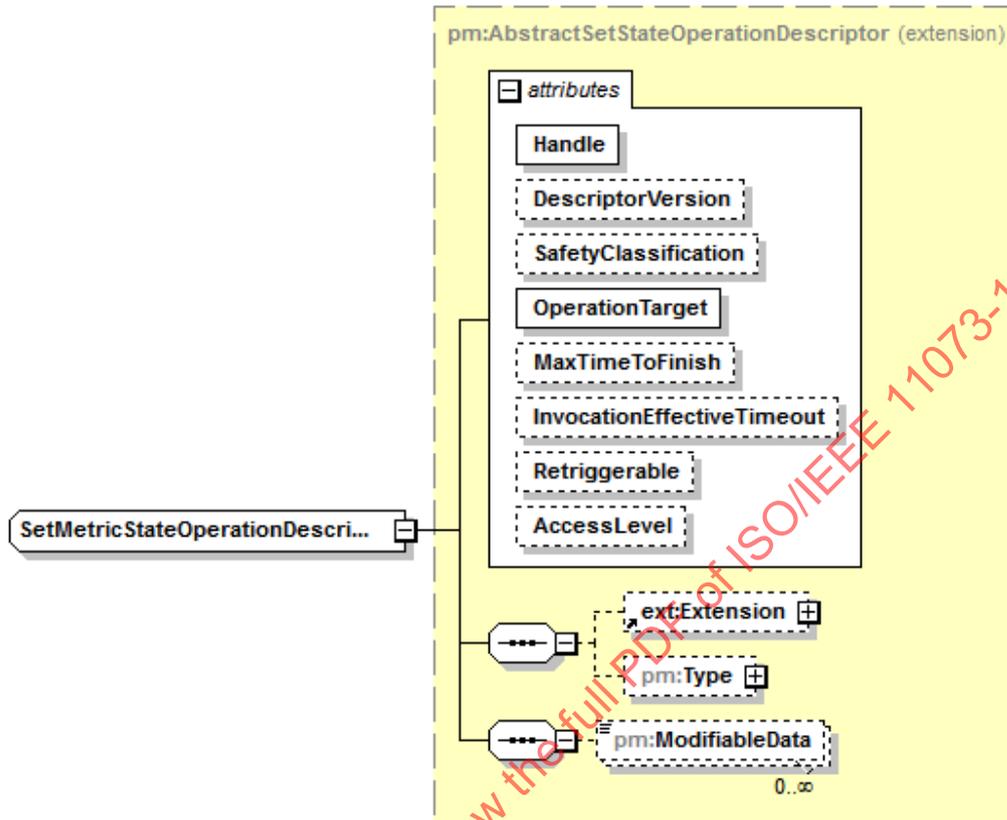
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B.372 SetMetricStateOperationDescriptor

Type: complexType



Type extension of **pm:AbstractSetStateOperationDescriptor**

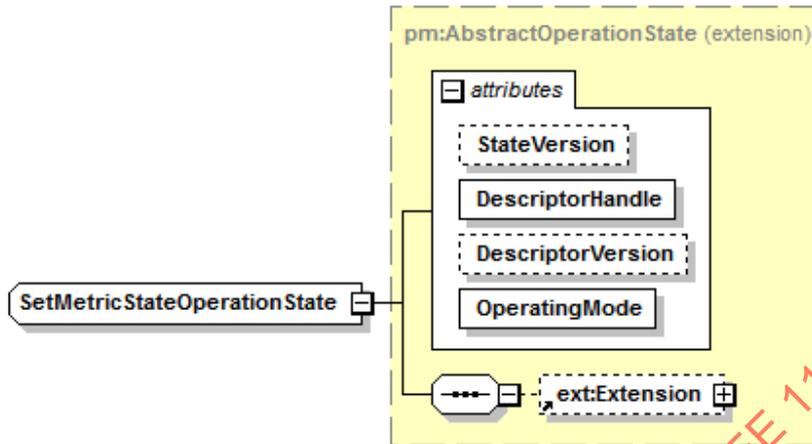
Children
tns:Extension
pm:Type
pm:ModifiableData

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation Describes a METRIC state set operation for a specific METRIC state in the MDIB that is exposed on the SCO.

B.373 SetMetricStateOperationState

Type: complexType



Type extension of **pm:AbstractOperationState**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of a METRIC state set operation that is exposed on the SCO.

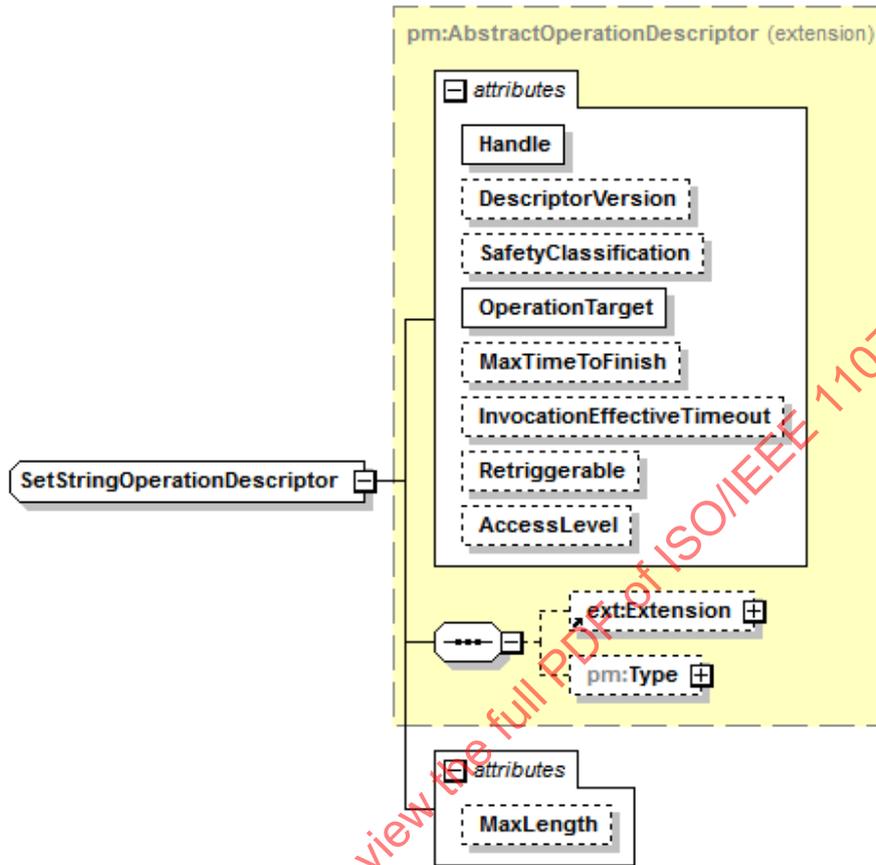
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B.374 SetStringOperationDescriptor

Type: complexType



Type extension of `pm:AbstractOperationDescriptor`

Children `tns:Extension`
`pm:Type`

Attributes	Name	Type	Use
	<u>Handle</u>	<code>pm:Handle</code>	required
	<u>DescriptorVersion</u>	<code>pm:VersionCounter</code>	optional
	<u>SafetyClassification</u>	<code>pm:SafetyClassification</code>	optional
	<u>OperationTarget</u>	<code>pm:HandleRef</code>	required
	<u>MaxTimeToFinish</u>	<code>xsd:duration</code>	optional
	<u>InvocationEffectiveTimeout</u>	<code>xsd:duration</code>	optional
	<u>Retriggerable</u>	<code>xsd:boolean</code>	optional
	<u>AccessLevel</u>	<code>xsd:string</code>	optional
	<u>MaxLength</u>	<code>xsd:unsignedLong</code>	optional

Documentation Describes a string set operation for a specific object state in the MDIB that is exposed on the SCO.

B.375 SetStringOperationDescriptor/@MaxLength

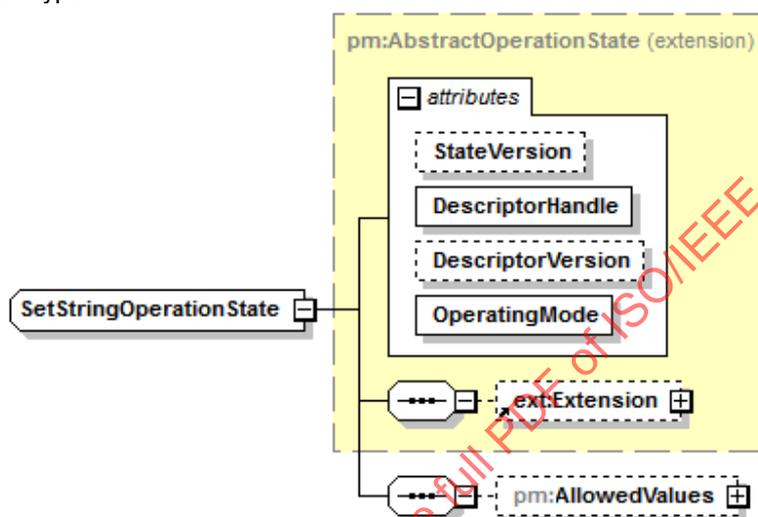
Type: attribute

Type `xsd:unsignedLong`

Documentation An optional parameter that gives the maximum length of the input string that is supported by the operation.

B.376 SetStringOperationState

Type: complexType



Type extension of `pm:AbstractOperationState`

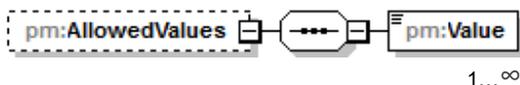
Children `tns:Extension`
`pm:AllowedValues`

Attributes	Name	Type	Use
	<u>StateVersion</u>	<code>pm:VersionCounter</code>	optional
	<u>DescriptorHandle</u>	<code>pm:HandleRef</code>	required
	<u>DescriptorVersion</u>	<code>pm:ReferencedVersion</code>	optional
	<u>OperatingMode</u>	<code>pm:OperatingMode</code>	required

Documentation State of a string set operation that is exposed on the SCO.

B.377 SetStringOperationState/AllowedValues

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Documentation An OPTIONAL list of currently allowed string values that can be requested. If the list does not exist, then any value can be requested.

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B.378 SetStringOperationState/AllowedValues/Value

Type: element



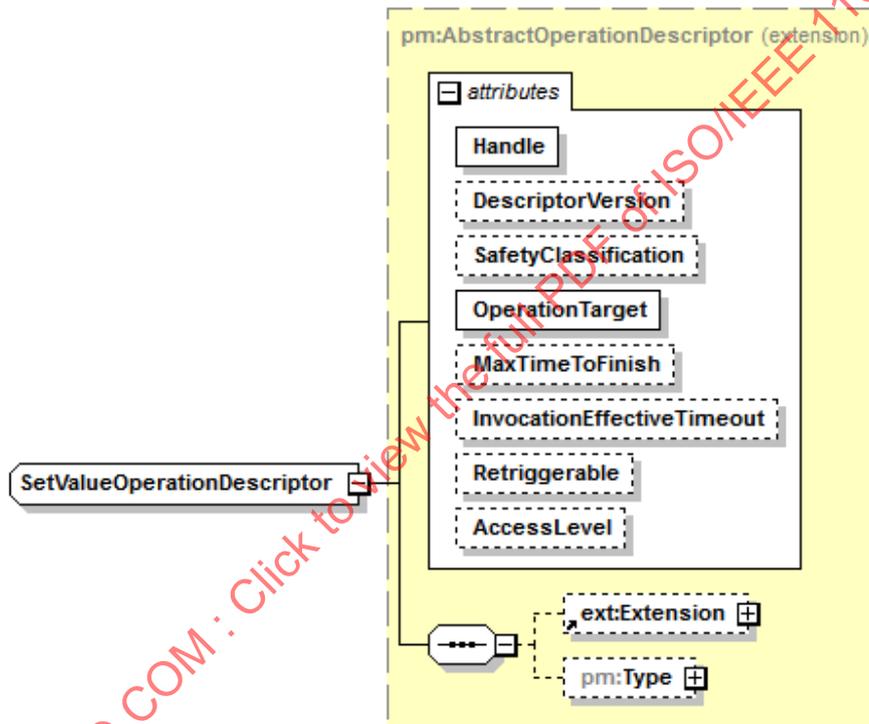
Type **xsd:string**

Properties Min. occurrence: 1
Max. occurrence: n

Documentation A single allowed value that can be requested.

B.379 SetValueOperationDescriptor

Type: complexType



Type extension of **pm:AbstractOperationDescriptor**

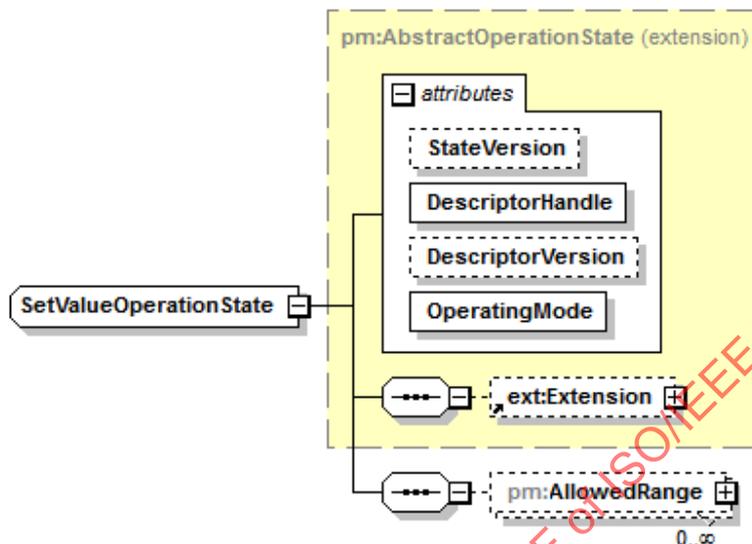
Children **tns:Extension**
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>OperationTarget</u>	pm:HandleRef	required
	<u>MaxTimeToFinish</u>	xsd:duration	optional
	<u>InvocationEffectiveTimeout</u>	xsd:duration	optional
	<u>Retriggerable</u>	xsd:boolean	optional
	<u>AccessLevel</u>	xsd:string	optional

Documentation Describes a numeric set operation for a specific object state in the MDIB that is exposed on the SCO.

B.380 SetValueOperationState

Type: complexType



Type extension of **pm:AbstractOperationState**

Children **tns:Extension**
pm:AllowedRange

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>OperatingMode</u>	pm:OperatingMode	required

Documentation State of a numeric set operation that is exposed on the SCO.

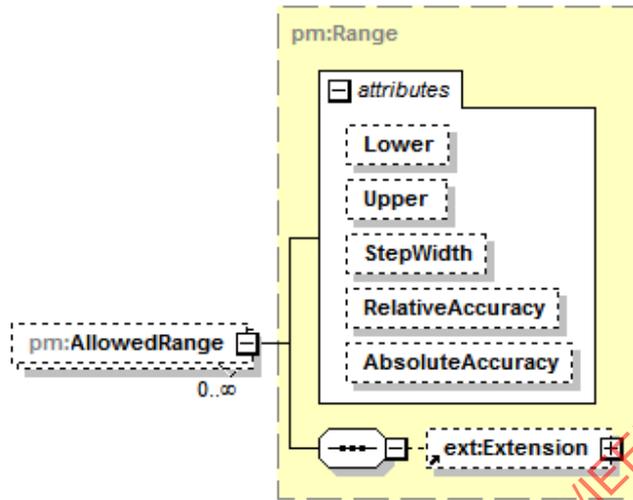
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B.381 SetValueOperationState/AllowedRange

Type: element



Type **pm:Range**

<i>Properties</i>	Min. occurrence:	0
	Max. occurrence:	unbounded

<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Lower</u>	xsd:decimal	optional
	<u>Upper</u>	xsd:decimal	optional
	<u>StepWidth</u>	xsd:decimal	optional
	<u>RelativeAccuracy</u>	xsd:decimal	optional
	<u>AbsoluteAccuracy</u>	xsd:decimal	optional

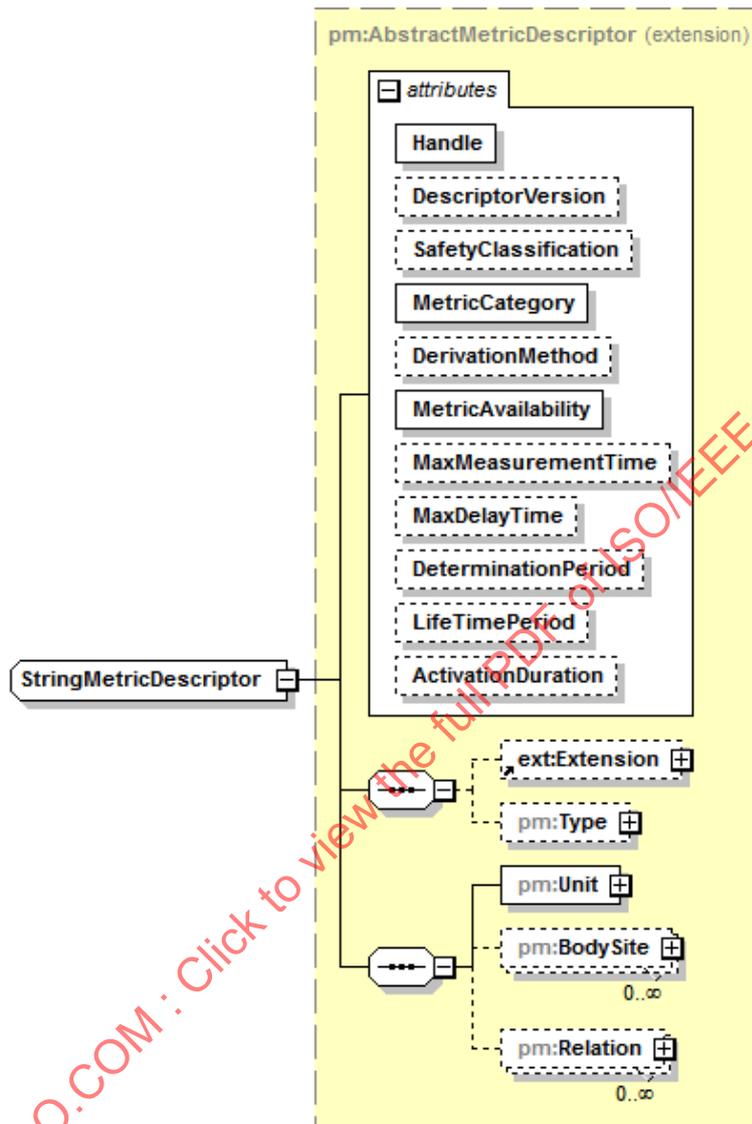
Documentation The currently allowed ranges that can be requested.

