TM Forum Specification

Alarm Management API User Guide

TMF642
Team Approved Date: 03-Apr-2020

Release Status: Pre-production	Approval Status: Team Approved
Version 4.0.0	IPR Mode: RAND

NOTICE

Direct inquiries to the TM Forum office:

4 Century Drive, Suite 100
Parsippany, NJ 07054, USA
Tel No. +1 973 944 5100
Fax No. +1 973 998 7196
TM Forum Web Page: www.tmforum.org

Table of Contents

List of Tables

N/A

Introduction

The TM Forum Alarm Management API applies lessons that were learned in previous generations of similar APIs that were implemented in the Telecommunication industry, starting from ITU recommendations, TM Forum OSS/J, MTOSI and TIP interfaces, NGMN alignment initiative between 3GPP and TM Forum interfaces, and the more recent ETSI work on requirements for NFV interfaces.

This document defines the REST API for Alarm Management. The API does not assume a particular management layer, so the monitored objects can be either Resource, Service or Customer layer.

There is a strong desire from Service Providers to provide a Fault Management interface that can be used in a simple way to do simple alarm reporting while also covering more complex OSS-to-OSS scenarios. The Alarm Management interface should support both and should not add complexity when used in the context of simple Alarm Reporting.

Alarm Information

An alarm is described in increasing detail by the attributes shown in the diagram below. Every alarm must include an *alarmType* which places the fault within a small set of broad categories. A *probableCause* is also required and attributes one of an industry agreed set of descriptions of the probable cause. Vendor specific descriptions may be contained in *specificProblem* and more detailed information about the fault may be provided in *alarmDetails*.
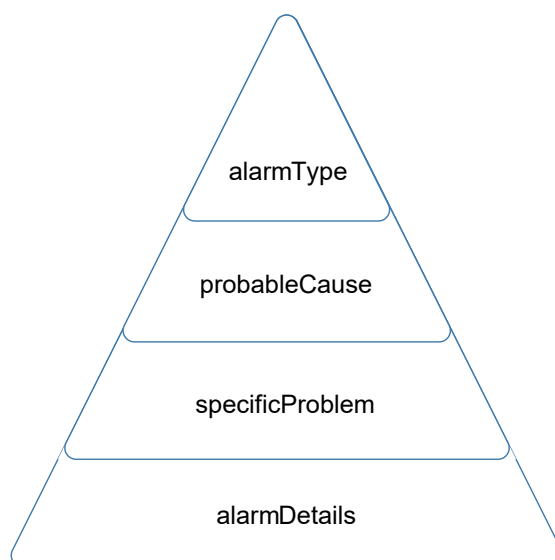
Alarm Type

The categories for alarm classification are defined in X.733 8.1.1 and 3GPP TS 32.111-2 Annex A. The complete enumerated list of possible values for the mandatory *alarmType* attribute is as follows:

alarmType	Description
communicationsAlarm	A communications fault.
processingErrorAlarm	A software or processing fault.
environmentalAlarm	A condition related to an enclosure in which the equipment resides.
qualityOfServiceAlarm	A degradation in the quality of a service.
equipmentAlarm	An equipment fault.
integrityViolation	Information may have been illegally modified, inserted or deleted.
operationalViolation	The unavailability, malfunction or incorrect invocation of a service.
physicalViolation	A physical resource has been violated in a way that suggests a security attack.
securityService	A security attack has been detected by a security service.
mechanismViolation	A security attack has been detected by a security mechanism.
timeDomainViolation	An event has occurred at an unexpected or prohibited time.

Probable Cause

Probable Cause values are defined in ITU-T X.733 and 3GPP TS 32.111-2 Annex B. It is highly recommended to choose a value from the existing list. If none of the specific values below are satisfactory consider choosing "other" and describe your situation with the *specificProblem* attribute.

The enumerated list of values for the mandatory *probableCause* attribute is as follows:

abisBtsInterfaceFailure	abisTrxInterfaceFailure
adapterError	airCompressorFailure
airConditioningFailure	airDryerFailure

ais	antennaFailure
applicationSubsystemFailure	authenticationFailure
backplaneFailure	bandwidthReduced
batteryBreakdown	batteryChargingFailure
batteryDischarging	batteryFailure
breachOfConfidentiality	broadcastChannelFailure
cableTamper	callEstablishmentError
callSetUpFailure	clockSynchronizationProblem
combinerProblem	commercialPowerFailure
communicationsProtocolError	communicationsSubsystemFailure
configurationOrCustomizationError	congestion
connectionEstablishmentError	coolingFanFailure
coolingSystemFailure	corruptData
cpuCyclesLimitExceeded	dataSetOrModemError
databaseInconsistency	degradedSignal
delayedInformation	demodulationFailure
denialOfService	diskFailure
duplicateInformation	enclosureDoorOpen
engineFailure	equipmentFailure
equipmentIdentifierDuplication	excessiveBitErrorRate
excessiveReceiverTemperature	excessiveResponseTime

excessiveRetransmissionRate	excessiveTransmitterOutputPower
excessiveTransmitterTemperature	excessiveVibration
explosiveGas	externalEquipmentFailure
externalIfDeviceProblem	externalPointFailure
externalPowerSupplyFailure	externalTransmissionDeviceFailure
farEndReceiverFailure	fileError
fileSystemCallUnsuccessful	fire
fireDetectorFailure	flood
framingError	frequencyHoppingDegraded
frequencyHoppingFailure	frequencyRedefinitionFailed
fuseFailure	generatorFailure
heatingVentCoolingSystemProblem	highHumidity
highTemperature	highWind
humidityUnacceptable	iceBuildUp
informationMissing	informationModificationDetected
informationOutOfSequence	inputDeviceError
inputOutputDeviceError	inputParameterOutOfRange
intrusionDetection	invalidMessageReceived
invalidParameter	invalidPointer
ioDeviceError	keyExpired
lanError	lapdLinkProtocolFailure

leakDetected	lineCardProblem
lineInterfaceFailure	linkFailure
localAlarmIndication	localNodeTransmissionError
lossOfFrame	lossOfMultiFrame
lossOfPointer	lossOfRealTime
lossOfRedundancy	lossOfSignal
lossOfSynchronisation	lowBatteryThreshold
lowCablePressure	lowFuel
lowHumidity	lowTemperatue
lowWater	mainsBreakdownWithBatteryBackUp
mainsBreakdownWithoutBatteryBackUp	materialSupplyExhausted
memoryMismatch	messageNotExpected
messageNotInitialized	messageOutOfSequence
modulationFailure	multiplexerProblem
neIdentifierDuplication	nonRepudiationFailure
other	ouputDeviceError
outOfCpuCycles	outOfHoursActivity
outOfMemory	outOfService
pathTraceMismatch	payloadTypeMismatch
performanceDegraded	powerProblems
powerSupplyFailure	pressureUnacceptable

proceduralError	processorProblem
protectingResourceFailure	protectionMechanismFailure
protectionPathFailure	pumpFailure
queueSizeExceeded	realTimeClockFailure
receiveFailure	receiverAntennaFault
receiverFailure	receiverMulticouplerFailure
rectifierFailure	rectifierHighVoltage
rectifierLowVoltage	reducedAlarmReporting
reducedEventReporting	reducedLoggingCapability
reducedTransmitterOutputPower	reinitialized
remoteAlarmIndication	remoteAlarmInterface
remoteNodeTransmissionError	replaceableUnitMissing
replaceableUnitProblem	replaceableUnitTypeMismatch
resourceAtOrNearingCapacity	responseTimeExecessive
retransmissionRateExcessive	routingFailure
signalLabelMismatch	signalQualityEvaluationFailure
smoke	softwareDownloadFailure
softwareEnvironmentProblem	softwareError
softwareProgramAbnormallyTerminated	softwareProgramError
ss7ProtocolFailure	storageCapacityProblem
synchronizationSourceMismatch	systemCallUnsuccessful

systemResourcesOverload	temperatureUnacceptable
terminalProblem	thresholdCrossed
timeoutExpired	timeslotHardwareFailure
timingProblem	toxicGas
toxicLeakDetected	transceiverFailure
transcoderOrRateAdapterProblem	transcoderProblem
transmissionError	transmitFailure
transmiterFailure	transmitterAntennaFailure
transmitterAntennaNotAdjusted	transmitterFailure
transmitterLowVoltageOrCurrent	transmitterOffFrequency
trunkCardProblem	unauthorizedAccessAttempt
unavailable	underlyingResourceUnavailable
unexpectedInformation	variableOutOfRange
ventilationsSystemFailure	versionMismatch
watchdogTimerExpired	

© TM Forum 2020. All Rights Reserved.   Page 13 of 134

SAMPLE USE CASES

The Alarm Management API provides the standardized client interface to Alarm Management systems for creating, tracking and managing alarms among partners. The interface supports alarm management on both resources and services. The alarmed objects are not restricted to any particular technology or a vendor, so the API can be used in a wide variety of fault management cases.

In real-life deployments we see various levels of fault management API needs starting from simple subscription on alarm lifecycle events, up to full synchronization of acknowledgements and root cause analysis between two alarm management systems.

Two main kinds of business scenarios were identified:

- Management Functions subscriptions ("simple" alarm notifications)
- Synchronization of Management systems (on alarm events, threshold crossing alarms, acknowledgements, root cause analysis, etc.)

Sample Use Case – Simple Alarm Forwarding

In the first case, one party of the interface is an Alarm Management system (the alarm-owning system) and the second party is a management function that is subscribed on events, mainly alarm life-cycle events. It cannot be assumed that the subscribed function has a persistent view of the alarms, as it is not necessarily an alarm management system. The subscriber party can be a UI, a communication hub, a Service Quality management system, a BSS system, or any other function that is interested in alarm events. In this case, the operations that will be used are typically:

- Alarm life-cycle notifications:
    - Raise notification (mandatory)
    - Clear notification(mandatory)
    - Change notification (optional)
- Get Alarms operations: used by the Management Function to get synchronized on the state of active alarms in situations where snapshots of the active alarms are required, such as system start, or recovery from communication failures. This operation may include a filter on the subset of alarms that are of interest.
- The acknowledgement notification (optional)
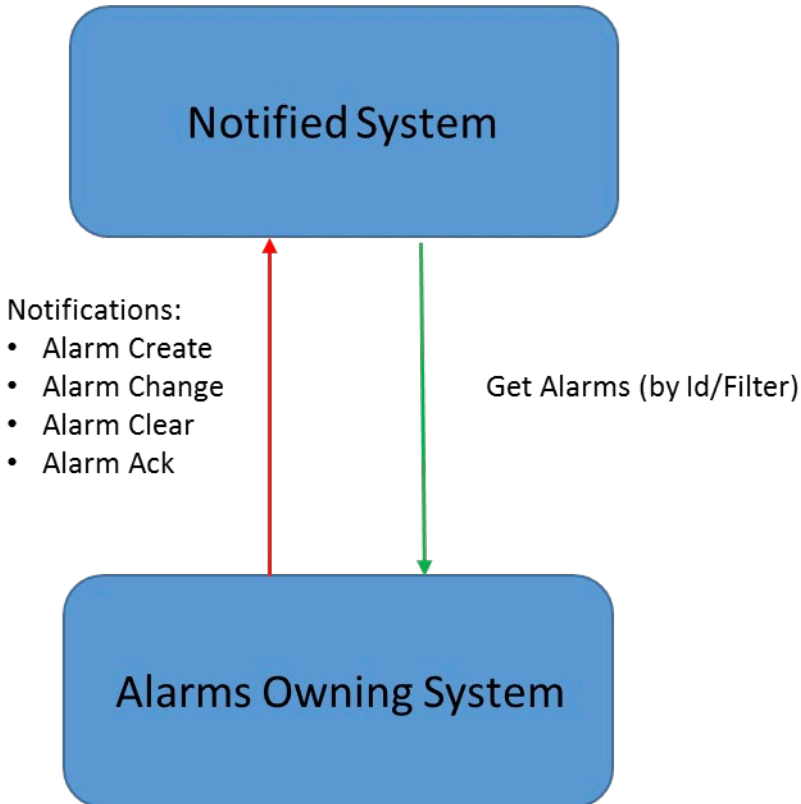
Sample Use Case – OSS-to-OSS

The second case is where the two parties are both alarm management systems/functions and they have to synchronize alarms in different aspects. Typically, Alarm Management system A is one of the alarm data sources of Alarm management system Z. In this case the operations will be slightly different with a tighter integration:

- Alarm management system A can raise, change and clear alarms in Alarm Management system Z
- Alarm management system A can acknowledge alarms in Alarm Management system Z
- Alarm Management system A can apply root cause analysis results in Alarm Management system Z by using the Group and Ungroup operations.
- Alarm management system A can comment (annotate) alarms in Alarm Management system Z
- Get Alarms operations used by the Management Function to get synchronized on the state of active alarms in situations where snapshots of the active alarms are required, such as system start, or recovery from communication failures. This operation may include a filter on the subset of alarms that are of interest.

In this scenario, since the level of integration is tighter, it is important that Alarm Management System A gets the information on the success of the operations in Alarm management system Z.

Basic Alarm Operations:
- Alarm Create
- Alarm Change
- Alarm Clear (by Id/Filter)
- Alarm Ack (by Id/Filter)
- Comment

RCA results:
- Group Alarms
- Ungroup Alarms

Get Alarms (by Id/Filter)

Alarms Owning System

Alarms system (source)
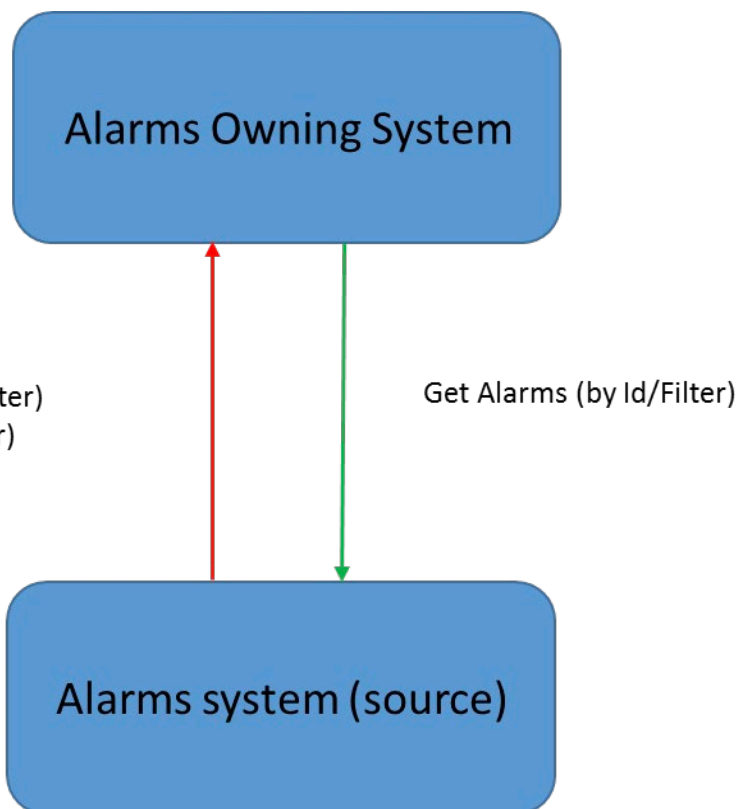
Support of polymorphism and extension patterns

Support of polymorphic collections and types and schema based extension is provided by means of a list of generic meta-attributes that we describe below. Polymorphism in collections occurs when entities inherit from base entities, for instance a BillingAccount and SettlementAccount inheriting properties from the abstract Account entity.

Generic support of polymorphism and pattern extensions is described in the TMF API Guidelines v3.0 Part 2 document.

The @type attribute provides a way to represent the actual class type of an entity. For example, within a list of Account instances some may be instances of BillingAccount where other could be instances of SettlementAccount. The @type gives this information. All resources and sub-resources of this API have a @type attributes that can be provided when this is useful.

The @referredType can be used within reference entities (like for instance an AccountRef object) to explicitly denote the actual entity type of the referred class. Notice that in reference entities the @type, when used, denotes the class type of the reference itself, such as BillingAccountRef or SettlementAccountRef, and not the class type of the referred object. However, since reference classes are rarely sub-classed, @type is generally not useful in reference objects.