NOTE—The given ranges need to be a (strict or nonstrict) subset of the technical range of the referenced descriptor.

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B.382 StringMetricDescriptor

Type: complexType



Type extension of **pm:AbstractMetricDescriptor**

- Children
- tns:Extension**
 - pm:Type**
 - pm:Unit**
 - pm:BodySite**
 - pm:Relation**

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
	<u>MetricCategory</u>	pm:MetricCategory	required
	<u>DerivationMethod</u>	pm:DerivationMethod	optional

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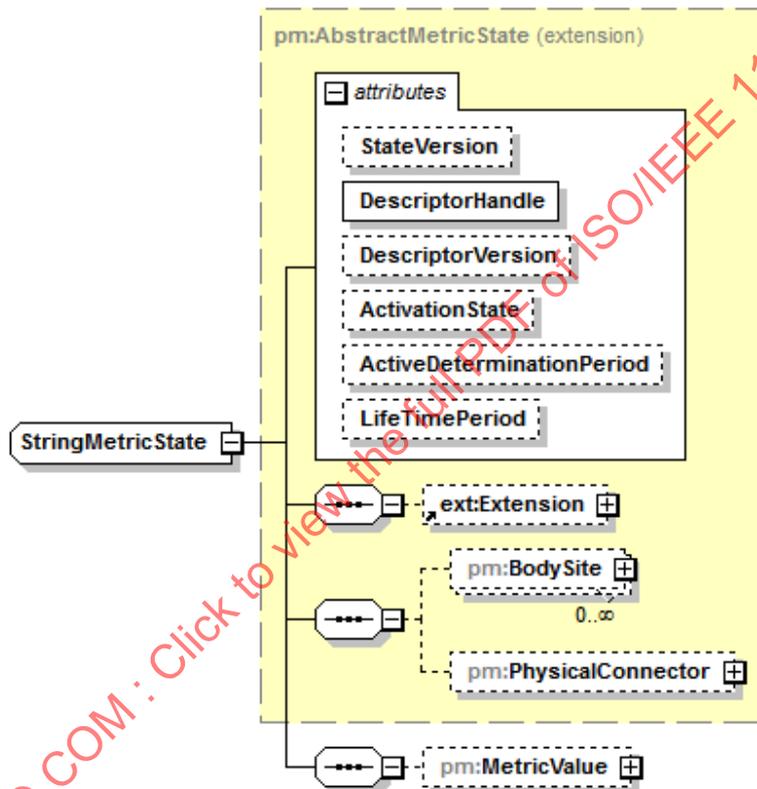
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<u>MetricAvailability</u>	pm:MetricAvailability	required
<u>MaxMeasurementTime</u>	xsd:duration	optional
<u>MaxDelayTime</u>	xsd:duration	optional
<u>DeterminationPeriod</u>	xsd:duration	optional
<u>LifeTimePeriod</u>	xsd:duration	optional
<u>ActivationDuration</u>	xsd:duration	optional

Documentation A string METRIC represents a textual status or annotation information.

B.383 StringMetricState

Type: complexType



Type extension of **pm:AbstractMetricState**

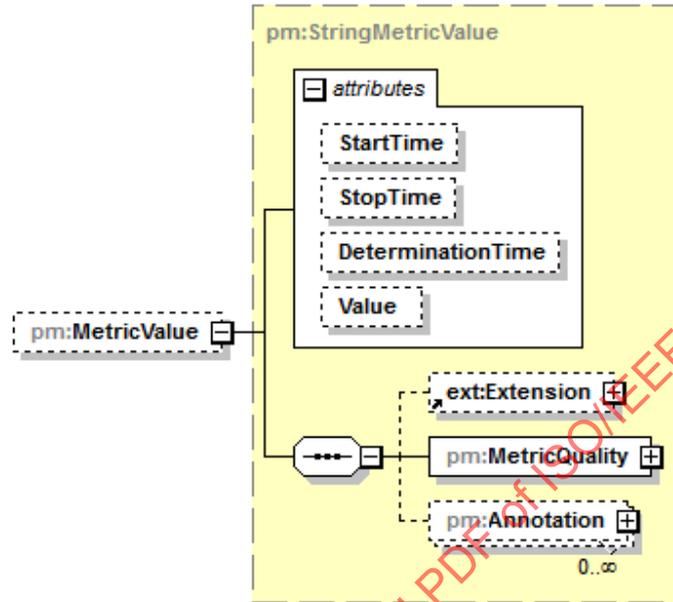
- Children
- tns:Extension**
 - pm:BodySite**
 - pm:PhysicalConnector**
 - pm:MetricValue**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>ActiveDeterminationPeriod</u>	xsd:duration	optional
	<u>LifeTimePeriod</u>	xsd:duration	optional

Documentation State of a string METRIC.

B.384 StringMetricState/MetricValue

Type: element



Type **pm:StringMetricValue**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:MetricQuality
pm:Annotation

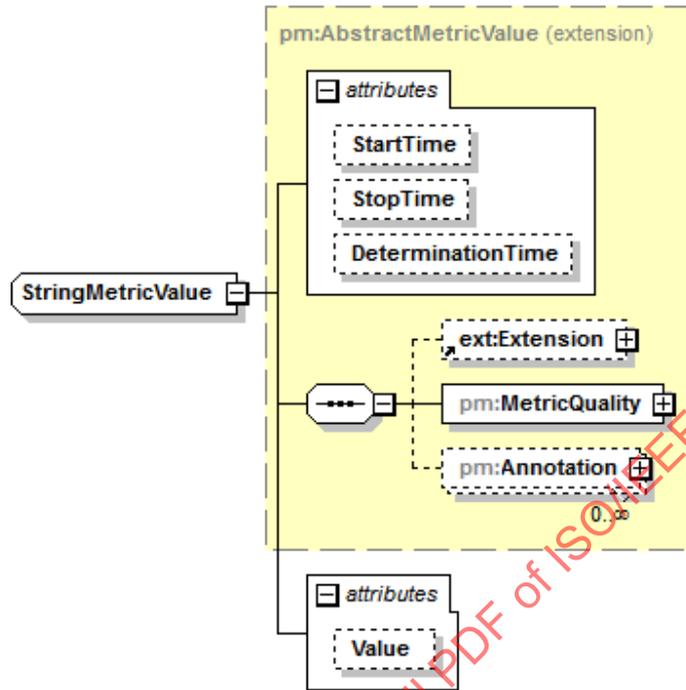
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>StartTime</u>	pm:Timestamp	optional
	<u>StopTime</u>	pm:Timestamp	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional
	<u>Value</u>	xsd:string	optional

Documentation OPTIONAL current value of the METRIC.

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B.385 StringMetricValue

Type: complexType



Type extension of **pm:AbstractMetricValue**

Children **tns:Extension**
pm:MetricQuality
pm:Annotation

Attributes	Name	Type	Use
	<u>StartTime</u>	pm:Timestamp	optional
	<u>StopTime</u>	pm:Timestamp	optional
	<u>DeterminationTime</u>	pm:Timestamp	optional
	<u>Value</u>	xsd:string	optional

Documentation String value of a METRIC state.

B.386 StringMetricValue/@Value

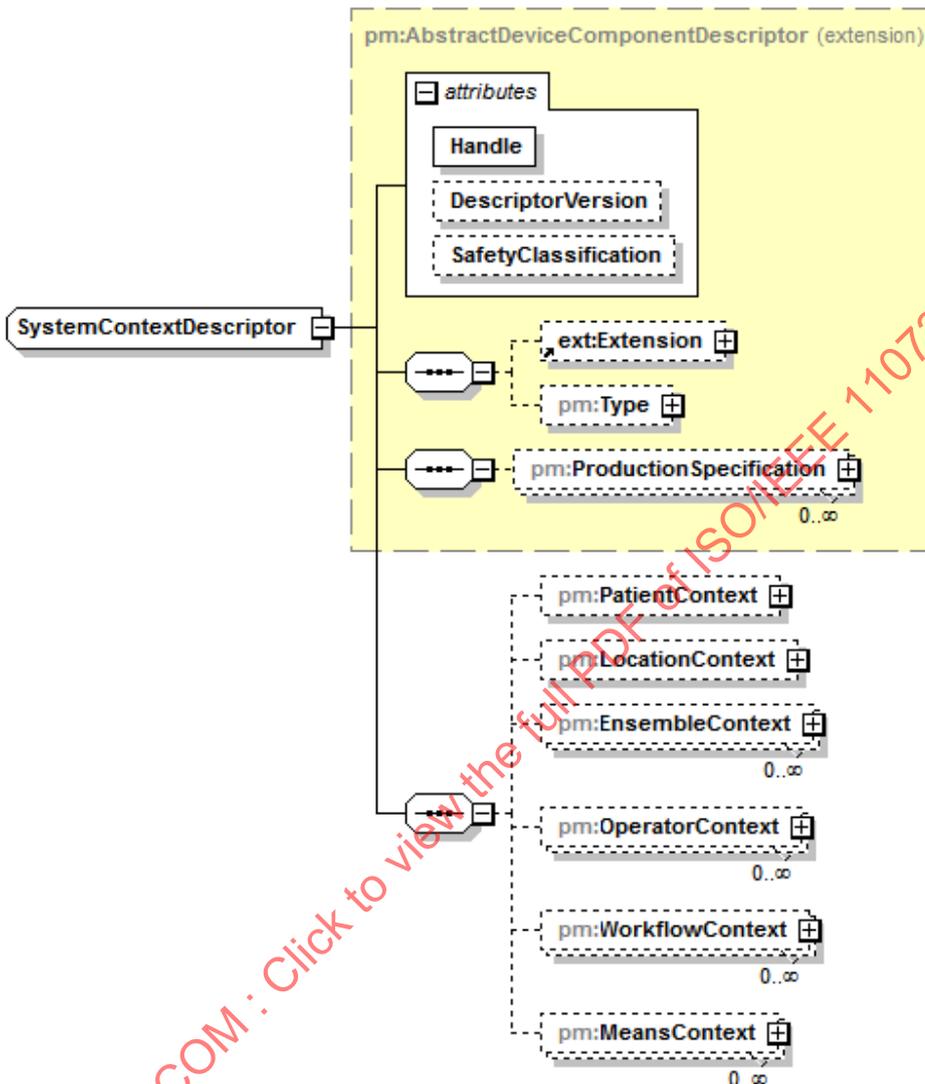
Type: attribute

Type **xsd:string**

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B.387 SystemContextDescriptor

Type: complexType



Type extension of **pm:AbstractDeviceComponentDescriptor**

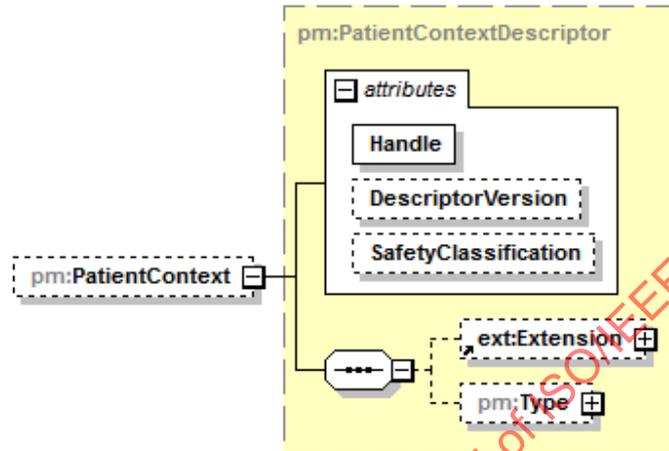
- Children
- tns:Extension**
 - pm:Type**
 - pm:ProductionSpecification**
 - pm:PatientContext**
 - pm:LocationContext**
 - pm:EnsembleContext**
 - pm:OperatorContext**
 - pm:WorkflowContext**
 - pm:MeansContext**

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation The context of an MDS that lists the possible relationship of a POC MEDICAL DEVICE into its usage environment by means of context descriptors. Context descriptors do not contain any stateful information. They only assert that the underlying MDS can provide corresponding context state information.

B.388 SystemContextDescriptor/PatientContext

Type: element



Type **pm:PatientContextDescriptor**

Properties Min. occurrence: 0
Max. occurrence: 1

Children tns:Extension
pm:Type

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

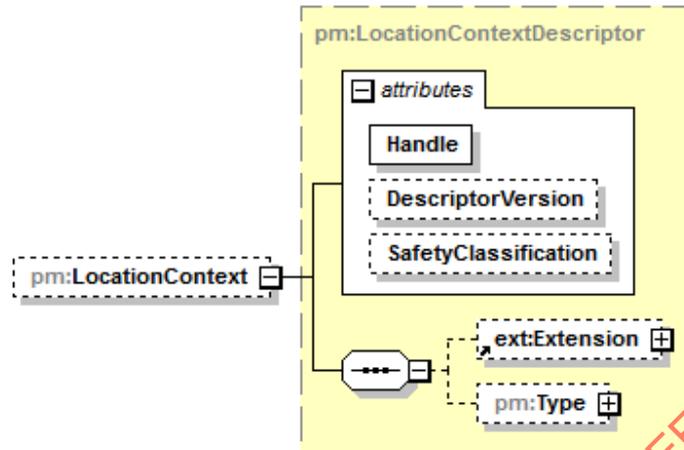
Documentation The patient context indicates that the POC MEDICAL DEVICE is able to process information about the patient that it is associated with.

A SERVICE PROVIDER SHALL NOT insert or delete the context descriptor ELEMENT during runtime, except when the whole MDS appears/disappears.

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B.389 SystemContextDescriptor/LocationContext

Type: element

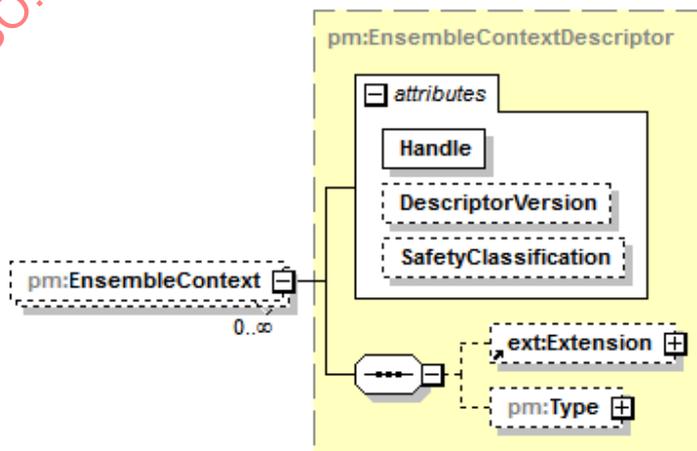


Type **pm:LocationContextDescriptor**

<i>Properties</i>	Min. occurrence: 0	Max. occurrence: 1												
<i>Children</i>	<u>tns:Extension</u> <u>pm:Type</u>													
<i>Attributes</i>	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td><u>Handle</u></td> <td>pm:Handle</td> <td>required</td> </tr> <tr> <td><u>DescriptorVersion</u></td> <td>pm:VersionCounter</td> <td>optional</td> </tr> <tr> <td><u>SafetyClassification</u></td> <td>pm:SafetyClassification</td> <td>optional</td> </tr> </tbody> </table>	Name	Type	Use	<u>Handle</u>	pm:Handle	required	<u>DescriptorVersion</u>	pm:VersionCounter	optional	<u>SafetyClassification</u>	pm:SafetyClassification	optional	
Name	Type	Use												
<u>Handle</u>	pm:Handle	required												
<u>DescriptorVersion</u>	pm:VersionCounter	optional												
<u>SafetyClassification</u>	pm:SafetyClassification	optional												
<i>Documentation</i>	<p>The location context indicates that the POC MEDICAL DEVICE can provide information about the location(s) that it is associated with.</p> <p>A SERVICE PROVIDER SHALL NOT insert or delete the context descriptor ELEMENT during runtime, except when the whole MDS appears/disappears.</p>													

B.390 SystemContextDescriptor/EnsembleContext

Type: element



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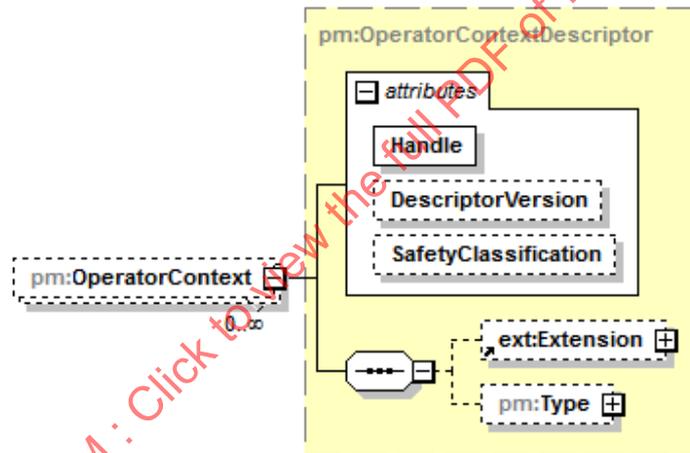
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Type **pm:EnsembleContextDescriptor**

<i>Properties</i>	Min. occurrence: 0		
	Max. occurrence: unbounded		
<i>Children</i>	tns:Extension pm:Type		
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
<i>Documentation</i>	The ensemble context indicates that the POC MEDICAL DEVICE can provide information about the ensemble(s) that it is associated with. An ensemble represents an arbitrary grouping of POC MEDICAL DEVICE. The semantics depend on the ensemble itself.		
	A SERVICE PROVIDER SHALL NOT insert or delete the context descriptor ELEMENT during runtime, except when the whole MDS appears/disappears.		