The @schemaLocation property can be used in resources to allow specifying user-defined properties of an Entity or to specify the expected *characteristics* of an entity.

The @baseType attribute gives a way to provide explicitly the base of class of a given resource that has been extended.

RESOURCE MODEL

Managed Entity and Task Resource Models

Alarm resource

This resource represents an alarm supporting the information model defined in ITU-T X.733.

Resource model
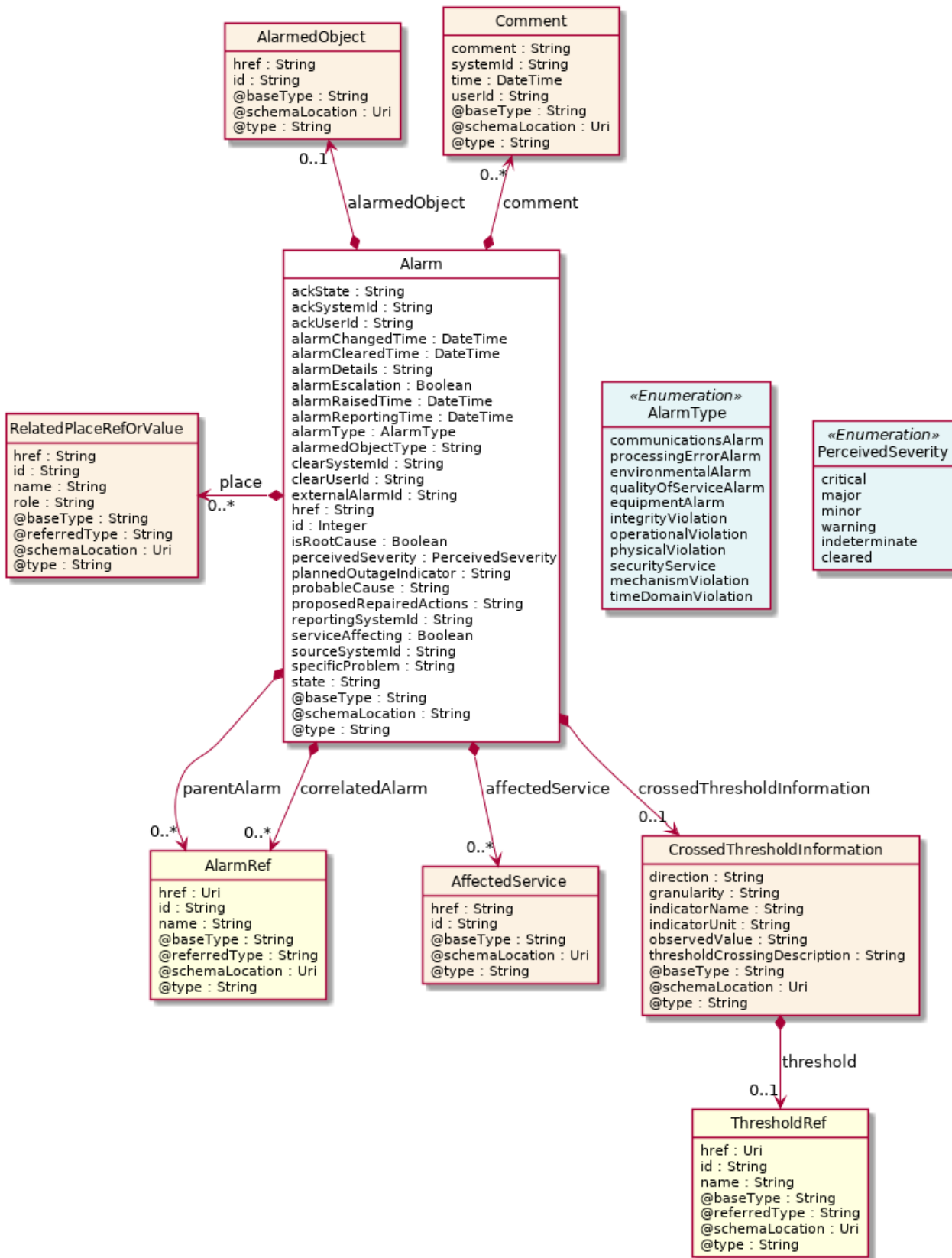
Field descriptions

Alarm fields

@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
affectedService	A list of affected services (AffectedService [*]).
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource, or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.

clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
externalAlarmId	A string. An identifier of the alarm in the source system.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.

specificProblem   A string. Provides more specific information about the alarm.

state   A string. Defines the alarm state during its life cycle (raised | updated | cleared).

AffectedService sub-resource

href   A string. Provides the identifier of the service affected by the alarm.

id   A string.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href   A string. A reference to the managed object associated with the event.

id   A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment   A string. Indicates the text of the comment.

systemId   A string. Indicates the system identifier on which the client set the comment.

time   A date time (DateTime). Indicates the time commenting the alarm.

userId   A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction   A string. Indicates the threshold crossing direction: up or down.

granularity   A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.

indicatorName   A string. Indicates the name of indicator which crossed the threshold.

indicatorUnit   A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.

observedValue   A string. Indicates the value of the indicator which crossed the threshold.

threshold   A threshold reference (ThresholdRef).

thresholdCrossingDescription   A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
role	A string.

AlarmRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

ThresholdRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.

href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of a 'Alarm' resource object

```
{
  "id": "8675309",
  "href": "/alarmManagement/v4/alarm/8675309",
  "@baseType": "Alarm",
  "@type": "Alarm",
  "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
  "externalAlarmId": "5551212",
  "state": "updated",
  "alarmType": "environmentalAlarm",
  "perceivedSeverity": "major",
  "probableCause": "rectifierLowVoltage",
  "specificProblem": "ps=3,sl=1,in=8",
  "alarmedObjectType": "Rectifier",
  "alarmedObject": {
    "id": "93051825",
    "href": "/resourceInventoryManagement/v4/resource/93051825"
  },
  "sourceSystemId": "ems-1",
  "alarmDetails": "voltage=95",
  "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
  "alarmReportingTime": "2019-07-03T03:32:17.552Z",
  "alarmChangedTime": "2019-07-03T03:32:52.744Z",
  "ackSystemId": "ems-1",
  "ackUserId": "bob@example.net",
  "ackTime": "2019-07-03T03:33:12.623Z",
  "ackState": "acknowledged",
  "isRoot": false,
  "parentAlarm": {
    "id": "8675300"
  },
  "correlatedAlarm": [
    {
      "id": "8675399",
      "href": "/alarmManagement/v4/alarm/868675399"
    }
  ],
  "comment": [
    {
      "userId": "bob@example.net",
```

```
        "systemId": "ems-1",
        "time": "2019-07-03T03:37:33.827Z",
        "comment": "Dispatched"
      }
   ]
 }
```

Ack Alarms resource

Task resource for the acknowledge alarms operation.