B.391 SystemContextDescriptor/OperatorContext

Type: element

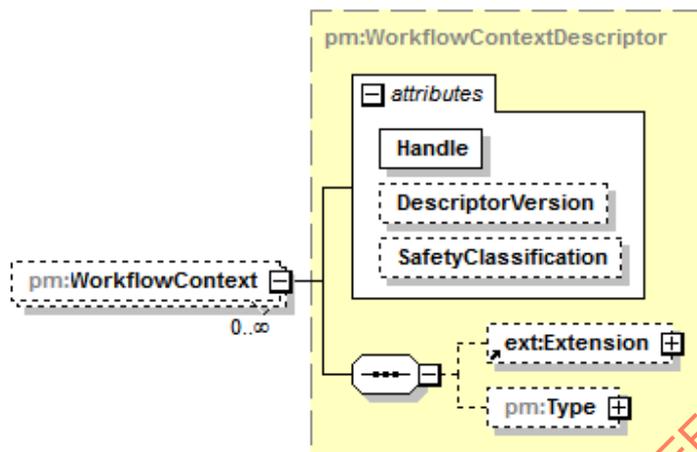


Type **pm:OperatorContextDescriptor**

<i>Properties</i>	Min. occurrence: 0		
	Max. occurrence: unbounded		
<i>Children</i>	tns:Extension pm:Type		
<i>Attributes</i>	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional
<i>Documentation</i>	The operator context indicates that the POC MEDICAL DEVICE can provide information about the operator(s) that it is associated with.		
	A SERVICE PROVIDER SHALL NOT insert or delete the context descriptor ELEMENT during runtime, except when the whole MDS appears/disappears.		

B.392 SystemContextDescriptor/WorkflowContext

Type: element

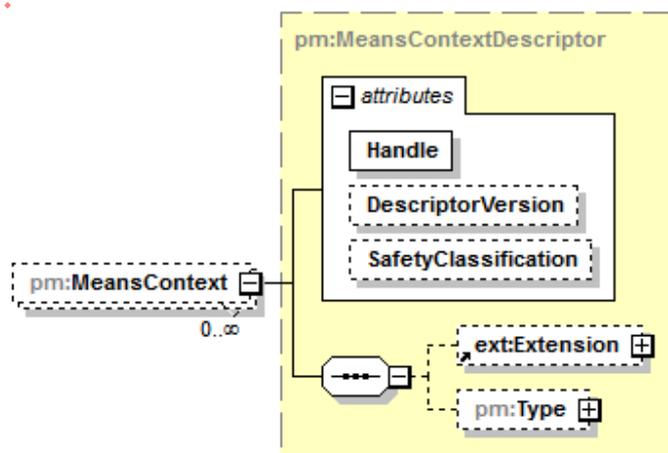


Type **pm:WorkflowContextDescriptor**

<i>Properties</i>	Min. occurrence: 0	Max. occurrence: unbounded												
<i>Children</i>	<u>tns:Extension</u> <u>pm:Type</u>													
<i>Attributes</i>	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td><u>Handle</u></td> <td>pm:Handle</td> <td>required</td> </tr> <tr> <td><u>DescriptorVersion</u></td> <td>pm:VersionCounter</td> <td>optional</td> </tr> <tr> <td><u>SafetyClassification</u></td> <td>pm:SafetyClassification</td> <td>optional</td> </tr> </tbody> </table>	Name	Type	Use	<u>Handle</u>	pm:Handle	required	<u>DescriptorVersion</u>	pm:VersionCounter	optional	<u>SafetyClassification</u>	pm:SafetyClassification	optional	
Name	Type	Use												
<u>Handle</u>	pm:Handle	required												
<u>DescriptorVersion</u>	pm:VersionCounter	optional												
<u>SafetyClassification</u>	pm:SafetyClassification	optional												
<i>Documentation</i>	<p>The workflow context indicates that the POC MEDICAL DEVICE can provide information about the workflow step(s) that it is associated with.</p> <p>A SERVICE PROVIDER SHALL NOT insert or delete the context descriptor ELEMENT during runtime, except when the whole MDS appears/disappears.</p>													

B.393 SystemContextDescriptor/MeansContext

Type: element



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Type **pm:MeansContextDescriptor**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type

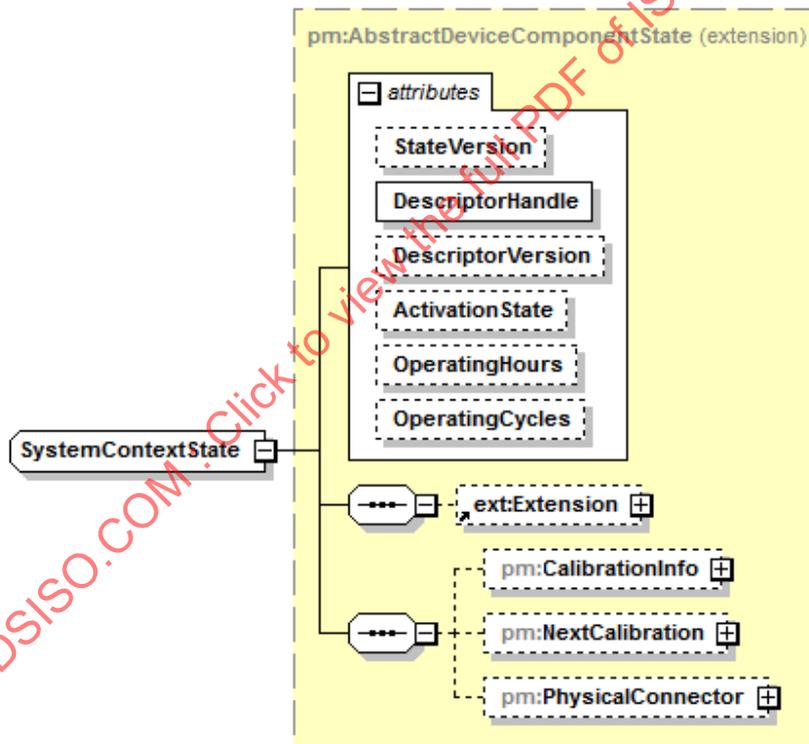
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation The means context indicates that the POC MEDICAL DEVICE can provide information about utilized means.

A SERVICE PROVIDER SHALL NOT insert or delete the context descriptor ELEMENT during runtime, except when the whole MDS appears/disappears.

B.394 SystemContextState

Type: complexType



Type extension of **pm:AbstractDeviceComponentState**

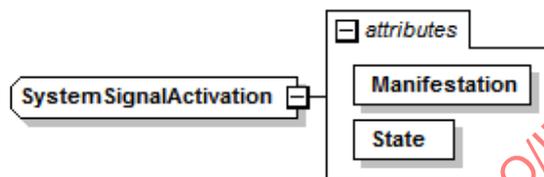
Children **tns:Extension**
pm:CalibrationInfo
pm:NextCalibration
pm:PhysicalConnector

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional

Documentation Corresponding state of pm:SystemContextDescriptor. This state comes with no additional attributes.

B.395 SystemSignalActivation

Type: complexType



Attributes	Name	Type	Use
	<u>Manifestation</u>	pm:AlertSignalManifestation	required
	<u>State</u>	pm:AlertActivation	required

Documentation Defines a tuple consisting of an pm:AlertSignalManifestation and an pm:AlertActivation to describe the alert activation state of a certain ALERT SIGNAL manifestation.

Example: ./@Manifestation is "Aud" and ./@State is "Psd" means that any audible alert activation is paused.

B.396 SystemSignalActivation/@Manifestation

Type: attribute

Type **pm:AlertSignalManifestation**

Constraints	Kind	Value	Documentation
	enumeration	Aud	Aud = Audible. The ALERT SIGNAL manifests in an audible manner, i.e., the alert can be heard. Example: an alarm sound.
	enumeration	Vis	Vis = Visible. The ALERT SIGNAL manifests in a visible manner, i.e., the alert can be seen. Example: a red flashing light.
	enumeration	Tan	Tan = Tangible. The ALERT SIGNAL manifests in a tangible manner, i.e., the alert can be felt. Example: vibration.
	enumeration	Oth	Oth = Other. The ALERT SIGNAL manifests in a manner not further specified.

Documentation See pm:AlertSignalManifestation.

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B.397 SystemSignalActivation/@State

Type: attribute

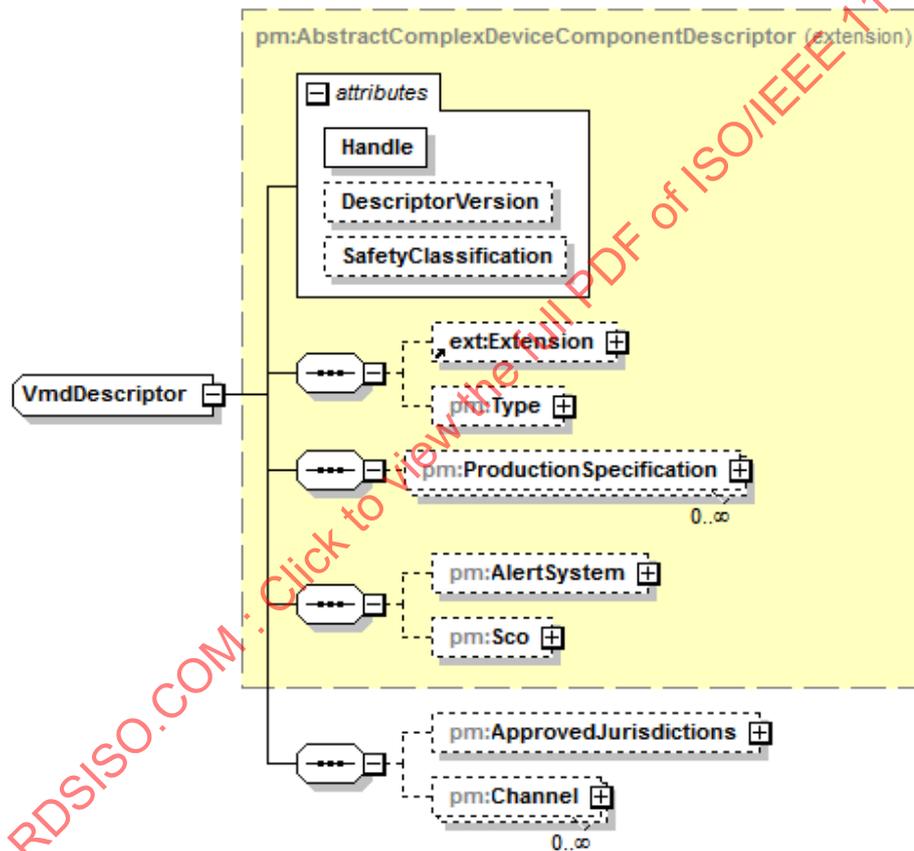
Type **pm:AlertActivation**

Constraints	Kind	Value	Documentation
	enumeration	On	The ALERT SYSTEM ELEMENT is operating.
	enumeration	Off	The ALERT SYSTEM ELEMENT is not operating.
	enumeration	Psd	Psd = Paused. The ALERT SYSTEM ELEMENT is temporarily not operating.

Documentation See pm:AlertActivation.

B.398 VmdDescriptor

Type: complexType



Type extension of **pm:AbstractComplexDeviceComponentDescriptor**

- Children
- tns:Extension**
 - pm:Type**
 - pm:ProductionSpecification**
 - pm:AlertSystem**
 - pm:Sco**
 - pm:ApprovedJurisdictions**
 - pm:Channel**

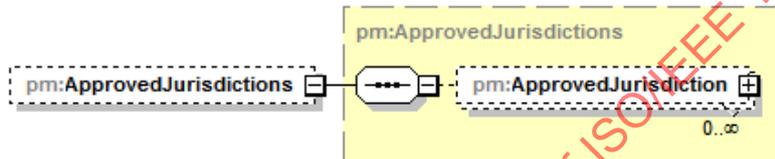
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation VmdDescriptor describes a VMD. A VMD is an abstraction for a module (medical-related subsystem) of an MDS. According to IEEE 11073-10201, an MDS with one VMD is a single purpose POC MEDICAL DEVICE in contrast to an MDS with multiple VMDs that has multiple purposes.

Example of a multiple purpose POC MEDICAL DEVICE: an anesthesia workstation (one MDS) with a ventilation unit (one VMD), a patient monitoring unit (another VMD), and gas delivery/monitor system (another VMD). In the IEEE 11073-10201 a VMD might not be a hardware module, it also can be pure software.

B.399 VmdDescriptor/ApprovedJurisdictions

Type: element



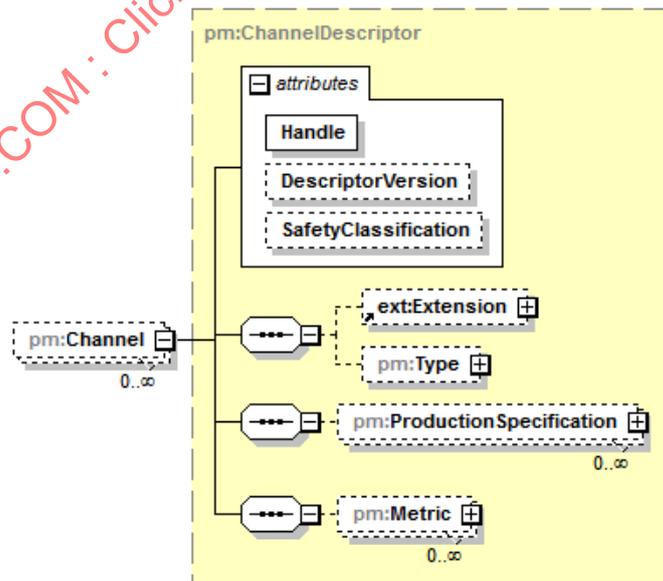
Type pm:ApprovedJurisdictions

Properties	Value
Min. occurrence:	0
Max. occurrence:	1

Documentation List of regions in which the the VMD is approved to be operated. If the list does not contain any entries, then the VMD is not approved for any region. If the list is not specified, then the VMD is approved to be operated in any region.

B.400 VmdDescriptor/Channel

Type: element



Type pm:ChannelDescriptor

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Properties Min. occurrence: 0
Max. occurrence: unbounded

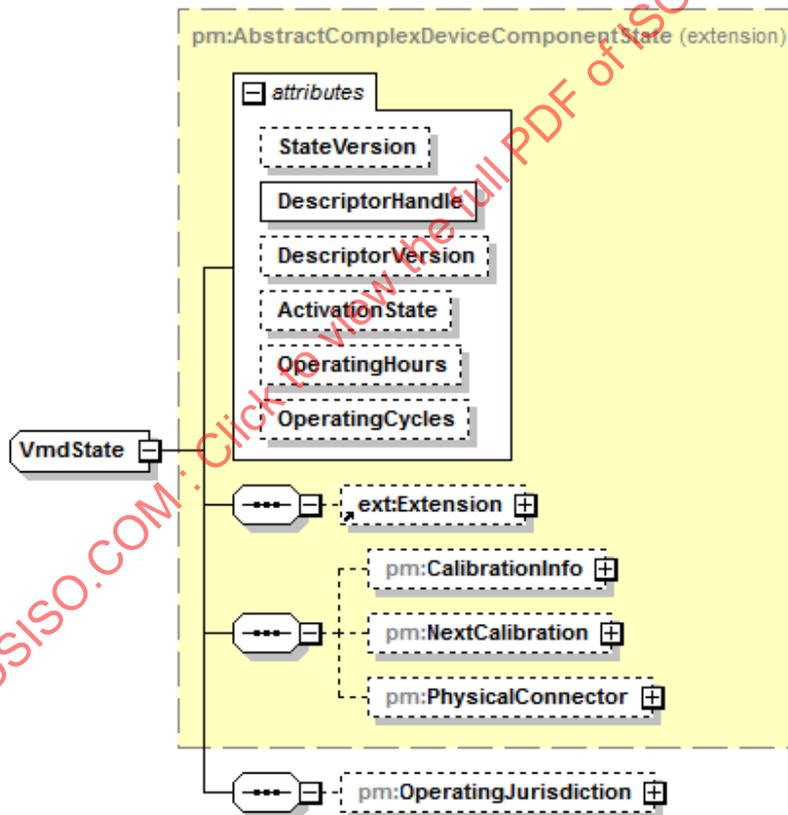
Children **tns:Extension**
pm:Type
pm:ProductionSpecification
pm:Metric

Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Ordered list of CHANNELs that allow hierarchical information organization of METRICs or ALERT SYSTEMs. The list is ordered by the position of the CHANNEL in the list where the ELEMENT with a lower list index has a higher clinical relevance than any entry with a higher list index. The SERVICE PROVIDER defines the clinical relevance and MAY reorder the list at any time.

B.401 VmdState

Type: complexType



Type extension of **pm:AbstractComplexDeviceComponentState**

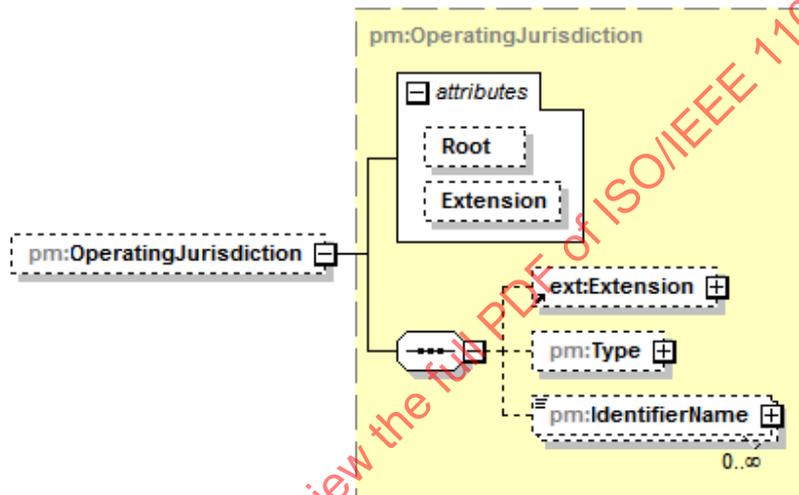
Children **tns:Extension**
pm:CalibrationInfo
pm:NextCalibration
pm:PhysicalConnector
pm:OperatingJurisdiction

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>ActivationState</u>	pm:ComponentActivation	optional
	<u>OperatingHours</u>	xsd:unsignedInt	optional
	<u>OperatingCycles</u>	xsd:int	optional

Documentation The state of a VMD.

B.402 VmdState/OperatingJurisdiction

Type: element



Type **pm:OperatingJurisdiction**

Properties Min. occurrence: 0
Max. occurrence:

Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation The current region information that is configured for the VMD. See also pm:OperatingJurisdiction. OperatingJurisdiction SHALL NOT be inserted if there is no pm:VmdDescriptor/pm:ApprovedJurisdictions list present.

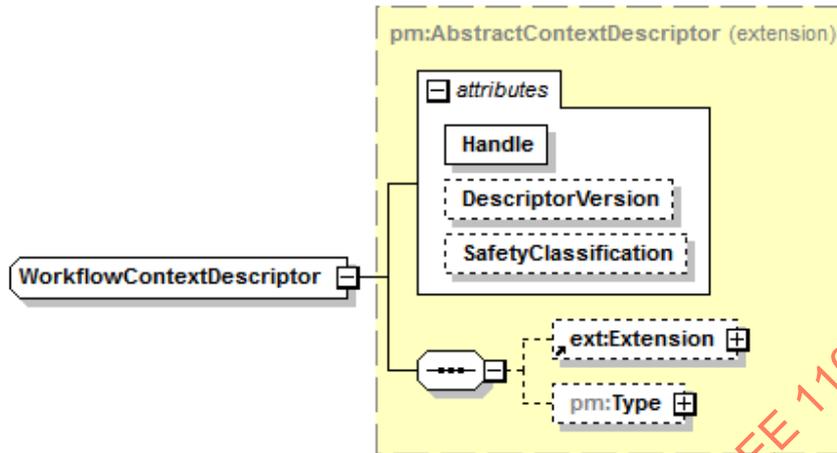
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B.403 WorkflowContextDescriptor

Type: complexType



Type extension of **pm:AbstractContextDescriptor**

Children **tns:Extension**
pm:Type

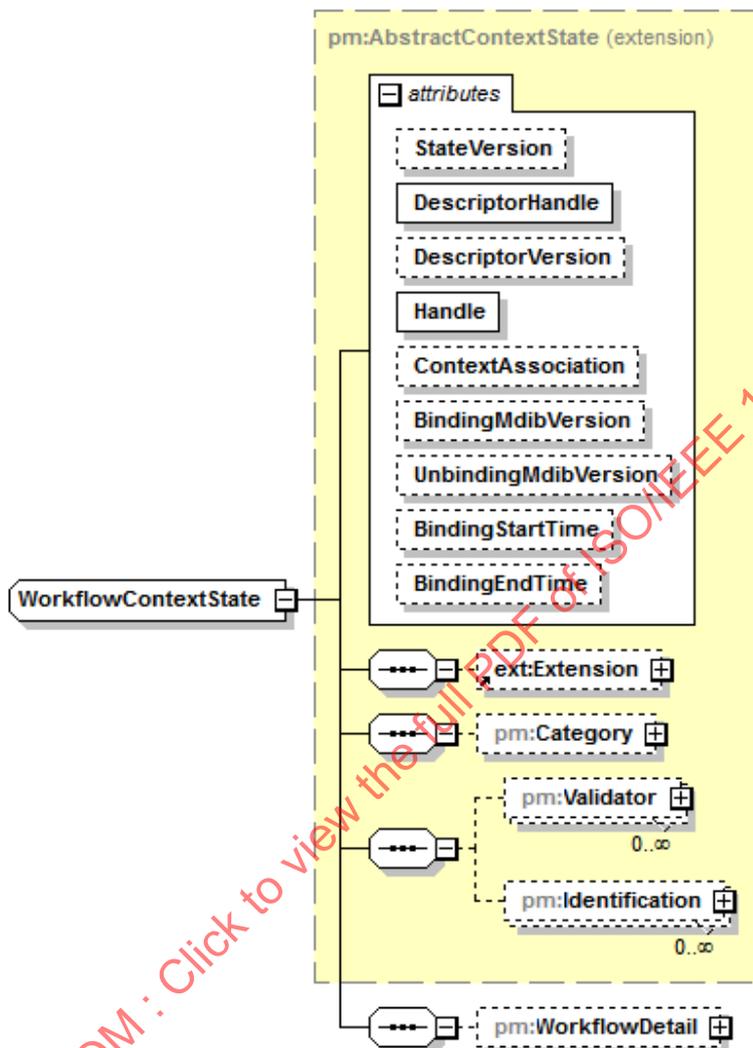
Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Context descriptor to specify that the MDS is able to provide workflow information.

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B.404 WorkflowContextState

Type: complexType



Type extension of **pm:AbstractContextState**

- Children
- tns:Extension**
 - pm:Category**
 - pm:Validator**
 - pm:Identification**
 - pm:WorkflowDetail**

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional
	<u>Handle</u>	pm:Handle	required
	<u>ContextAssociation</u>	pm:ContextAssociation	optional
	<u>BindingMdibVersion</u>	pm:ReferencedVersion	optional
	<u>UnbindingMdibVersion</u>	pm:ReferencedVersion	optional

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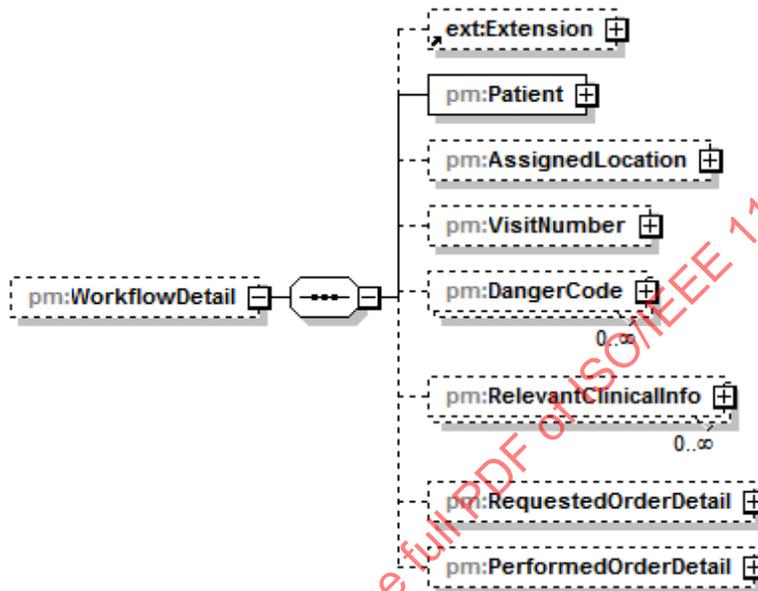
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<u>BindingStartTime</u>	pm:Timestamp	optional
<u>BindingEndTime</u>	pm:Timestamp	optional

Documentation A context state to identify a step in a clinical workflow.

B.405 WorkflowContextState/WorkflowDetail

Type: element



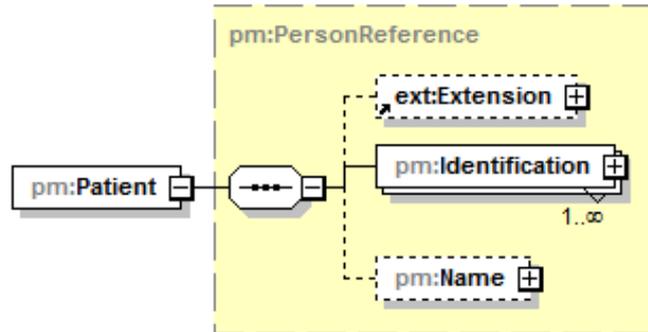
Properties Min. occurrence: 0
Max. occurrence: 1

- Children*
- tns:Extension
 - pm:Patient
 - pm:AssignedLocation
 - pm:VisitNumber
 - pm:DangerCode
 - pm:RelevantClinicalInfo
 - pm:RequestedOrderDetail
 - pm:PerformedOrderDetail

Documentation A workflow step for a clinical treatment or diagnostic procedure or monitoring procedure.

B.406 WorkflowContextState/WorkflowDetail/Patient

Type: element



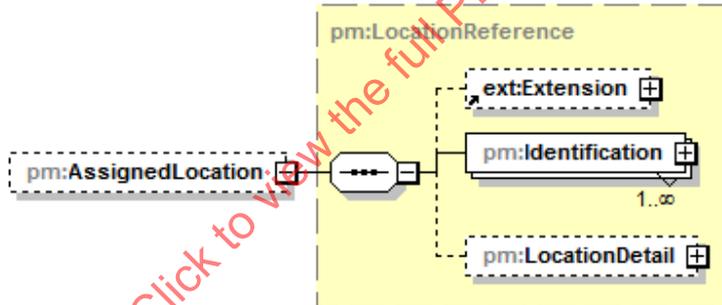
Type **pm:PersonReference**

Children **tns:Extension**
pm:Identification
pm:Name

Documentation Subject of the order.

B.407 WorkflowContextState/WorkflowDetail/AssignedLocation

Type: element



Type **pm:LocationReference**

Properties Min. occurrence: 0
Max. occurrence: 1

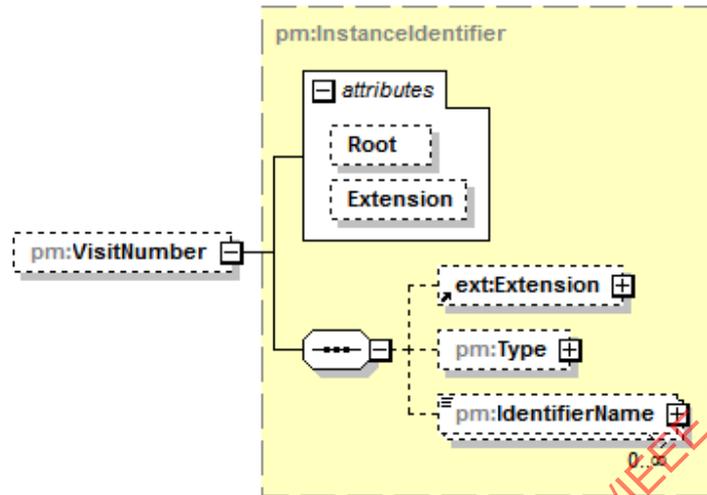
Children **tns:Extension**
pm:Identification
pm:LocationDetail

Documentation Location the order is assigned to.

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B.408 WorkflowContextState/WorkflowDetail/VisitNumber

Type: element



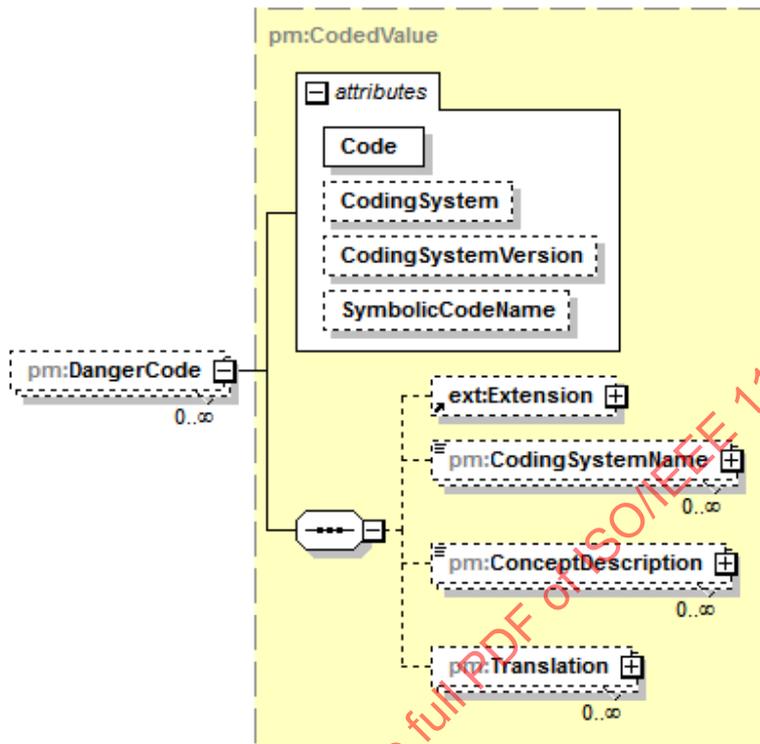
Type **pm:InstanceIdentifier**

<i>Properties</i>	Min. occurrence: 0	Max. occurrence: 1									
<i>Children</i>	<u>tns:Extension</u> <u>pm:Type</u> <u>pm:IdentifierName</u>										
<i>Attributes</i>	<table border="1"> <thead> <tr> <th>Name</th> <th>Type</th> <th>Use</th> </tr> </thead> <tbody> <tr> <td><u>Root</u></td> <td>xsd:anyURI</td> <td>optional</td> </tr> <tr> <td><u>Extension</u></td> <td>xsd:string</td> <td>optional</td> </tr> </tbody> </table>	Name	Type	Use	<u>Root</u>	xsd:anyURI	optional	<u>Extension</u>	xsd:string	optional	
Name	Type	Use									
<u>Root</u>	xsd:anyURI	optional									
<u>Extension</u>	xsd:string	optional									
<i>Documentation</i>	Reference key of inpatient stay or outpatient visit of the patient administration system.										

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B.409 WorkflowContextState/WorkflowDetail/DangerCode

Type: element



Type **pm:CodedValue**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:CodingSystemName
pm:ConceptDescription
pm:Translation

Attributes	Name	Type	Use
	<u>Code</u>	pm:CodeIdentifier	required
	<u>CodingSystem</u>	xsd:anyURI	optional
	<u>CodingSystemVersion</u>	xsd:string	optional
	<u>SymbolicCodeName</u>	pm:SymbolicCodeName	optional

Documentation Identifier and textual descriptions of patient immanent risks, e.g., infectious diseases.