Resource model
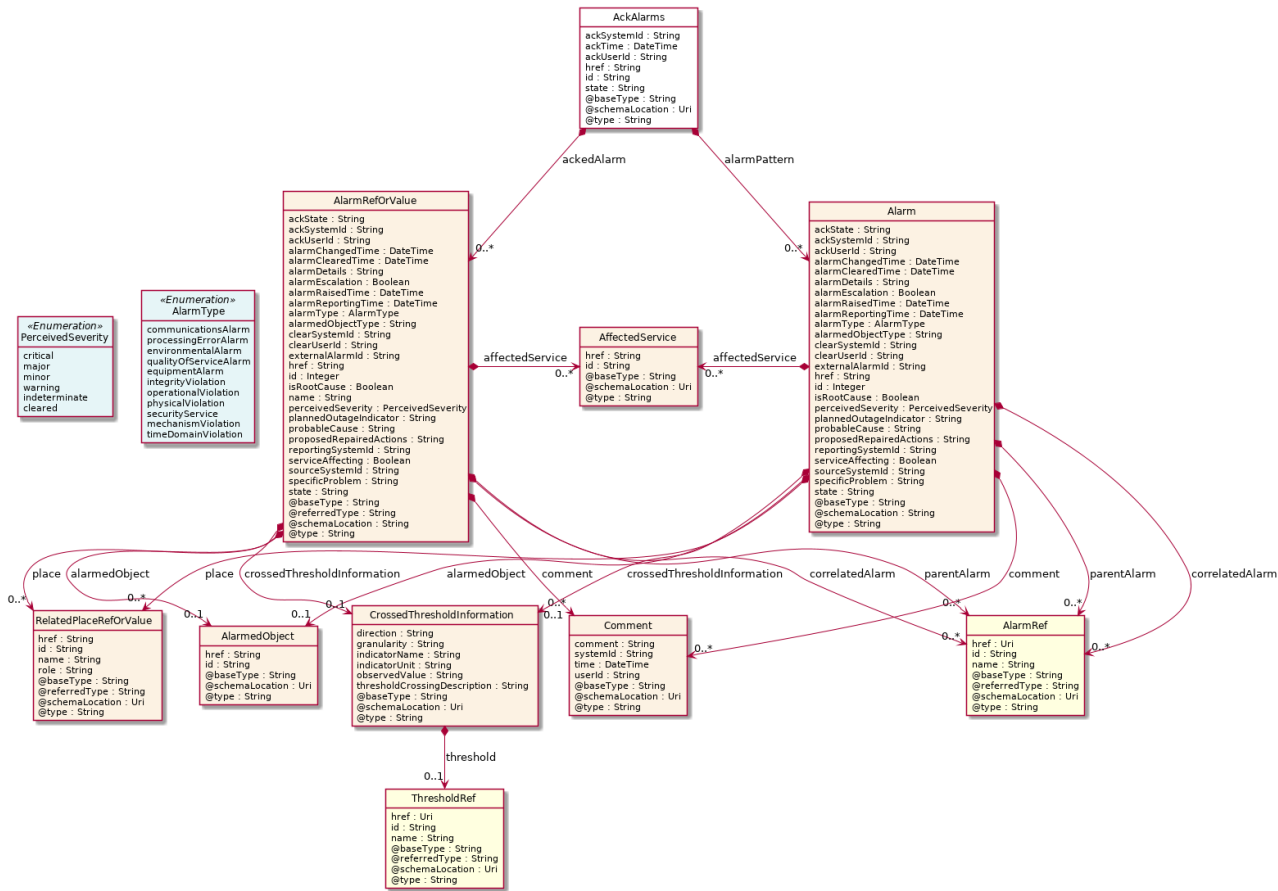
Field descriptions

AckAlarms fields

ackSystemId	A string. Name of the acknowledging system.
ackTime	A date time (DateTime). Time of the acknowledgement.
ackUserId	A string. Name of the acknowledging user.
ackedAlarm	A list of alarm ref or values (AlarmRefOrValue [*]). The successfully acknowledged

alarms.

alarmPattern	A list of alarms (Alarm [*]). An alarm will match if all of the sttributes in any of the patterns compare equal to those attributes of the alarm.
href	A string. A reference to the task.
id	A string. The identifier of the task.
state	A string. Current state of the operation task.

AffectedService sub-resource

href	A string. Provides the identifier of the service affected by the alarm.
id	A string.

Alarm sub-resource

This resource represents an alarm supporting the information model defined in ITU-T X.733.

@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
affectedService	A list of affected services (AffectedService [*]).
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.

alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
externalAlarmId	A string. An identifier of the alarm in the source system.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation &

	@referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).

AlarmRefOrValue sub-resource

An alarm defined by reference or value. The polymorphic attributes @type, @schemaLocation & @referredType are related to the alarm entity and not the RelatedAlarmRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.

alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
externalAlarmId	A string. An identifier of the alarm in the source system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.

state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).
affectedService	A list of affected services (AffectedService [*]).
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href	A string. A reference to the managed object associated with the event.
id	A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment	A string. Indicates the text of the comment.
systemId	A string. Indicates the system identifier on which the client set the comment.
time	A date time (DateTime). Indicates the time commenting the alarm.

userId   A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction   A string. Indicates the threshold crossing direction: up or down.

granularity   A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.

indicatorName   A string. Indicates the name of indicator which crossed the threshold.

indicatorUnit   A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.

observedValue   A string. Indicates the value of the indicator which crossed the threshold.

threshold   A threshold reference (ThresholdRef).

thresholdCrossingDescription   A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType   A string. The actual type of the target instance when needed for disambiguation.

name   A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].

href   A string. Unique reference of the place.

id   A string. Unique identifier of the place.

@baseType   A string. When sub-classing, this defines the super-class.

@schemaLocation   An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type   A string. When sub-classing, this defines the sub-class Extensible name.

role   A string.

AlarmRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

ThresholdRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of an 'AckAlarms' resource object

```
{
  "id": "1038",
  "href": "/alarmManagement/v4/ackAlarms/1038",
  "ackSystemId": "ems-1",
  "ackUserId": "bob@example.net",
  "ackTime": "2019-07-03T03:33:12.623Z",
  "alarmPattern": [
    {
      "id": "8675309"
    },
    {
      "id": "8675399"
    }
  ],
  "state": "done",
```

```json
"ackedAlarm": [
  {
    "id": "8675309",
    "href": "/alarmManagement/v4/alarm/8675309",
    "@baseType": "Alarm",
    "@type": "Alarm",
    "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
    "externalAlarmId": "5551212",
    "state": "updated",
    "alarmType": "environmentalAlarm",
    "perceivedSeverity": "major",
    "probableCause": "rectifierLowVoltage",
    "specificProblem": "ps=3,sl=1,in=8",
    "alarmedObjectType": "Rectifier",
    "alarmedObject": {
      "id": "93051825",
      "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=95",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z",
    "alarmChangedTime": "2019-07-03T03:32:52.744Z",
    "ackSystemId": "ems-1",
    "ackUserId": "bob@example.net",
    "ackTime": "2019-07-03T03:33:12.623Z",
    "ackState": "acknowledged",
    "correlatedAlarm": [
      {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/868675399"
      }
    ]
  },
  {
    "id": "8675399",
    "href": "/alarmManagement/v4/alarm/8675399",
    "@baseType": "Alarm",
    "@type": "Alarm",
    "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
    "externalAlarmId": "5551234",
    "state": "raised",
    "alarmType": "equipmentAlarm",
    "perceivedSeverity": "minor",
    "probableCause": "powerSupplyFailure",
    "specificProblem": "ch=1,ps=3",
    "alarmedObjectType": "Chassis",
    "alarmedObject": {
      "id": "95830731",
      "href": "/resourceInventoryManagement/v4/resource/95830731"
    },
    "sourceSystemId": "ems-1",
    "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
    "alarmReportingTime": "2019-07-03T03:32:18.102Z",
    "alarmChangedTime": "2019-07-03T03:32:52.744Z",
```

```
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:33:12.623Z",
      "ackState": "acknowledged",
      "parentAlarm": [
        {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/868675309"
        }
      ]
    }
  ]
}
```

Un Ack Alarms resource

Task resource for unacknowledged alarms operation.

Resource model
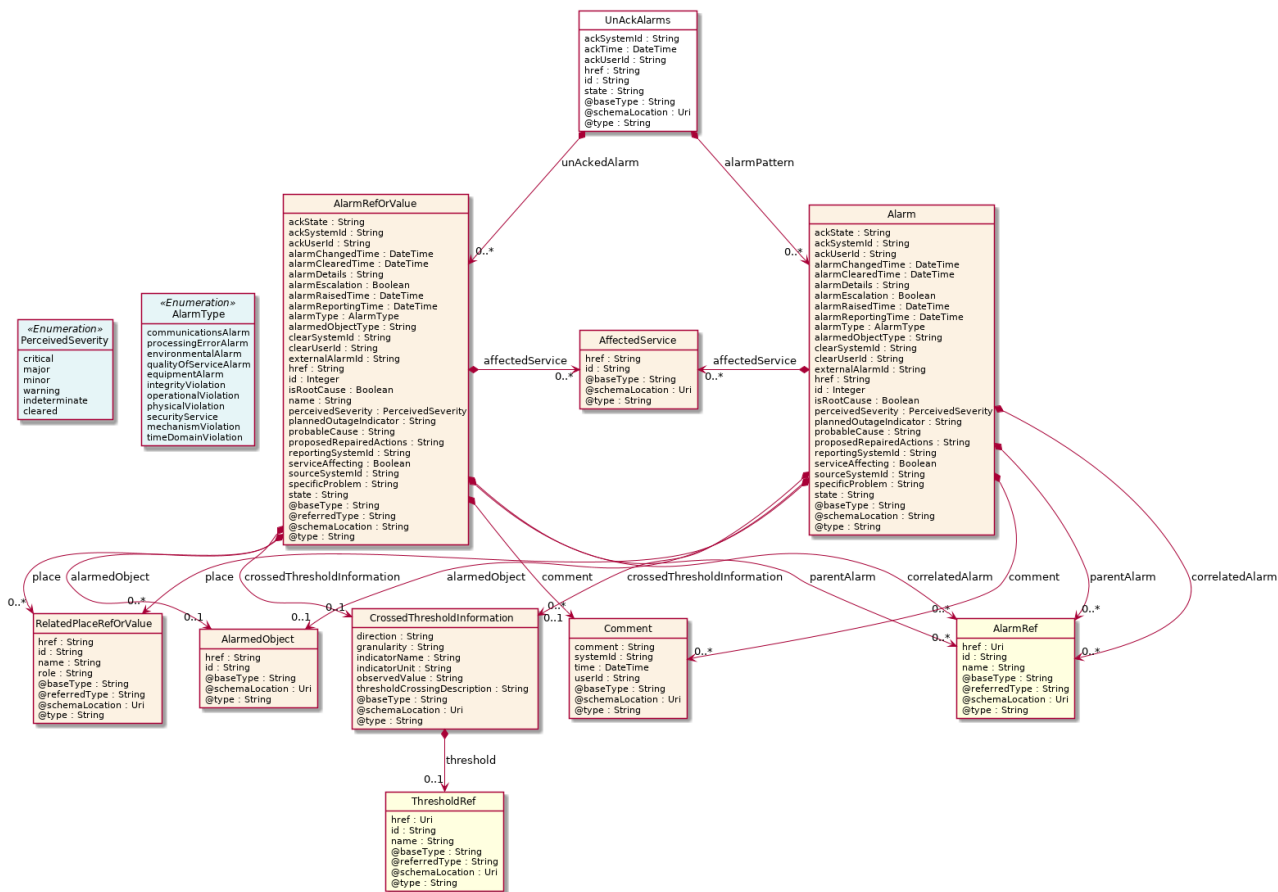
Field descriptions

UnAckAlarms fields

ackSystemId	A string. Name of the unacknowledging system.
ackTime	A date time (DateTime). Time of the unacknowledgement.
ackUserId	A string. Name of the unacknowledging user.
alarmPattern	A list of alarms (Alarm [*]). An alarm will match if all of the attributes in any of the patterns compare equal to those attributes of the alarm.
href	A string. A reference to the task.
id	A string. The identifier of the task.
state	A string. Current state of the operation task.
unAckedAlarm	A list of alarm ref or values (AlarmRefOrValue [*]). The successfully unacknowledged alarms.

AffectedService sub-resource

href	A string. Provides the identifier of the service affected by the alarm.
id	A string.

Alarm sub-resource

This resource represents an alarm supporting the information model defined in ITU-T X.733.

@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
affectedService	A list of affected services (AffectedService [*]).
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.

alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
externalAlarmId	A string. An identifier of the alarm in the source system.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation

	X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).

AlarmRefOrValue sub-resource

An alarm defined by reference or value. The polymorphic attributes @type, @schemaLocation & @referredType are related to the alarm entity and not the RelatedAlarmRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged	

acknowledged).

ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource, or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
externalAlarmId	A string. An identifier of the alarm in the source system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.

reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).
affectedService	A list of affected services (AffectedService [*]).
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href	A string. A reference to the managed object associated with the event.
id	A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment   A string. Indicates the text of the comment.

systemId   A string. Indicates the system identifier on which the client set the comment.

time   A date time (DateTime). Indicates the time commenting the alarm.

userId   A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction   A string. Indicates the threshold crossing direction: up or down.

granularity   A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.

indicatorName   A string. Indicates the name of indicator which crossed the threshold.

indicatorUnit   A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.

observedValue   A string. Indicates the value of the indicator which crossed the threshold.

threshold   A threshold reference (ThresholdRef).

thresholdCrossingDescription   A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType   A string. The actual type of the target instance when needed for disambiguation.

name   A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].

href   A string. Unique reference of the place.

id   A string. Unique identifier of the place.

@baseType   A string. When sub-classing, this defines the super-class.

@schemaLocation   An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type   A string. When sub-classing, this defines the sub-class Extensible name.

role   A string.

AlarmRef relationship

@referredType   A string. The actual type of the target instance when needed for disambiguation.

name   A string. Name of the related entity.

href   An uri (Uri). Hyperlink reference.

id   A string. unique identifier.

@baseType   A string. When sub-classing, this defines the super-class.

@schemaLocation   An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type   A string. When sub-classing, this defines the sub-class Extensible name.

ThresholdRef relationship

@referredType   A string. The actual type of the target instance when needed for disambiguation.

name   A string. Name of the related entity.

href   An uri (Uri). Hyperlink reference.

id   A string. unique identifier.

@baseType   A string. When sub-classing, this defines the super-class.

@schemaLocation   An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type   A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of a 'UnAckAlarms' resource object

```
{
  "id": "1052",
  "href": "/alarmManagement/v4/unAckAlarms/1052",
  "ackSystemId": "ems-1",
  "ackUserId": "bob@example.net",
  "ackTime": "2019-07-03T03:38:06.890Z",
  "alarmPattern": [
    {
```

```
            "id": "8675309"
        },
        {
            "id": "8675399"
        }
    ],
    "state": "done",
    "unAckedAlarm": [
        {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/8675309",
            "@baseType": "Alarm",
            "@type": "Alarm",
            "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
            "externalAlarmId": "5551212",
            "state": "raised",
            "alarmType": "environmentalAlarm",
            "perceivedSeverity": "minor",
            "probableCause": "rectifierLowVoltage",
            "specificProblem": "ps=3,sl=1,in=8",
            "alarmedObjectType": "Rectifier",
            "alarmedObject": {
                "id": "93051825",
                "href": "/resourceInventoryManagement/v4/resource/93051825"
            },
            "sourceSystemId": "ems-1",
            "alarmDetails": "voltage=204",
            "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
            "alarmReportingTime": "2019-07-03T03:32:17.552Z",
            "ackSystemId": "ems-1",
            "ackUserId": "bob@example.net",
            "ackTime": "2019-07-03T03:38:06.890Z",
            "ackState": "UNacknowledged",
            "correlatedAlarm": [
                {
                    "id": "8675399",
                    "href": "/alarmManagement/v4/alarm/868675399"
                }
            ],
            "comment": [
                {
                    "userId": "bob@example.net",
                    "systemId": "ems-1",
                    "time": "2019-07-03T03:37:33.827Z",
                    "comment": "Dispatched"
                }
            ]
        },
        {
            "id": "8675399",
            "href": "/alarmManagement/v4/alarm/8675399",
            "@baseType": "Alarm",
            "@type": "Alarm",
            "@schemaLocation": "/alarmManagement/v4//Alarm.schema.json",
            "externalAlarmId": "5551234",
```

```
      "state": "raised",
      "alarmType": "equipmentAlarm",
      "perceivedSeverity": "minor",
      "probableCause": "powerSupplyFailure",
      "specificProblem": "ch=1,ps=3",
      "alarmedObjectType": "Chassis",
      "alarmedObject": {
         "id": "95830731",
         "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "alarmChangedTime": "2019-07-03T03:32:52.744Z",
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:38:06.890Z",
      "ackState": "unacknowledged",
      "parentAlarm": [
         {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/868675309"
         }
      ],
      "comment": [
         {
            "userId": "bob@example.net",
            "systemId": "ems-1",
            "time": "2019-07-03T03:37:33.827Z",
            "comment": "Dispatched"
         }
      ]
   }
  ]
 }
}
```

Clear Alarms resource

Task resource for clear alarms operation.