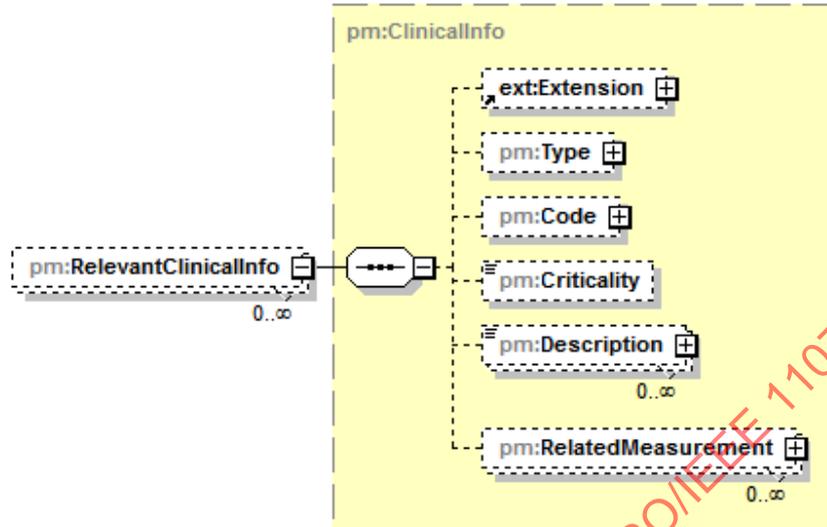
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B.410 WorkflowContextState/WorkflowDetail/RelevantClinicalInfo

Type: element



Type **pm:ClinicalInfo**

Properties Min. occurrence: 0
Max. occurrence: unbounded

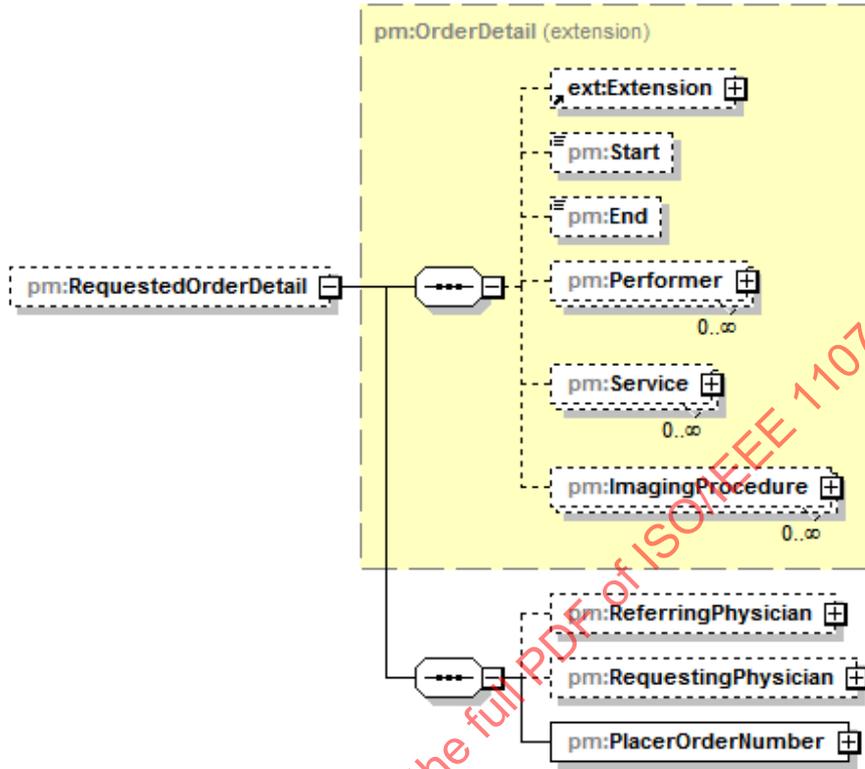
Children **tns:Extension**
pm:Type
pm:Code
pm:Criticality
pm:Description
pm:RelatedMeasurement

Documentation Clinical information that is relevant for the order.

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B.411 WorkflowContextState/WorkflowDetail/RequestedOrderDetail

Type: element



Type extension of **pm:OrderDetail**

Properties Min. occurrence: 0
Max. occurrence: 1

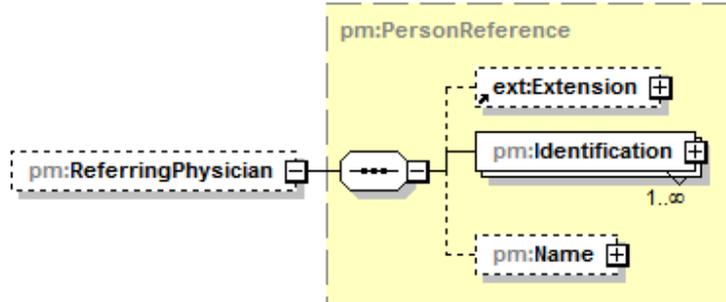
Children **tns:Extension**
pm:Start
pm:End
pm:Performer
pm:Service
pm:ImagingProcedure
pm:ReferringPhysician
pm:RequestingPhysician
pm:PlacerOrderNumber

Documentation Initial order details at the time of order release.

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B.412 WorkflowContextState/WorkflowDetail/RequestedOrderDetail/ReferringPhysician

Type: element



Type **pm:PersonReference**

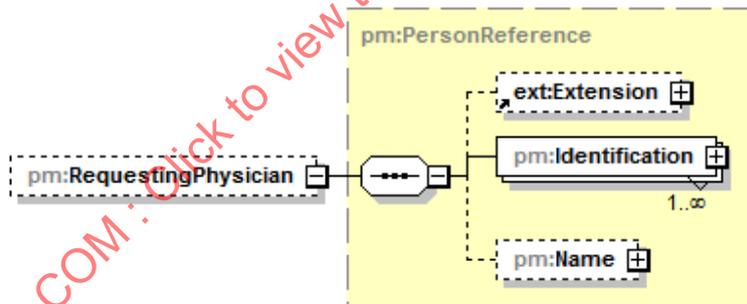
Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Identification
pm:Name

Documentation Physician as the initiator of the clinical process, e.g., the general practitioner.

B.413 WorkflowContextState/WorkflowDetail/RequestedOrderDetail/RequestingPhysician

Type: element



Type **pm:PersonReference**

Properties Min. occurrence: 0
Max. occurrence: 1

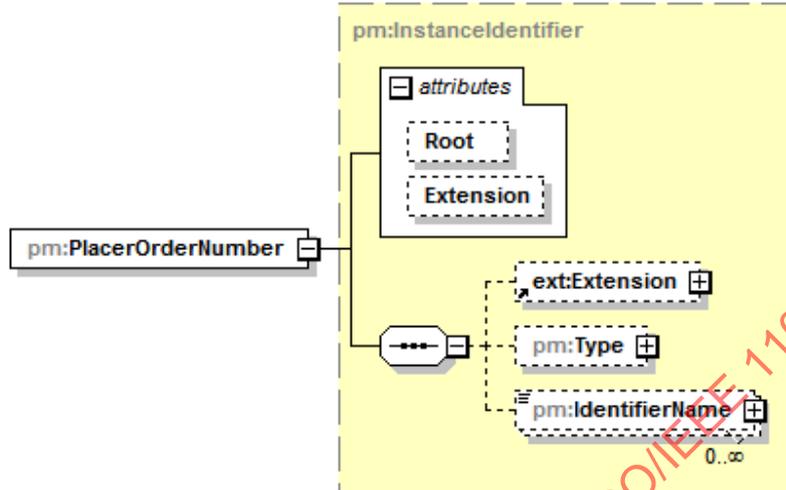
Children **tns:Extension**
pm:Identification
pm:Name

Documentation Source that initiated the order.

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**B.414 WorkflowContextState/WorkflowDetail/RequestedOrderDetail/
PlacerOrderNumber**

Type: element



Type **pm:InstanceIdentifier**

Children **tns:Extension**
pm:Type
pm:IdentifierName

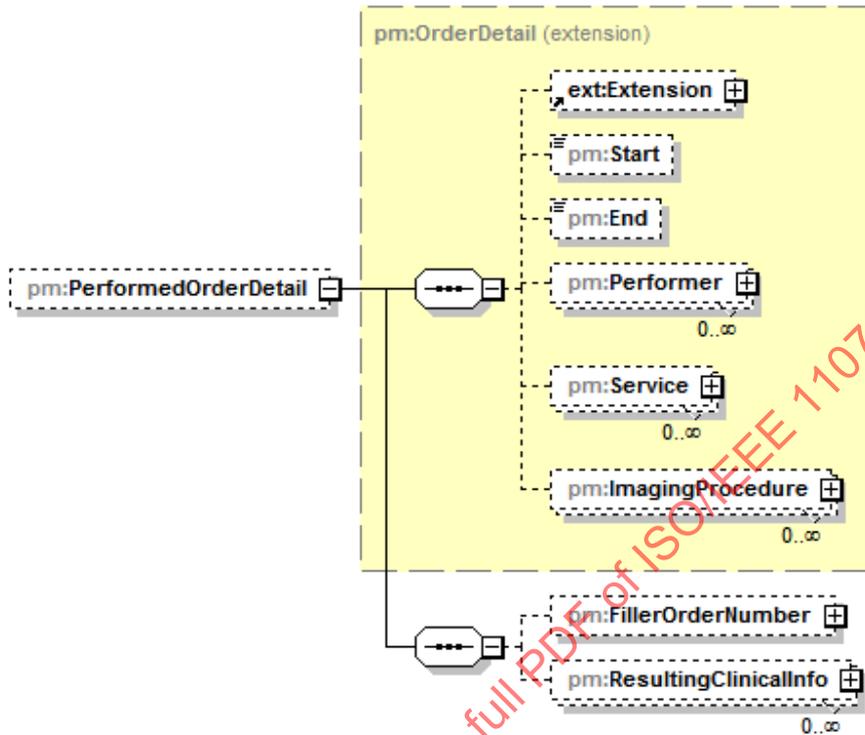
Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Reference key of the order generating system.

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B.415 WorkflowContextState/WorkflowDetail/PerformedOrderDetail

Type: element



Type extension of **pm:OrderDetail**

Properties Min. occurrence: 0
Max. occurrence: 1

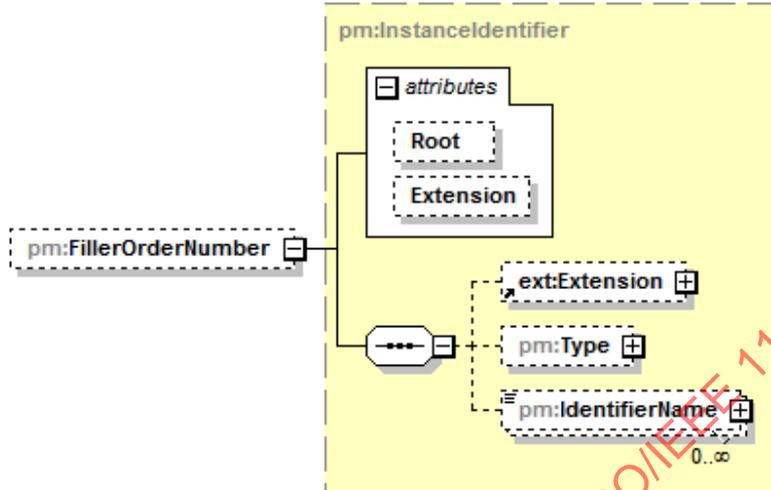
Children **tns:Extension**
pm:Start
pm:End
pm:Performer
pm:Service
pm:ImagingProcedure
pm:FillerOrderNumber
pm:ResultingClinicalInfo

Documentation Recent state of order details after order has been performed.

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**B.416 WorkflowContextState/WorkflowDetail/PerformedOrderDetail/
FillerOrderNumber**

Type: element



Type **pm:InstanceIdentifier**

Properties Min. occurrence: 0
Max. occurrence: 1

Children **tns:Extension**
pm:Type
pm:IdentifierName

Attributes	Name	Type	Use
	<u>Root</u>	xsd:anyURI	optional
	<u>Extension</u>	xsd:string	optional

Documentation Reference key of the order filler system/departmental system completing or changing order details.

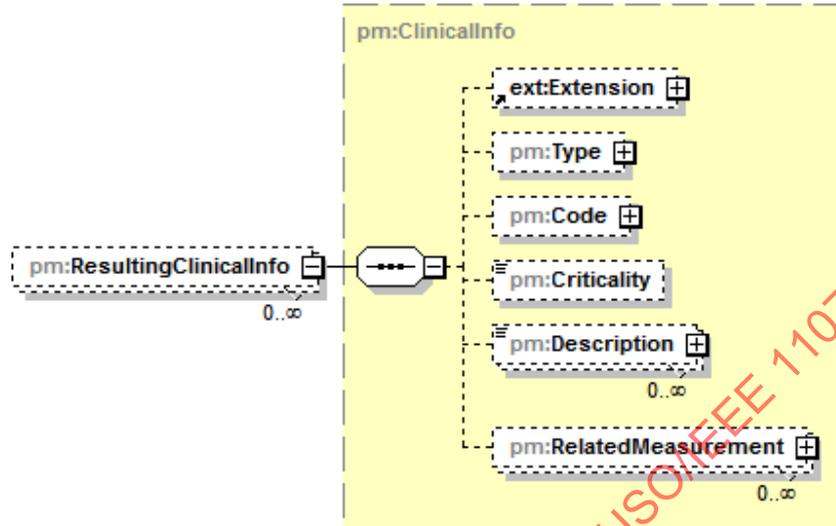
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B.417 WorkflowContextState/WorkflowDetail/PerformedOrderDetail/ResultingClinicalInfo

Type: element



Type **pm:ClinicalInfo**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
pm:Type
pm:Code
pm:Criticality
pm:Description
pm:RelatedMeasurement

Documentation Clinical information resulting from the service.

B.418 AlertActivation

Type: simpleType

Type restriction of **xsd:string**

Used by **AbstractAlertState/@ActivationState**
LimitAlertConditionState/@AutoLimitActivationState
SystemSignalActivation/@State

Constraints	Kind	Value	Documentation
	enumeration	On	The ALERT SYSTEM ELEMENT is operating.
	enumeration	Off	The ALERT SYSTEM ELEMENT is not operating.
	enumeration	Psd	Psd = Paused. The ALERT SYSTEM ELEMENT is temporarily not operating.

Documentation The activation state of any ALERT SYSTEM ELEMENT, i.e., pm:AlertSystemState, pm:AlertConditionState, pm:LimitAlertConditionState, and pm:AlertSignalState.

Special meanings MAY apply depending on the ALERT SYSTEM ELEMENT.

B.419 AlertConditionKind

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Phy	Phy = Physiological. The condition arises from a patient-related variable. Examples: "blood pressure high" or "minute volume low".
	enumeration	Tec	Tec = Technical. The condition arises from a monitored equipment-related or ALERT SYSTEM-related variable. Examples: "battery low" or "sensor unplugged".
	enumeration	Oth	Oth = Other. The condition arises from another origin, e.g., equipment-user advisory conditions like "room temperature high".

Documentation AlertConditionKind categorizes ALERT CONDITIONS by their origin.

B.420 AlertConditionMonitoredLimits

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	All	Both alert limits are monitored.
	enumeration	LoOff	LoOff = Low-Off. Low-limit violation detection is either currently turned off if the state possesses a low-limit value or is not supported at all.
	enumeration	HiOff	HiOff = Hi-Off. High-limit violation detection is either currently turned off if the state possesses a high-limit value or is not supported at all.
	enumeration	None	No alert limits are monitored.

NOTE—This flag is not equal to the activation state "Off" that pm:AlertConditionState/@ActivationState provides, although the result with regard to alert signalization is the same.

Documentation Indicates which limits of a pm:LimitAlertCondition ELEMENT are monitored to trigger ALERT SIGNALS.

B.421 AlertConditionPriority

Type: simpleType

Type restriction of **xsd:string**

Used by [AlertConditionState/@ActualPriority](#)
[AlertConditionDescriptor/@CanDeescalate](#)
[AlertConditionDescriptor/@CanEscalate](#)
[AlertConditionDescriptor/@Priority](#)

Constraints	Kind	Value	Documentation
	enumeration	Lo	Lo = Low. Awareness of the ALERT CONDITION is required.
	enumeration	Me	Me = Medium. Prompt response to remove the ALERT CONDITION is required.
	enumeration	Hi	Hi = High. Immediate response to remove the ALERT CONDITION is required.
	enumeration	None	No awareness of the ALERT CONDITION is required.

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Documentation AlertConditionPriority categorizes ALERT CONDITIONS into priorities.

AlertConditionPriority can be used to distinguish the severity of the potential or actual hazard that exists if an ALERT CONDITION is present.

NOTE—The priority is assigned through risk analysis.

B.422 AlertConditionReference

Type: simpleType

Type list of pm:HandleRef

Used by AlertSystemState/@PresentPhysiologicalAlarmConditions
AlertSystemState/@PresentTechnicalAlarmConditions

Documentation A list of HANDLE references that point to ALERT CONDITIONS.

B.423 AlertSignalManifestation

Type: simpleType

Type restriction of **xsd:string**

Used by SystemSignalActivation/@Manifestation
AlertSignalDescriptor/@Manifestation

Constraints	Kind	Value	Documentation
	enumeration	Aud	Aud = Audible. The ALERT SIGNAL manifests in an audible manner, i.e., the alert can be heard. Example: an alarm sound.
	enumeration	Vis	Vis = Visible. The ALERT SIGNAL manifests in a visible manner, i.e., the alert can be seen. Example: a red flashing light.
	enumeration	Tan	Tan = Tangible. The ALERT SIGNAL manifests in a tangible manner, i.e., the alert can be felt. Example: vibration.
	enumeration	Oth	Oth = Other. The ALERT SIGNAL manifests in a manner not further specified.