Resource model
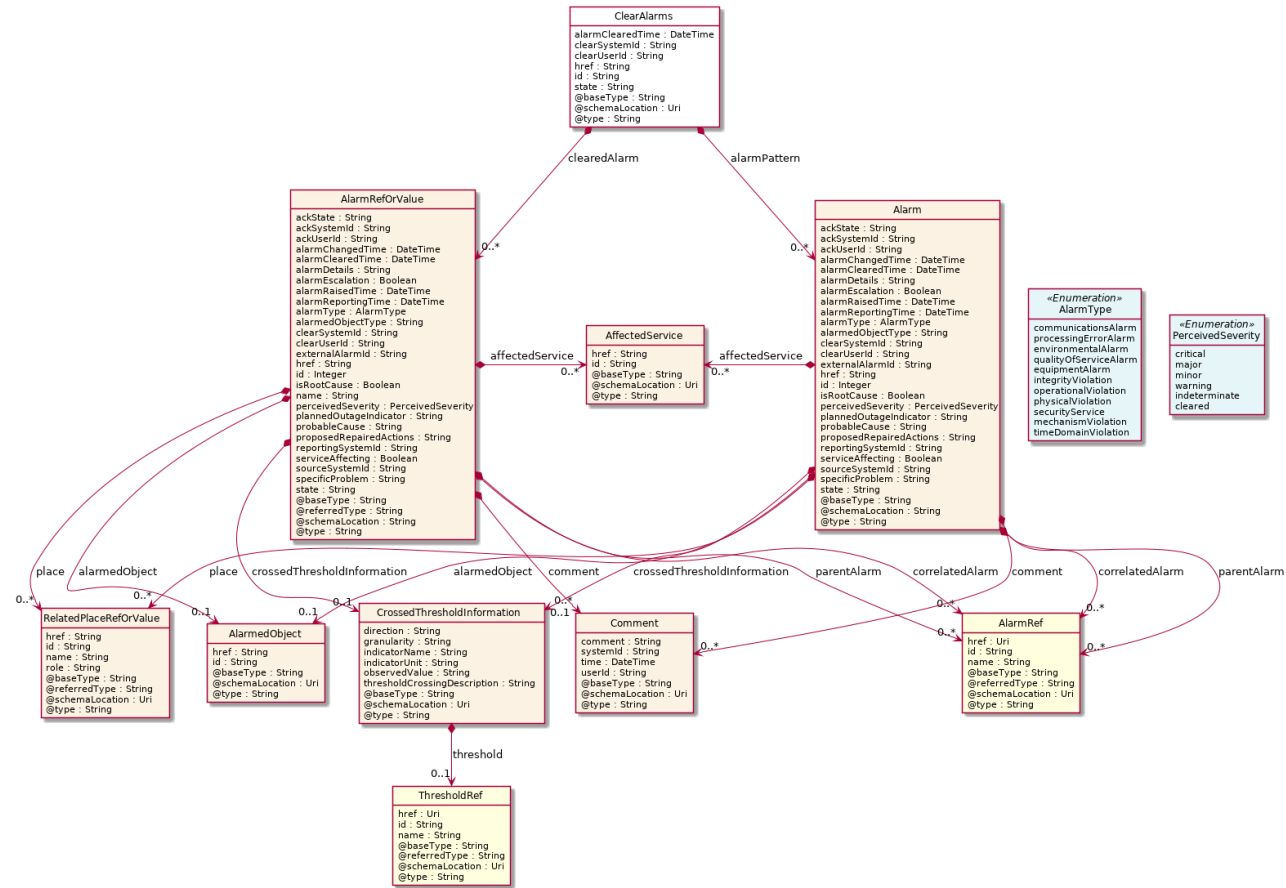
Field descriptions

ClearAlarms fields

alarmClearedTime   A date time (DateTime). Time of the alarm clearing.

alarmPattern   A list of alarms (Alarm [*]). An alarm will match if all of the attributes in any of the patterns compare equal to those attributes of the alarm.

clearSystemId   A string. Name of the clearing system.

clearUserId   A string. Name of the clearing user.

clearedAlarm   A list of alarm ref or values (AlarmRefOrValue [*]). The successfully cleared alarms.

href   A string. A reference to the task.

id   A string. The identifier of the task.

state   A string. Current state of the operation task.

AffectedService sub-resource

href	A string. Provides the identifier of the service affected by the alarm.
id	A string.

Alarm sub-resource

This resource represents an alarm supporting the information model defined in ITU-T X.733.

@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
affectedService	A list of affected services (AffectedService [*]).
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).

alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
externalAlarmId	A string. An identifier of the alarm in the source system.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.

reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).

AlarmRefOrValue sub-resource

An alarm defined by reference or value. The polymorphic attributes @type, @schemaLocation & @referredType are related to the alarm entity and not the RelatedAlarmRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm

	occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
externalAlarmId	A string. An identifier of the alarm in the source system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).
affectedService	A list of affected services (AffectedService [*]).
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.

correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href	A string. A reference to the managed object associated with the event.
id	A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment	A string. Indicates the text of the comment.
systemId	A string. Indicates the system identifier on which the client set the comment.
time	A date time (DateTime). Indicates the time commenting the alarm.
userId	A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction	A string. Indicates the threshold crossing direction: up or down.
granularity	A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.
indicatorName	A string. Indicates the name of indicator which crossed the threshold.

indicatorUnit	A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.
observedValue	A string. Indicates the value of the indicator which crossed the threshold.
threshold	A threshold reference (ThresholdRef).
thresholdCrossingDescription	A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
role	A string.

AlarmRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

| @type | A string. When sub-classing, this defines the sub-class Extensible name. |

ThresholdRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of a 'ClearAlarms' resource object

```
{
  "id": "1089",
  "href": "/alarmManagement/v4/commentAlarms/1089",
  "clearSystemId": "ems-1",
  "clearUserId": "bob@example.net",
  "alarmClearedTime": "2019-07-03T03:55:45.937Z",
  "alarmPattern": [
    {
      "id": "8675309"
    },
    {
      "id": "8675399"
    }
  ],
  "state": "done",
  "clearedAlarm": [
    {
      "id": "8675309",
      "href": "/alarmManagement/v4/alarm/8675309",
      "@baseType": "Alarm",
      "@type": "Alarm",
      "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
      "externalAlarmId": "5551212",
      "state": "cleared",
      "alarmType": "environmentalAlarm",
      "perceivedSeverity": "cleared",
      "probableCause": "rectifierLowVoltage",
      "specificProblem": "ps=3,sl=1,in=8",
```

```
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
            "id": "93051825",
            "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=204",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "alarmChangedTime": "2019-07-03T03:42:12.861Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:38:06.890Z",
        "ackState": "UNacknowledged",
        "comment": [
            {
                "userId": "bob@example.net",
                "systemId": "ems-1",
                "time": "2019-07-03T03:37:33.827Z",
                "comment": "Dispatched"
            }
        ],
        "clearSystemId": "ems-1",
        "clearUserId": "bob@example.net",
        "alarmClearedTime": "2019-07-03T03:55:45.937Z"
    },
    {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551234",
        "state": "cleared",
        "alarmType": "equipmentAlarm",
        "perceivedSeverity": "cleared",
        "probableCause": "powerSupplyFailure",
        "specificProblem": "ch=1,ps=3",
        "alarmedObjectType": "Chassis",
        "alarmedObject": {
            "id": "95830731",
            "href": "/resourceInventoryManagement/v4/resource/95830731"
        },
        "sourceSystemId": "ems-1",
        "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
        "alarmReportingTime": "2019-07-03T03:32:18.102Z",
        "alarmChangedTime": "2019-07-03T03:42:12.861Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:38:06.890Z",
        "ackState": "unacknowledged",
        "comment": [
            {
                "userId": "bob@example.net",
                "systemId": "ems-1",
```

```
              "time": "2019-07-03T03:37:33.827Z",
              "comment": "Dispatched"
           }
        ],
        "clearSystemId": "ems-1",
        "clearUserId": "bob@example.net",
        "alarmClearedTime": "2019-07-03T03:55:45.937Z"
      }
   ]
}
```

Comment Alarms resource

Task resource for comment alarms operation.

Resource model
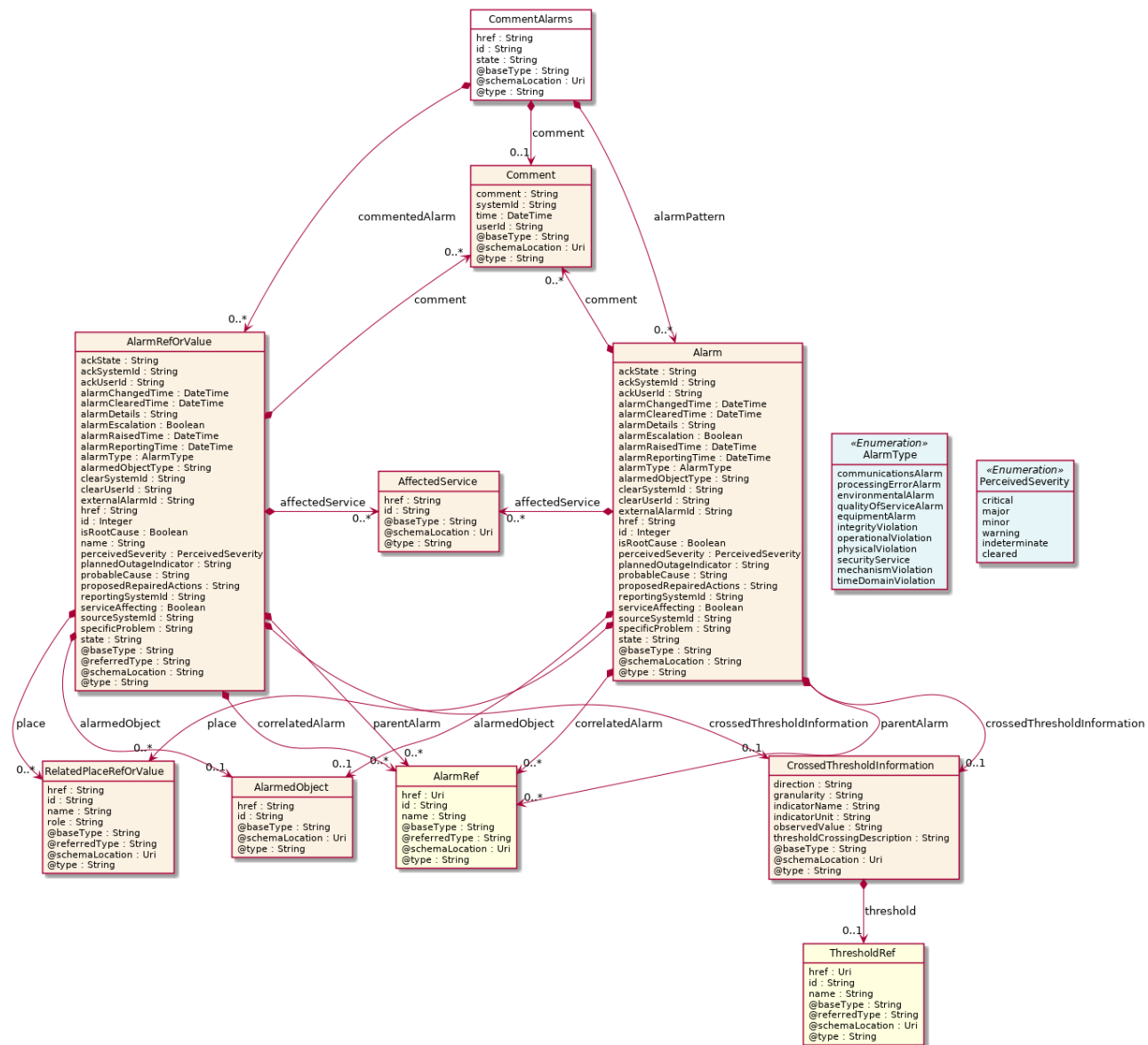
Field descriptions

CommentAlarms fields

alarmPattern | A list of alarms (Alarm [*]). An alarm will match if all of the sttributes in any of the patterns compare equal to those attributes of the alarm.

comment | A comment (Comment). Indicates the comments entered on the alarm.

commentedAlarm | A list of alarm ref or values (AlarmRefOrValue [*]). The successfully commented alarms.

href | A string. A reference to the task.

id | A string. The identifier of the task.

state | A string. Current state of the operation task.

AffectedService sub-resource

href | A string. Provides the identifier of the service affected by the alarm.

id | A string.

Alarm sub-resource

This resource represents an alarm supporting the information model defined in ITU-T X.733.

@baseType | A string. The base type of this alarm.

@schemaLocation | A string. A reference to the schema describing this alarm.

@type | A string. The type for this alarm.

ackState | A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).

ackSystemId | A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.

ackUserId | A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.

affectedService | A list of affected services (AffectedService [*]).

alarmChangedTime | A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.

alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
externalAlarmId	A string. An identifier of the alarm in the source system.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation

	X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).

AlarmRefOrValue sub-resource

An alarm defined by reference or value. The polymorphic attributes @type, @schemaLocation & @referredType are related to the alarm entity and not the RelatedAlarmRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged |

acknowledged).

ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
externalAlarmId	A string. An identifier of the alarm in the source system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.

reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).
affectedService	A list of affected services (AffectedService [*]).
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href	A string. A reference to the managed object associated with the event.
id	A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment	A string. Indicates the text of the comment.
systemId	A string. Indicates the system identifier on which the client set the comment.
time	A date time (DateTime). Indicates the time commenting the alarm.
userId	A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction	A string. Indicates the threshold crossing direction: up or down.
granularity	A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.
indicatorName	A string. Indicates the name of indicator which crossed the threshold.
indicatorUnit	A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.
observedValue	A string. Indicates the value of the indicator which crossed the threshold.
threshold	A threshold reference (ThresholdRef).
thresholdCrossingDescription	A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

role   A string.

AlarmRef relationship

@referredType   A string. The actual type of the target instance when needed for disambiguation.

name   A string. Name of the related entity.

href   An uri (Uri). Hyperlink reference.

id   A string. unique identifier.

@baseType   A string. When sub-classing, this defines the super-class.

@schemaLocation   An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type   A string. When sub-classing, this defines the sub-class Extensible name.

ThresholdRef relationship

@referredType   A string. The actual type of the target instance when needed for disambiguation.

name   A string. Name of the related entity.

href   An uri (Uri). Hyperlink reference.

id   A string. unique identifier.

@baseType   A string. When sub-classing, this defines the super-class.

@schemaLocation   An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.

@type   A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of a 'CommentAlarms' resource object

```
{
  "id": "1045",
  "href": "/alarmManagement/v4/ackAlarms/1045",
  "comment": {
    "userId": "bob@example.net",
    "systemId": "ems-1",
    "time": "2019-07-03T03:37:33.827Z",
    "comment": "Dispatched"
```

```
    },
    "alarmPattern": [
      {
        "id": "8675309"
      },
      {
        "id": "8675399"
      }
    ],
    "state": "done",
    "commentedAlarm": [
      {
        "id": "8675309",
        "href": "/alarmManagement/v4/alarm/8675309",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551212",
        "state": "raised",
        "alarmType": "environmentalAlarm",
        "perceivedSeverity": "minor",
        "probableCause": "rectifierLowVoltage",
        "specificProblem": "ps=3,sl=1,in=8",
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
          "id": "93051825",
          "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=204",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:33:12.623Z",
        "ackState": "acknowledged",
        "correlatedAlarm": [
          {
            "id": "8675399",
            "href": "/alarmManagement/v4/alarm/868675399"
          }
        ],
        "comment": [
          {
            "userId": "bob@example.net",
            "systemId": "ems-1",
            "time": "2019-07-03T03:37:33.827Z",
            "comment": "Dispatched"
          }
        ]
      },
      {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
```

```
      "@type": "Alarm",
      "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
      "externalAlarmId": "5551234",
      "state": "raised",
      "alarmType": "equipmentAlarm",
      "perceivedSeverity": "minor",
      "probableCause": "powerSupplyFailure",
      "specificProblem": "ch=1,ps=3",
      "alarmedObjectType": "Chassis",
      "alarmedObject": {
        "id": "95830731",
        "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "alarmChangedTime": "2019-07-03T03:32:52.744Z",
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:33:12.623Z",
      "ackState": "acknowledged",
      "parentAlarm": [
        {
          "id": "8675309",
          "href": "/alarmManagement/v4/alarm/868675309"
        }
      ],
      "comment": [
        {
          "userId": "bob@example.net",
          "systemId": "ems-1",
          "time": "2019-07-03T03:37:33.827Z",
          "comment": "Dispatched"
        }
      ]
    }
  ]
}
```

Group Alarms resource

Task resource for group alarms operation.