Documentation AlertSignalManifestation categorizes ALERT SIGNALS by the way they can be recognized by the alerted human, e.g., the nurse.

B.424 AlertSignalPresence

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	On	Indicates that an ALERT SIGNAL is currently generated.
	enumeration	Off	Indicates that an ALERT SIGNAL is currently not generated.
	enumeration	Latch	Latch = Latched. "Latched" indicates that an ALERT SIGNAL is currently generated even if the ALERT CONDITION is no longer present.
	enumeration	Ack	Ack = Acknowledged. "Acknowledged" indicates that an ALERT SIGNAL is currently not generated due to an acknowledgment even if the ALERT CONDITION is still present. Acknowledged signals are those, where an auditory ALERT SIGNAL that is related to a currently active ALERT CONDITION, is inactive until the ALERT CONDITION is no longer present.

Documentation Generation state of an ALERT SIGNAL.

B.425 AlertSignalPrimaryLocation

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Loc	Loc = Local. The ALERT SIGNAL is perceivable on the machine where the ALERT CONDITION has been detected.
	enumeration	Rem	Rem = Remote. The ALERT SIGNAL is perceivable on a remote machine.

Documentation AlertSignalPrimaryLocation defines where the primary ALERT SIGNAL is generated.

B.426 CalibrationState

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	No	No = Not Calibrated. Defines that a component is not calibrated.
	enumeration	Req	Req = Calibration Required. Defines that a component requires a calibration.
	enumeration	Run	Run = Running. Defines that a calibration for a component is running.
	enumeration	Cal	Cal = Calibrated. Defines that a component is calibrated.
	enumeration	Oth	Oth = Other. The calibration state is defined by other means.

Documentation Calibration state of a component.

B.427 CalibrationType

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Offset	Offset calibration.
	enumeration	Gain	Gain calibration
	enumeration	TP	Two point calibration.
	enumeration	Unspec	Unspecified calibration type.

Documentation Type of a calibration method.

B.428 CodeIdentifier

Type: simpleType

Type restriction of **xsd:string**

Used by [CodedValue/Translation/@Code](#)
[CodedValue/@Code](#)

Constraints	Kind	Value
	minLength	1

Documentation CodeIdentifier defines an arbitrary CODE identifier with a minimum length of 1 character.

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B.429 ComponentActivation

Type: simpleType

Type restriction of **xsd:string**

<i>Used by</i>	<u>AbstractDeviceComponentState/@ActivationState</u> <u>AbstractMetricState/@ActivationState</u>		
<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	<i>Documentation</i>
	enumeration	On	The component is operating.
	enumeration	NotRdy	NotRdy = Not Ready. The component is not ready to be operated and not operating, but initialization is ongoing.
	enumeration	StndBy	StndBy = Stand By. The component is ready to be operated, but not currently operating.
	enumeration	Off	The component is inactive.
	enumeration	Shtdn	Shtdn = Shutdown. The component is ceasing from being ready to be operated or operating, but not yet inactive.
	enumeration	Fail	Fail = Failure. The component has detected a failure and is not ready to be operated.
<i>Documentation</i>	Activation state of a component, i.e., any type that is derived from pm:AbstractComponentState and pm:AbstractMetricState.		

B.430 ContextAssociation

Type: simpleType

Type restriction of **xsd:string**

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	<i>Documentation</i>
	enumeration	No	No = Not Associated. There is currently no context information associated, such that there cannot be made any assumptions on the encompassing context.
	enumeration	Pre	Pre = Pre-Associated. Context information is in a pre-association state.
	enumeration	Assoc	Assoc = Associated. Context information is associated.
	enumeration	Dis	Dis = Disassociated. Context information is no longer associated.
<i>Documentation</i>	Defines an association between an arbitrary context and an MDS.		

B.431 DerivationMethod

Type: simpleType

Type restriction of **xsd:string**

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	<i>Documentation</i>
	enumeration	Auto	Auto = Automatic derivation. The METRIC value is derived by an automatic mechanism (e.g., electronically measured).
	enumeration	Man	Man = Manual derivation. The METRIC is derived manually by a clinician/human.
<i>Documentation</i>	In some circumstances, e.g., in spot-check situations or when dealing with settings, METRIC values might be entered manually. DerivationMethod provides an enumeration to designate if a METRIC is set automatically or manually.		

B.432 EntryRef

Type: simpleType

Type list of **pm:HandleRef***Documentation* A list of CONTAINMENT TREE ENTRY handle references.**B.433 GenerationMode**

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Real	Real = Real Data. A value that is generated under real conditions.
	enumeration	Test	Test = Test Data. A value that is arbitrary and is for testing purposes only.
	enumeration	Demo	Demo = Demo Data. A value that is arbitrary and is for demonstration purposes only.

Documentation Describes whether METRIC data is generated by real measurements or under unreal settings (demo or test data).**B.434 Handle**

Type: simpleType

Type restriction of **xsd:string***Used by* **AbstractDescriptor/@Handle**
AbstractMultiState/@Handle

Constraints	Kind	Value
	minLength	1

Documentation A HANDLE is used to efficiently identify an object in the MDIB.**B.435 HandleRef**

Type: simpleType

Type restriction of **xsd:string**

Used by **GetDescriptorsFromArchive/Handle**
GetStatesFromArchive/Handle
GetMdDescription/HandleRef
GetMdState/HandleRef
GetContextStates/HandleRef
GetContainmentTree/HandleRef
GetDescriptor/HandleRef
AbstractSet/OperationHandleRef
AbstractReportPart/SourceMds
AlertConditionDescriptor/Source
AlertConditionReference
EntryRef
OperationRef
AlertSignalDescriptor/@ConditionSignaled
AbstractState/@DescriptorHandle
ContainmentTreeInfo/@HandleRef
ObservedValueStream/Value/@Metric
OperationInvokedReport/ReportPart/@OperationHandleRef
OperationInvokedReport/ReportPart/@OperationTarget
AbstractOperationDescriptor/@OperationTarget

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**DescriptionModificationReport/ReportPart/@ParentDescriptor
ContainmentTreeInfo/@ParentHandleRef**

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>
	minLength	1

Documentation HandleRef describes a HANDLE reference. It is used to form logical connections to ELEMENTs that possess a pm:Handle ATTRIBUTE.

Example: a METRIC state is associated with a METRIC descriptor (pm:AbstractDescriptor/@Handle) by means of an ATTRIBUTE of type pm:HandleRef (see pm:AbstractState/@DescriptorHandle).

B.436 LocalizedTextContent

Type: simpleType

Type restriction of **xsd:string**

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>
	minLength	0

Documentation Content restriction for pm:LocalizedText ELEMENTs.

B.437 LocalizedTextRef

Type: simpleType

Type restriction of **xsd:string**

<i>Used by</i>	<u>GetLocalizedText/Ref LocalizedText/@Ref</u>
----------------	---

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>
	minLength	1

Documentation LocalizedTextRef defines a reference to a localized text.

B.438 LocalizedTextWidth

Type: simpleType

Type restriction of **xsd:string**

<i>Used by</i>	<u>GetLocalizedText/TextWidth LocalizedText/@TextWidth</u>
----------------	---

<i>Constraints</i>	<i>Kind</i>	<i>Value</i>	<i>Documentation</i>
	enumeration	xs	A line has 4 or less fullwidth characters.
	enumeration	s	A line has 8 or less fullwidth characters.
	enumeration	m	A line has 12 or less fullwidth characters.
	enumeration	l	A line has 16 or less fullwidth characters.
	enumeration	xl	A line has 20 or less fullwidth characters.
	enumeration	xxl	A line has 21 or more fullwidth characters.

Documentation LocalizedTextWidth indicates the width of a localized text based on the number of fullwidth characters in order to allow a SERVICE CONSUMER an effective filtering and querying for translations.

In the following, a line is defined as the content of the text from either the beginning of the text or the beginning of a previous line until the next occurrence of period mark, question mark, exclamation mark, or paragraph.

B.439 MdsOperatingMode

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Nml	Nml = Normal. The POC MEDICAL DEVICE operates in a mode that supports the fulfillment of its clinical functions.
	enumeration	Dmo	Dmo = Demo. The POC MEDICAL DEVICE operates in a mode that is intended for demonstration purposes only. Arbitrary values are generated.
	enumeration	Srv	Srv = Service. The POC MEDICAL DEVICE operates in a mode that is intended for services purposes only.
	enumeration	Mtn	MTN = Maintenance. The POC MEDICAL DEVICE operates in a mode that is intended for maintenance purposes only.

Documentation MdsOperatingMode defines the interpretation constraints of the data that is provided by an MDS.

B.440 MeasurementValidity

Type: simpleType

Type restriction of **xsd:string**

Used by **AbstractMetricValue/MetricQuality/@Validity**
ClinicalInfo/RelatedMeasurement/@Validity

Constraints	Kind	Value	Documentation
	enumeration	Vld	Vld = Valid. A measured value that is correct from the perspective of the measuring device.
	enumeration	Vldated	Vldated = Validated Data. A measured value where the validity has been confirmed by an external actor, e.g., an operator, other than the POC MEDICAL DEVICE.
	enumeration	Ong	Ong = Measurement Ongoing. Indicates that a new measurement is just being taken and therefore measured value is not available.
	enumeration	Qst	Qst = Questionable. A measured value where correctness can not be guaranteed.
	enumeration	Calib	Calib = Calibration Ongoing. A measured value where correctness can not be guaranteed, because a calibration is currently going on.
	enumeration	Inv	Inv = Invalid. A measured value that is incorrect from the perspective of the measuring device.
	enumeration	Oflw	Oflw = Overflow. A measured value where correctness cannot be guaranteed as it is above all defined technical ranges.
	enumeration	Uflw	Uflw = Underflow. A measured value where correctness cannot be guaranteed as it is below all defined technical ranges.
	enumeration	NA	NA = Not Available. No value can be derived, e.g., if a sensor is not placed correctly.

Documentation Level of validity of a measured value.

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B.441 MetricAvailability

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Intr	Intr = Intermittent. Stopping or ceasing for a time; alternately ceasing and beginning again. Example: noninvasive blood pressure measurement.
	enumeration	Cont	Cont = Continuous. Without break, cessation, or interruption; without intervening time.

Documentation Availability of the means that derives the METRIC state.

B.442 MetricCategory

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Unspec	Unspec = Unspecified. None of the categories in MetricCategory is valid for the METRIC.
	enumeration	Msrmt	Msrmt = Measurement. The METRIC has been derived by measurement.
	enumeration	Clc	Clc = Calculation. The METRIC has been derived by calculation only.
	enumeration	Set	Set = Setting. The METRIC has a value that is adjustable by some (local or remote) control means.
	enumeration	Preset	Preset = Presetting. The METRIC has a value that is adjustable by some (local or remote) control means. Once the value is adjusted, it remains a Preset until committed, at which point it becomes a setting. Related settings MAY be defined by using pm:AbstractMetricDescriptor/pm:Relation.
	enumeration	Rcmm	Rcmm = Recommendation. The METRIC is a proposal for a setting or presetting. The related setting or presetting MAY be defined by using pm:AbstractMetricDescriptor/pm:Relation.

Documentation The METRIC category makes it possible to distinguish between different manifestations of a METRIC like measurements, settings or recommendations.

Example: if the respiratory rate can be adjusted and the ventilator is smart and provides a recommendation, there are likely be at least three METRICs with a type of "Respiratory Rate":

- 1 METRIC with MetricCategory set to Measurement. This METRIC is the actual measured value.
- 1 METRIC with MetricCategory set to Setting. This METRIC is the adjustable value.
- 1 METRIC with MetricCategory set to Recommendation. This METRIC is the recommended value derived from some smart algorithm.

B.443 OperatingMode

Type: simpleType

Type restriction of **xsd:string**

Used by ScoState/OperationGroup/@OperatingMode
AbstractOperationState/@OperatingMode

Constraints	Kind	Value	Documentation
	enumeration	Dis	Dis = Disabled. Object is disabled.
	enumeration	En	En = Enabled. Object is enabled
	enumeration	NA	NA = Not Available. Object is not available for interaction. This means that it is defined but currently not in a mode so that it can be interacted with.

Documentation Mode of an operation state.

B.444 OperationRef

Type: simpleType

Type list of pm:HandleRef

Used by ScoState/@InvocationRequested
ScoState/@InvocationRequired
ScoState/OperationGroup/@Operations

Documentation A list of operation handle references.

B.445 PatientType

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Unspec	Unspec = Unspecified. Unspecified type.
	enumeration	Ad	Ad = Adult. Indicates an adult patient.
	enumeration	Ado	Ado = Adolescent. Indicates an adolescent patient with approximate age range of 12 years to 21 years.
	enumeration	Ped	Ped = Pediatric. Indicates a pediatric patient with approximate age range of 2 years to 12 years.
	enumeration	Inf	Inf = Infant. Indicates an infant patient with approximate age range of 1 month to 2 years.
	enumeration	Neo	Neo = Neonatal. Indicates a neonatal patient with approximate age range of birth to 1 month.
	enumeration	Oth	Oth = Other. The patient type is designated by some other means.

Documentation Type of a patient.

B.446 QualityIndicator

Type: simpleType

Type restriction of **xsd:decimal**

Constraints	Kind	Value	Documentation
	minInclusive	0	The minimal value that indicates that the signal has the worst quality.
	maxInclusive	1	The maximal value that indicates that the signal has the best quality.

Documentation Indicates the quality of a determined value, where 0 means lowest quality and 1 means high quality with regard to the validity level.

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B.447 RealTimeValueType

Type: simpleType

Type list of **xsd:decimal**

Documentation Defines the real-time sample array value type comprising a whitespace separated list of decimal numbers.

B.448 ReferencedVersion

Type: simpleType

Type **pm:VersionCounter**

Used by [GetLocalizedText/Version](#)
[AbstractContextState/@BindingMdibVersion](#)
[AbstractState/@DescriptorVersion](#)
[VersionFrame/@End](#)
[VersionFrame/@Start](#)
[AbstractContextState/@UnbindingMdibVersion](#)
[LocalizedText/@Version](#)

Documentation In contrast to pm:VersionCounter, ReferencedVersion does not represent a version of an MDIB object, but a reference to a particular version of an MDIB object.

B.449 SafetyClassification

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Inf	Inf = Informational. The descriptor and the related state information are intended to be used for information purposes only. They are not intended to be used in clinical functions.
	enumeration	MedA	MedA = Medical Class A. The descriptor and related state information are intended to be used in clinical functions, specifically for general display in order to support patient and device monitoring. The displayed data is not intended to be used as sole source for diagnostic or therapeutic decisions. Deviations from this intended use are in the sole responsibility of the SERVICE CONSUMER.
	enumeration	MedB	MedB = Medical Class B. The descriptor and related state information are intended to be used in clinical functions. The manufacturer has specified and considered a specific intended use for the data, which could result in nonserious injury. Deviations from this intended use are in the sole responsibility of the SERVICE CONSUMER.
	enumeration	MedC	MedC = Medical Class C. The descriptor and related state information are intended to be used in clinical functions. The manufacturer has specified and considered a specific intended use for the data, which could result in serious injury. Deviations from this intended use are in the sole responsibility of the SERVICE CONSUMER.

Documentation SafetyClassification allows POC MEDICAL DEVICE manufacturers to limit their responsibility for the provided objects that allow informational use or use in clinical functions. It reflects the quality of the respective data from the risk management perspective of the data provider.

Enumeration values prefixed with "Med" indicate that the manufacturer has considered a clinical function related to the object in its development process, particularly the risk management, software development, usability, and verification process.

B.450 Sex

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value	Documentation
	enumeration	Unspec	Unspec = Unspecified. Sex is not designated.
	enumeration	M	M = Male. Indicates a male patient.
	enumeration	F	F = Female. Indicates a female patient.
	enumeration	Unkn	Unkn = Unknown. Indicates that the sex is unknown for different reasons.

Documentation Sex of a human.

"Sex" refers to the biological and physiological characteristics that define men and women, while "Gender" refers to the socially constructed roles, behaviors, activities, and attributes that a given society considers appropriate for men and women. See <http://www.who.int/gender/whatisgender/en/index.html>.

NOTE—ISO/IEC 5218:2004 defines four CODEs that represent human sexes.

B.451 SymbolicCodeName

Type: simpleType

Type restriction of **xsd:string**

Constraints	Kind	Value
	minLength	1

Documentation SymbolicCodeName is a symbolic, programmatic form of a pm:CodeIdentifier term.

NOTE—SymbolicCodeName is the equivalent of the Reference ID attribute that is defined in IEEE 11073-10101.

B.452 Timestamp

Type: simpleType

Type **xsd:unsignedLong**

Used by [AbstractContextState/@BindingEndTime](#)
[AbstractContextState/@BindingStartTime](#)
[ClockState/@DateAndTime](#)
[AlertConditionState/@DeterminationTime](#)
[AbstractMetricValue/@DeterminationTime](#)
[TimeFrame/@End](#)
[AlertSystemState/@LastSelfCheck](#)
[ClockState/@LastSet](#)
[TimeFrame/@Start](#)
[AbstractMetricValue/@StartTime](#)
[AbstractMetricValue/@StopTime](#)
[CalibrationInfo/@Time](#)

Documentation An unsigned 64-bit integer value that represents a timestamp.

R5001: A timestamp SHALL count the milliseconds between the current time and midnight, January 1, 1970 UTC without leap seconds.

R5002: Timestamps are an optional feature of the MDIB. If anywhere in the MDIB a timestamp is used, the SERVICE PROVIDER SHALL provide a pm:ClockDescriptor ELEMENT.

NOTE 1—Typically all systems assume that a day has 86400 seconds.

NOTE 2—While the unit of time of pm:Timestamp is a millisecond, the granularity of the value depends on the hardware/software system and might be larger (e.g., tens of milliseconds).

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B.453 TimeZone

Type: simpleType

Type **xsd:string***Documentation* TimeZone describes the time zone and DST setting of a clock in POSIX format (ISO/IEC/IEEE 9945).

Example: CST6CDT,M3.2.0/2:00:00,M11.1.0/2:00:00, which would effect a change to daylight saving time at 2:00 AM on the second Sunday in March and change back at 2:00 AM on the first Sunday in November, and keep 6 hours time offset from GMT every year.

B.454 VersionCounter

Type: simpleType

Type **xsd:unsignedLong**

Used by [ReferencedVersion](#)
[MdDescription/@DescriptionVersion](#)
[AbstractDescriptor/@DescriptorVersion](#)
[MdibVersionGroup/@MdibVersion](#)
[ObservedValueStream/Value/@StateVersion](#)
[MdState/@StateVersion](#)
[AbstractState/@StateVersion](#)

Documentation A version counter to provide versionized MDIB objects. The initial value of a version counter SHALL be "0".**R5003: VersionCounter values SHALL never be decremented.****B.455 ContainmentTreeInfo**

Type: attributeGroup

Used by [ContainmentTree](#)
[ContainmentTreeEntry](#)

Attributes	Name	Type	Use
	HandleRef	pm:HandleRef	optional
	ParentHandleRef	pm:HandleRef	optional
	EntryType	xsd:QName	optional
	ChildrenCount	xsd:int	optional

Documentation ContainmentTreeInfo summarizes ATTRIBUTES related to a CONTAINMENT TREE entry.**B.456 ContainmentTreeInfo/@HandleRef**

Type: attribute

Type **pm:HandleRef**

Constraints	Kind	Value
	minLength	1

Documentation Handle reference to the descriptor that the CONTAINMENT TREE entry represents.

B.457 ContainmentTreeInfo/@ParentHandleRef

Type: attribute

Type **pm:HandleRef**

Constraints	Kind	Value
	minLength	1

Documentation Handle reference to the parent descriptor of the descriptor that this CONTAINMENT TREE entry represents.

B.458 ContainmentTreeInfo/@EntryType

Type: attribute

Type **xsd:QName**

Documentation Qualified name of the descriptor that the CONTAINMENT TREE entry represents.

B.459 ContainmentTreeInfo/@ChildrenCount

Type: attribute

Type **xsd:int**

Documentation Number of child ELEMENTs that the CONTAINMENT TREE entry possesses.

B.460 MdibVersionGroup

Type: attributeGroup

Used by **AbstractGetResponse**
AbstractReport
AbstractSetResponse
Mdib

Attributes	Name	Type	Use
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation MdibVersionGroup is a triple populated with a pm:VersionCounter, an instance id (xsd:unsignedLong) and a sequence id (xsd:anyURI).

Semantics of instance and sequence identifiers relate to WS-Discovery [B3]. In contrast to WS-Discovery, in which the instance id is mandatory and the sequence id is optional, this standard defines the sequence id to be REQUIRED and the instance id to be OPTIONAL.

B.461 MdibVersionGroup/@MdibVersion

Type: attribute

Type **pm:VersionCounter**

Documentation The unique change version number of the MDIB. The implied value of the initial version SHALL be "0".

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B.462 MdibVersionGroup/@Sequenceld

Type: attribute

Type xsd:anyURI*Documentation* Sequenceld identifies a sequence within the context of ./@Instanceld.**R5029: Sequenceld SHALL be compared per RFC 3986 Section 6.2.1 Simple String Comparison [RFC3986].****B.463 MdibVersionGroup/@Instanceld**

Type: attribute

Type xsd:unsignedLong*Documentation* Value that indicates an instantiation counter.**R5004: If Instanceld is used, it SHALL be incremented by a positive value (≥ 1), when the Sequenceld has changed.**

NOTE—This occurs each time the POC MEDICAL DEVICE has gone down, lost state, and came back up again.

R5005: Instanceld SHOULD NOT be incremented otherwise than defined in R5004.

NOTE 1—Means to set this value include, but are not limited to:

- A counter that is incremented on each cold boot
- The boot time of the POC MEDICAL DEVICE, expressed as seconds elapsed since midnight January 1, 1970

NOTE 2—The MDIB version's instance id is different to the pm:Instanceldidentifier data type.

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Annex C

(normative)

Message Model

Elements

[Activate](#)
[ActivateResponse](#)
[DescriptionModificationReport](#)
[EpisodicAlertReport](#)
[EpisodicComponentReport](#)
[EpisodicContextReport](#)
[EpisodicMetricReport](#)
[EpisodicOperationalStateReport](#)
[GetContainmentTree](#)
[GetContainmentTreeResponse](#)
[GetContextStates](#)
[GetContextStatesByFilter](#)
[GetContextStatesByFilterResponse](#)
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[GetContextStatesResponse](#)
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[GetDescriptorResponse](#)
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[GetDescriptorsFromArchiveResponse](#)
[GetLocalizedText](#)
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[GetMdDescription](#)
[GetMdDescriptionResponse](#)
[GetMdib](#)
[GetMdibResponse](#)
[GetMdState](#)
[GetMdStateResponse](#)
[GetStatesFromArchive](#)
[GetStatesFromArchiveResponse](#)
[GetSupportedLanguages](#)
[GetSupportedLanguagesResponse](#)
[ObservedValueStream](#)
[OperationInvokedReport](#)
[PeriodicAlertReport](#)
[PeriodicComponentReport](#)
[PeriodicContextReport](#)
[PeriodicMetricReport](#)
[PeriodicOperationalStateReport](#)
[Retrievability](#)
[SetAlertState](#)
[SetAlertStateResponse](#)
[SetComponentState](#)
[SetComponentStateResponse](#)
[SetContextState](#)
[SetContextStateResponse](#)
[SetMetricState](#)
[SetMetricStateResponse](#)
[SetString](#)
[SetStringResponse](#)
[SetValue](#)
[SetValueResponse](#)
[SystemErrorReport](#)
[WaveformStream](#)

Complex types

[AbstractAlertReport](#)
[AbstractComponentReport](#)
[AbstractContextReport](#)
[AbstractGet](#)
[AbstractGetResponse](#)
[AbstractMetricReport](#)
[AbstractOperationalStateReport](#)
[AbstractReport](#)
[AbstractReportPart](#)
[AbstractSet](#)
[AbstractSetResponse](#)
[InvocationInfo](#)
[RetrievabilityInfo](#)
[TimeFrame](#)
[VersionFrame](#)

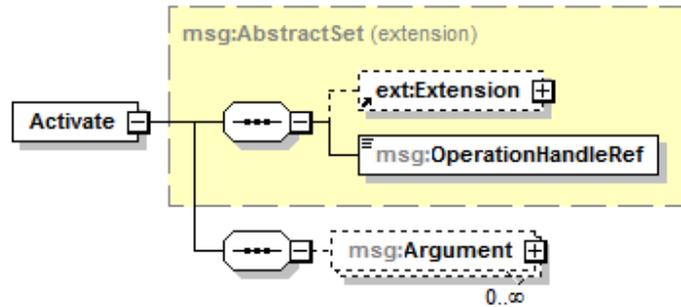
Simple types

[DescriptionModificationType](#)
[InvocationError](#)
[InvocationState](#)
[RetrievabilityMethod](#)
[TransactionId](#)



C.1 Activate

Type: element



Type extension of **msg:AbstractSet**

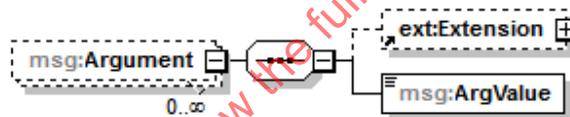
Children **tns:Extension**
msg:OperationHandleRef
msg:Argument

Documentation Activate is the request to an msg:ActivateResponse MESSAGE. It allows invocation of a predefined job, e.g., to silence alarms.

The corresponding operation description is defined by pm:ActivateOperationDescriptor.

C.2 Activate/Argument

Type: element



Properties Min. occurrence: 0
Max. occurrence: unbounded

Children **tns:Extension**
msg:ArgValue

Documentation List of arguments that can be used for invocation. The type list of the arguments can be obtained by the operation description in the MDIB. Furthermore, the ordering of Argument SHALL match the ordering in pm:ActivateOperationDescriptor/pm:Argument.

C.3 Activate/Argument/ArgValue

Type: element

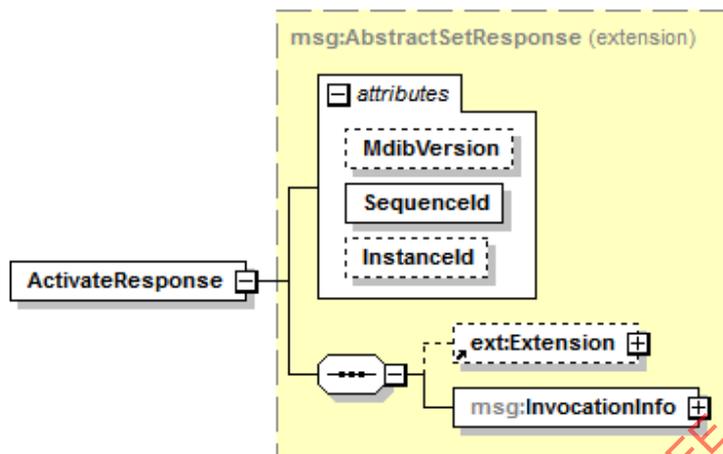


Type **xsd:anySimpleType**

Documentation Argument value.

C.4 ActivateResponse

Type: element



Type extension of **msg:AbstractSetResponse**

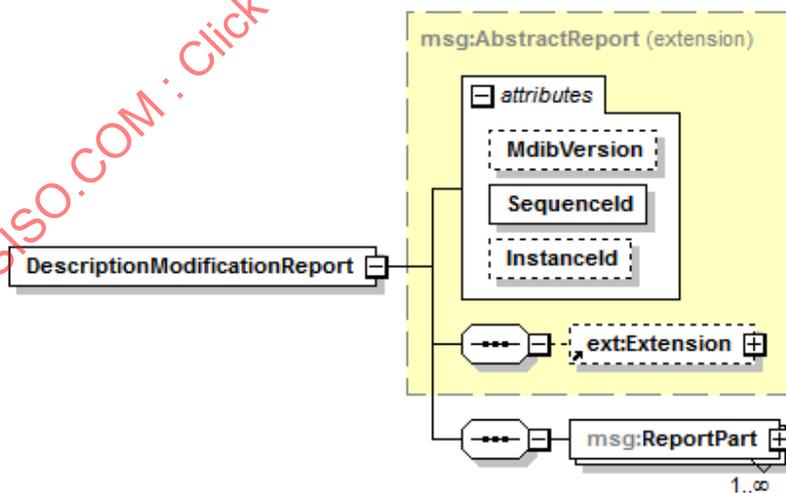
Children **tns:Extension**
msg:InvocationInfo

Attributes	Name	Type	Use
	<i>MdibVersion</i>	pm:VersionCounter	optional
	<i>SequenceId</i>	xsd:anyURI	required
	<i>InstanceId</i>	xsd:unsignedLong	optional

Documentation ActivateResponse is the response to an msg:Activate MESSAGE.

C.5 DescriptionModificationReport

Type: element



Type extension of **msg:AbstractReport**

Children **tns:Extension**
msg:ReportPart

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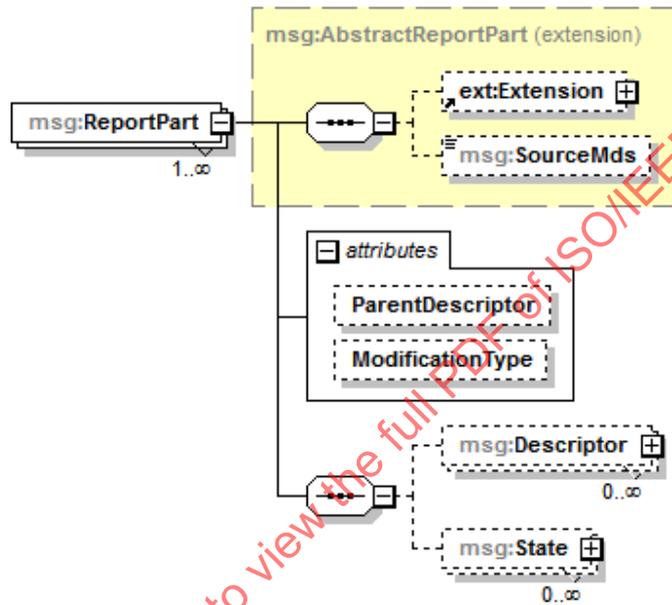
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Attributes	Name	Type	Use
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation DescriptionModificationReport is an msg:AbstractReport that is delivered episodically. It is sent if at least one pm:AbstractDescriptor has changed. It SHALL contain only pm:AbstractDescriptor instances where at least one child ELEMENT or ATTRIBUTE have changed, i.e., inserted, updated, or deleted.

C.6 DescriptionModificationReport/ReportPart

Type: element



Type extension of **msg:AbstractReportPart**

Properties	Min. occurrence:	Max. occurrence:
	1	unbounded

- Children
- tns:Extension**
 - msg:SourceMds**
 - msg:Descriptor**
 - msg:State**

Attributes	Name	Type	Use
	<u>ParentDescriptor</u>	pm:HandleRef	optional
	<u>ModificationType</u>	msg:DescriptionModificationType	optional

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C.7 DescriptionModificationReport/ReportPart/@ParentDescriptor

Type: attribute

Type **pm:HandleRef**

Constraints	Kind	Value
	minLength	1

Documentation The HANDLE reference of the parent descriptor. The HANDLE reference SHALL be empty if an pm:MdsDescriptor is inserted, updated or deleted.

C.8 DescriptionModificationReport/ReportPart/@ModificationType

Type: attribute

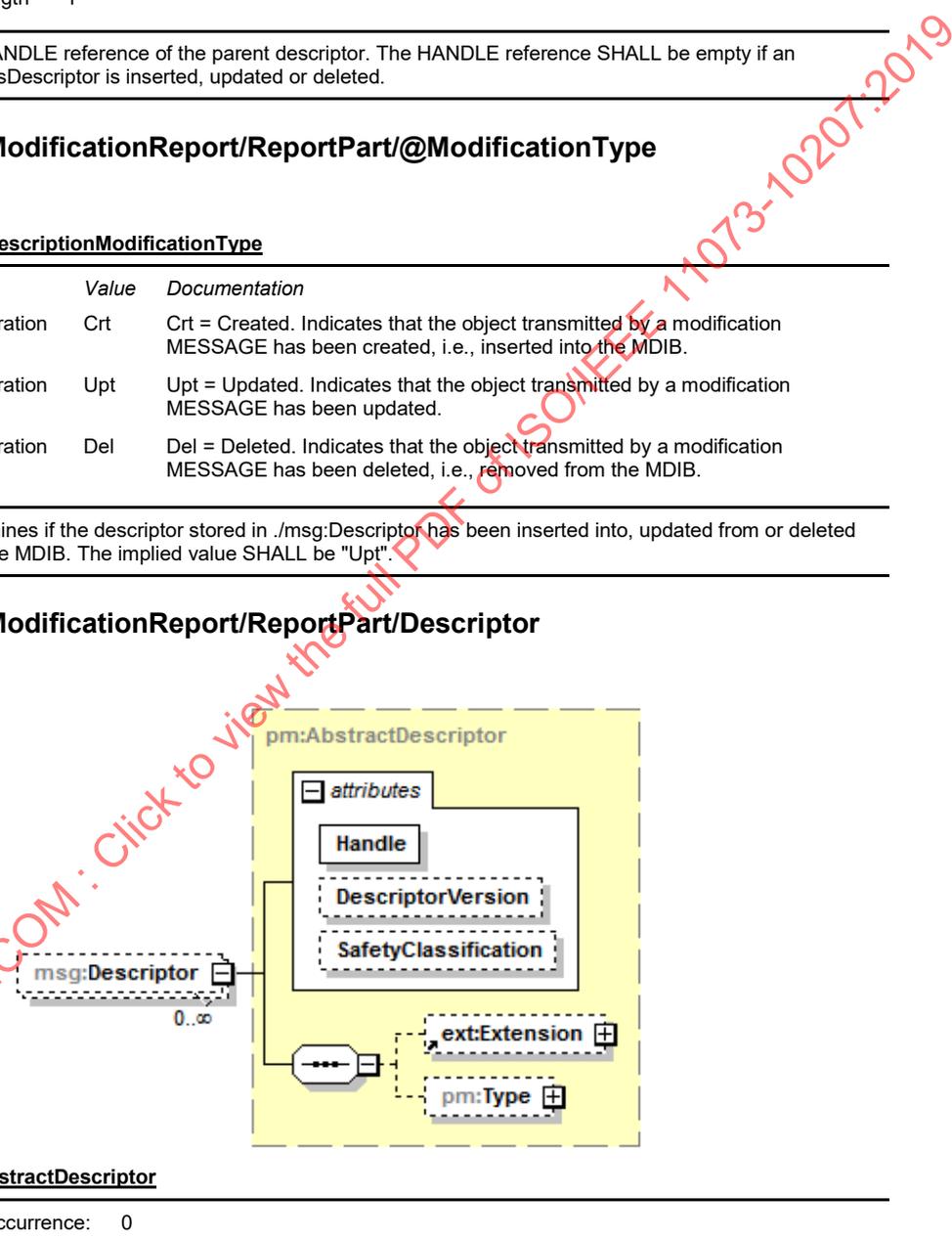
Type **msg:DescriptionModificationType**

Constraints	Kind	Value	Documentation
	enumeration	Crt	Crt = Created. Indicates that the object transmitted by a modification MESSAGE has been created, i.e., inserted into the MDIB.
	enumeration	Upt	Upt = Updated. Indicates that the object transmitted by a modification MESSAGE has been updated.
	enumeration	Del	Del = Deleted. Indicates that the object transmitted by a modification MESSAGE has been deleted, i.e., removed from the MDIB.

Documentation Determines if the descriptor stored in .msg:Descriptor has been inserted into, updated from or deleted from the MDIB. The implied value SHALL be "Upt".

C.9 DescriptionModificationReport/ReportPart/Descriptor

Type: element



Type **pm:AbstractDescriptor**

Properties	Min. occurrence:	0
	Max. occurrence:	unbounded

Children	tns:Extension
	pm:Type

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Attributes	Name	Type	Use
	<u>Handle</u>	pm:Handle	required
	<u>DescriptorVersion</u>	pm:VersionCounter	optional
	<u>SafetyClassification</u>	pm:SafetyClassification	optional

Documentation Descriptor that was inserted into, updated from or deleted from the MDIB. The mode is stored in the `./@ModificationType` ATTRIBUTE.

R5024: Descriptors in this list SHALL not include nested descriptors.

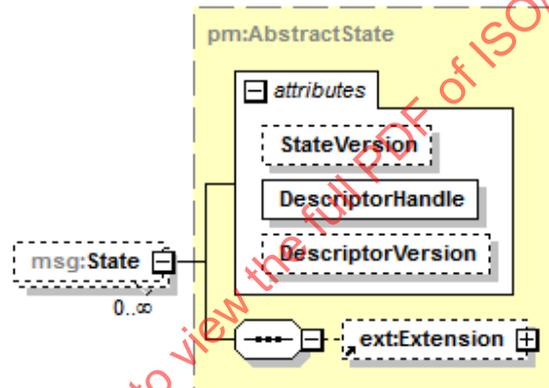
NOTE—If nested descriptors are also modified, then they can be included as children of the report part.

R5025: Updated descriptors SHALL be ordered in the way that parent descriptors appear before child descriptors.

R5046: If a parent descriptor is deleted, then all child descriptors of that parent SHALL be communicated as deleted in advance.

C.10 DescriptionModificationReport/ReportPart/State

Type: element



Type **pm:AbstractState**

Properties Min. occurrence: 0
Max. occurrence: unbounded

Attributes	Name	Type	Use
	<u>StateVersion</u>	pm:VersionCounter	optional
	<u>DescriptorHandle</u>	pm:HandleRef	required
	<u>DescriptorVersion</u>	pm:ReferencedVersion	optional

Documentation The descriptor's corresponding state(s).

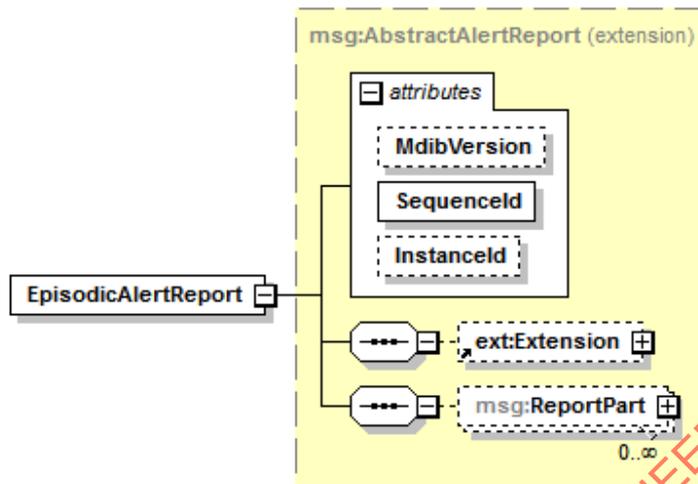
R5051: If `./@ModificationType` is "Crt", then the descriptor version referenced by State SHALL match the descriptor given in `./Descriptor`.

R5052: If `./@ModificationType` is "Upt", then the descriptor version referenced by State SHALL match the descriptor given in `./Descriptor`.

R5053: If `./@ModificationType` is "Del", then State SHALL be omitted from the MESSAGE.

C.11 EpisodicAlertReport

Type: element



Type extension of **msg:AbstractAlertReport**

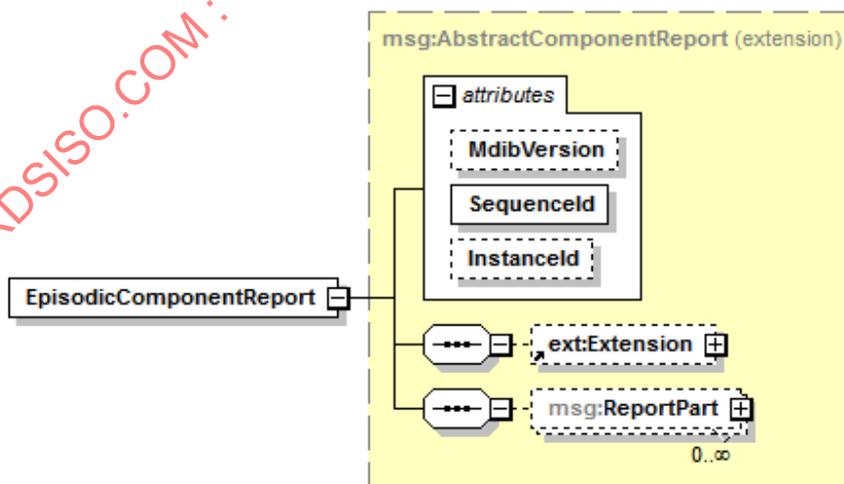
Children **tns:Extension**
msg:ReportPart

Attributes	Name	Type	Use
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation EpisodicAlertReport is an msg:AbstractAlertReport that is delivered episodically. It is sent if at least one pm:AbstractAlertState has changed. It SHALL contain only pm:AbstractAlertState instances where at least one child ELEMENT or ATTRIBUTE have changed.

C.12 EpisodicComponentReport

Type: element



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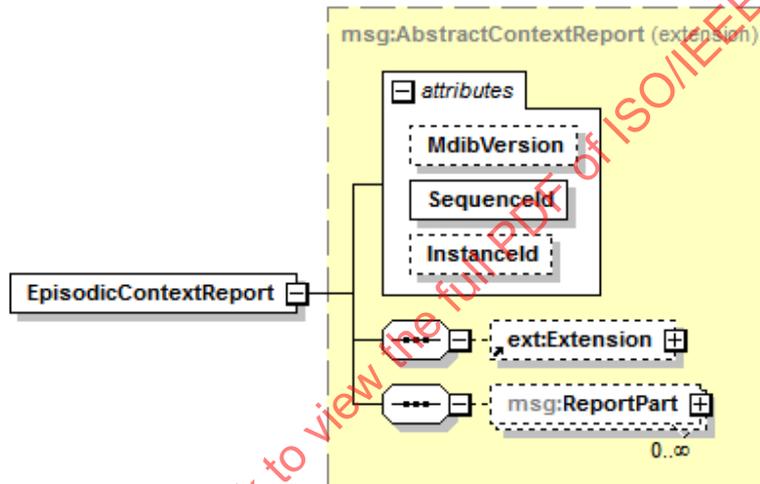
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Type extension of **msg:AbstractComponentReport**

Children	<u>tns:Extension</u> <u>msg:ReportPart</u>		
Attributes	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional
Documentation	EpisodicComponentReport is an msg:AbstractComponentReport that is delivered episodically. It is sent if at least one pm:AbstractComponentState has changed. It SHALL contain only pm:AbstractComponentState instances where at least one child ELEMENT or ATTRIBUTE have changed.		

C.13 EpisodicContextReport

Type: element

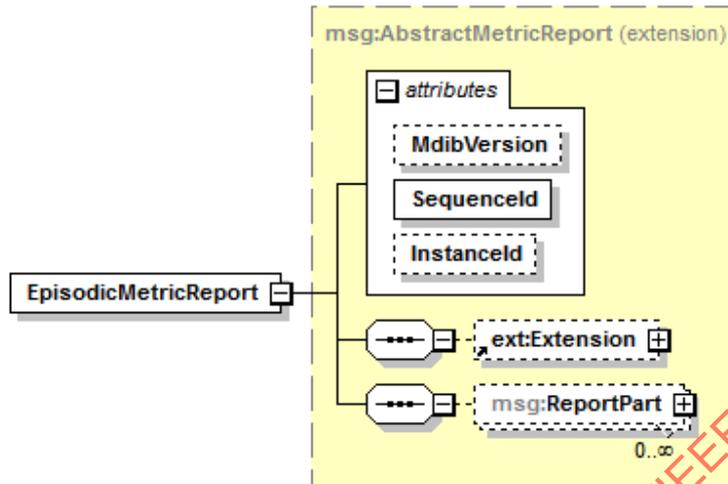


Type extension of **msg:AbstractContextReport**

Children	<u>tns:Extension</u> <u>msg:ReportPart</u>		
Attributes	<i>Name</i>	<i>Type</i>	<i>Use</i>
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional
Documentation	EpisodicContextReport is an msg:AbstractContextReport that is delivered episodically. It is sent if at least one pm:AbstractContextState has changed. It SHALL contain only pm:AbstractContextState instances where at least one child ELEMENT or ATTRIBUTE have changed.		

C.14 EpisodicMetricReport

Type: element



Type extension of **msg:AbstractMetricReport**

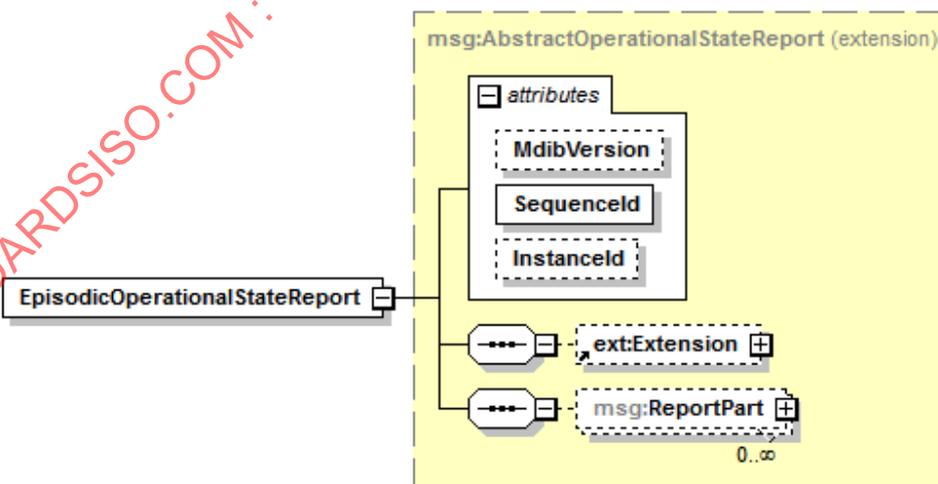
Children **tns:Extension**
msg:ReportPart

Attributes	Name	Type	Use
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation EpisodicMetricReport is an msg::AbstractMetricReport that is delivered episodically. It is sent if at least one pm:AbstractMetricState has changed. It SHALL contain only pm:AbstractMetricState instances where at least one child ELEMENT or ATTRIBUTE have changed.

C.15 EpisodicOperationalStateReport

Type: element



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Type extension of **msg:AbstractOperationalStateReport**

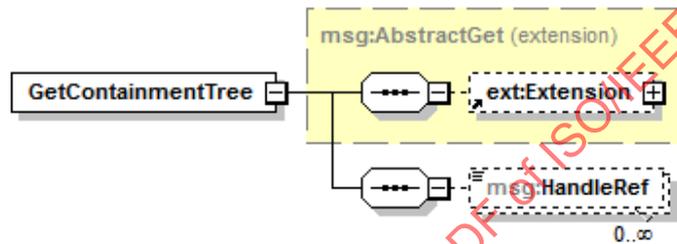
Children **tns:Extension**
msg:ReportPart

Attributes	Name	Type	Use
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation EpisodicOperationalStateReport is an msg:AbstractOperationalStateReport that is delivered episodically. It is sent if at least one pm:AbstractOperationState has changed. It SHALL contain only pm:AbstractOperationState instances where at least one child ELEMENT or ATTRIBUTE have changed.

C.16 GetContainmentTree

Type: element



Type extension of **msg:AbstractGet**

Children **tns:Extension**
msg:HandleRef

Documentation GetContainmentTree is the request to a msg:GetContainmentTreeResponse MESSAGE. It is intended to be used as a tool to navigate through the CONTAINMENT TREE of an MDIB.

C.17 GetContainmentTree/HandleRef

Type: element



Type **pm:HandleRef**

Properties Min. occurrence: 0
Max. occurrence: unbounded

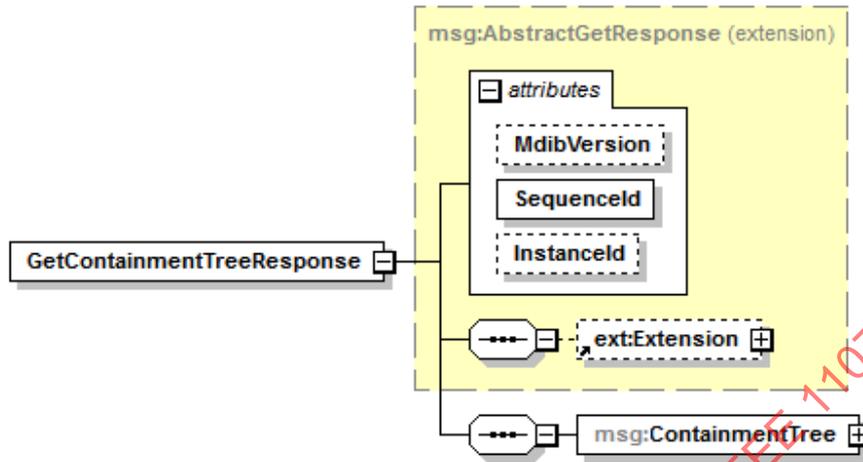
Constraints	Kind	Value
	minLength	1

Documentation List of HANDLE references that specify which CONTAINMENT TREE ENTRYs are requested.

R5030: All HANDLE references SHALL share the same parent. Otherwise, the result of GetContainmentTree is undefined.

C.18 GetContainmentTreeResponse

Type: element



Type extension of **msg:AbstractGetResponse**

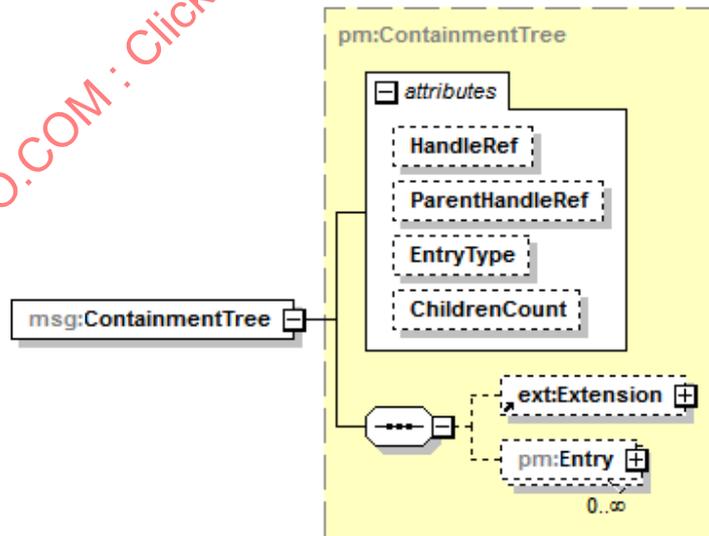
Children **tns:Extension**
msg:ContainmentTree

Attributes	Name	Type	Use
	<u>MdibVersion</u>	pm:VersionCounter	optional
	<u>SequenceId</u>	xsd:anyURI	required
	<u>InstanceId</u>	xsd:unsignedLong	optional

Documentation GetContainmentTreeResponse is the response to a msg:GetContainmentTree MESSAGE.

C.19 GetContainmentTreeResponse/ContainmentTree

Type: element



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