Resource model
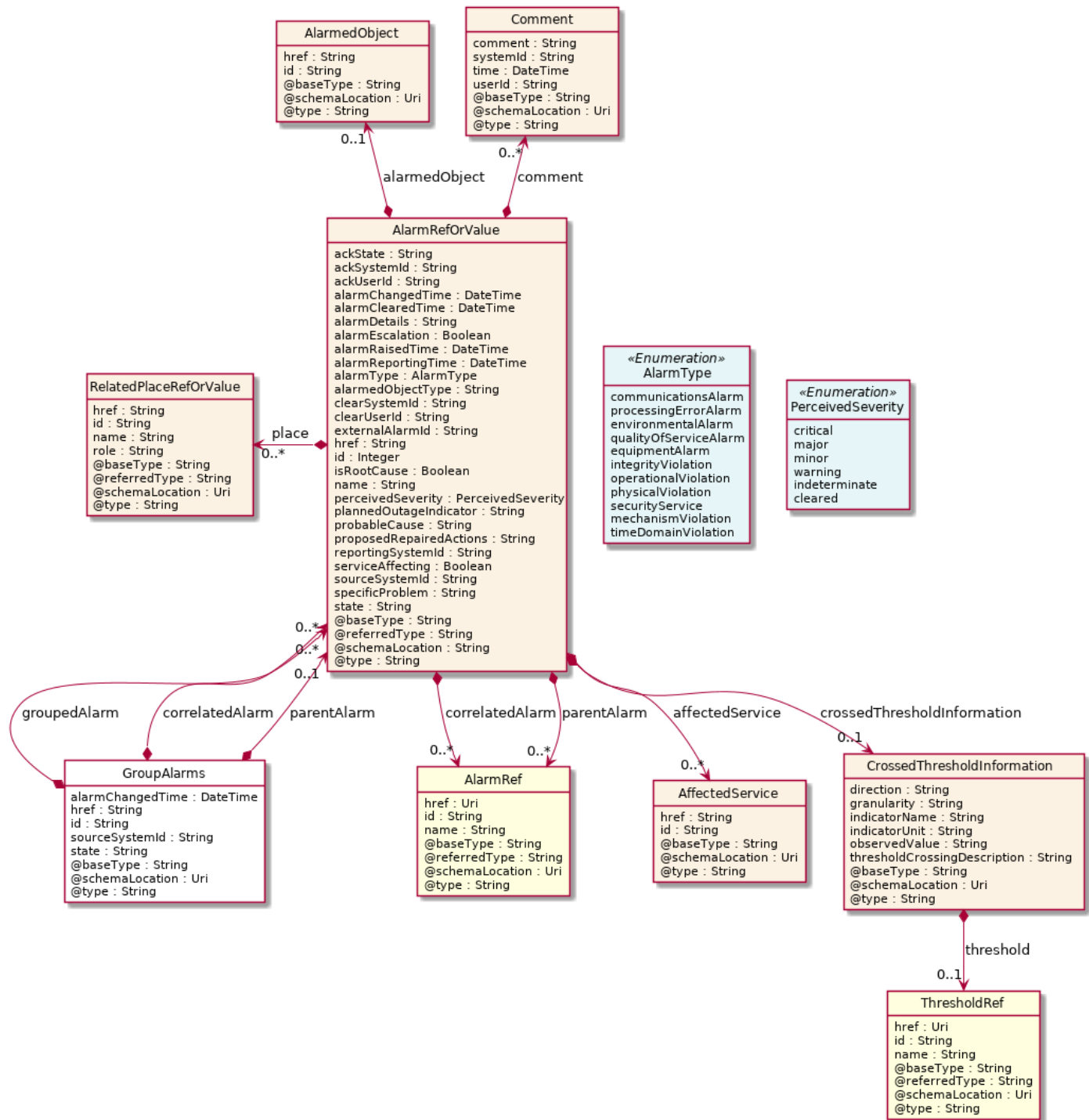
Field descriptions

GroupAlarms fields

alarmChangedTime   A date time (DateTime). Time of the correlation.

correlatedAlarm   A list of alarm ref or values (AlarmRefOrValue [*]). Correlated alarms.

groupedAlarm	A list of alarm ref or values (AlarmRefOrValue [*]). The successfully correlated alarms.
href	A string. A reference to the task.
id	A string. The identifier of the task.
parentAlarm	An alarm ref or value (AlarmRefOrValue). Root cause alarm.
sourceSystemId	A string. Source system identifier.
state	A string. Current state of the operation task.

AffectedService sub-resource

href	A string. Provides the identifier of the service affected by the alarm.
id	A string.

AlarmRefOrValue sub-resource

An alarm defined by reference or value. The polymorphic attributes @type, @schemaLocation & @referredType are related to the alarm entity and not the RelatedAlarmRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.
ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the

	alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
externalAlarmId	A string. An identifier of the alarm in the source system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.
sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).

affectedService	A list of affected services (AffectedService [*]).
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href	A string. A reference to the managed object associated with the event.
id	A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment	A string. Indicates the text of the comment.
systemId	A string. Indicates the system identifier on which the client set the comment.
time	A date time (DateTime). Indicates the time commenting the alarm.
userId	A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction	A string. Indicates the threshold crossing direction: up or down.
granularity	A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.
indicatorName	A string. Indicates the name of indicator which crossed the threshold.
indicatorUnit	A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.
observedValue	A string. Indicates the value of the indicator which crossed the threshold.
threshold	A threshold reference (ThresholdRef).
thresholdCrossingDescription	A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
role	A string.

AlarmRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.

href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

ThresholdRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of a 'GroupAlarms' resource object

```
{
  "id": "1029",
  "href": "/alarmManagement/v4/groupAlarms/1029",
  "sourceSystemId": "ems-1",
  "alarmChangedTime": "2019-07-03T03:32:52.744Z",
  "parentAlarm": {
    "id": "8675309"
  },
  "correlatedAlarm": [
    {
      "id": "8675399"
    }
  ],
  "state": "done",
  "groupedAlarm": [
    {
      "id": "8675309",
      "href": "/alarmManagement/v4/alarm/8675309",
      "@baseType": "Alarm",
```

```json
      "@type": "Alarm",
      "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
      "externalAlarmId": "5551212",
      "state": "raised",
      "alarmType": "environmentalAlarm",
      "perceivedSeverity": "minor",
      "probableCause": "rectifierLowVoltage",
      "specificProblem": "ps=3,sl=1,in=8",
      "alarmedObjectType": "Rectifier",
      "alarmedObject": {
        "id": "93051825",
        "href": "/resourceInventoryManagement/v4/resource/93051825"
      },
      "sourceSystemId": "ems-1",
      "alarmDetails": "voltage=204",
      "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
      "alarmReportingTime": "2019-07-03T03:32:17.552Z",
      "alarmChangedTime": "2019-07-03T03:32:52.744Z",
      "correlatedAlarm": [
        {
          "id": "8675399",
          "href": "/alarmManagement/v4/alarm/868675399"
        }
      ]
    },
    {
      "id": "8675399",
      "href": "/alarmManagement/v4/alarm/8675399",
      "@baseType": "Alarm",
      "@type": "Alarm",
      "@schemaLocation": "/alarmManagement/v4/Alarm.schema.json",
      "externalAlarmId": "5551234",
      "state": "raised",
      "alarmType": "equipmentAlarm",
      "perceivedSeverity": "minor",
      "probableCause": "powerSupplyFailure",
      "specificProblem": "ch=1,ps=3",
      "alarmedObjectType": "Chassis",
      "alarmedObject": {
        "id": "95830731",
        "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "alarmChangedTime": "2019-07-03T03:32:52.744Z",
      "parentAlarm": [
        {
          "id": "8675309",
          "href": "/alarmManagement/v4/alarm/868675309"
        }
      ]
    }
  ]
}
```

Un Group Alarms resource

Task resource for ungroup alarms operation.

Resource model
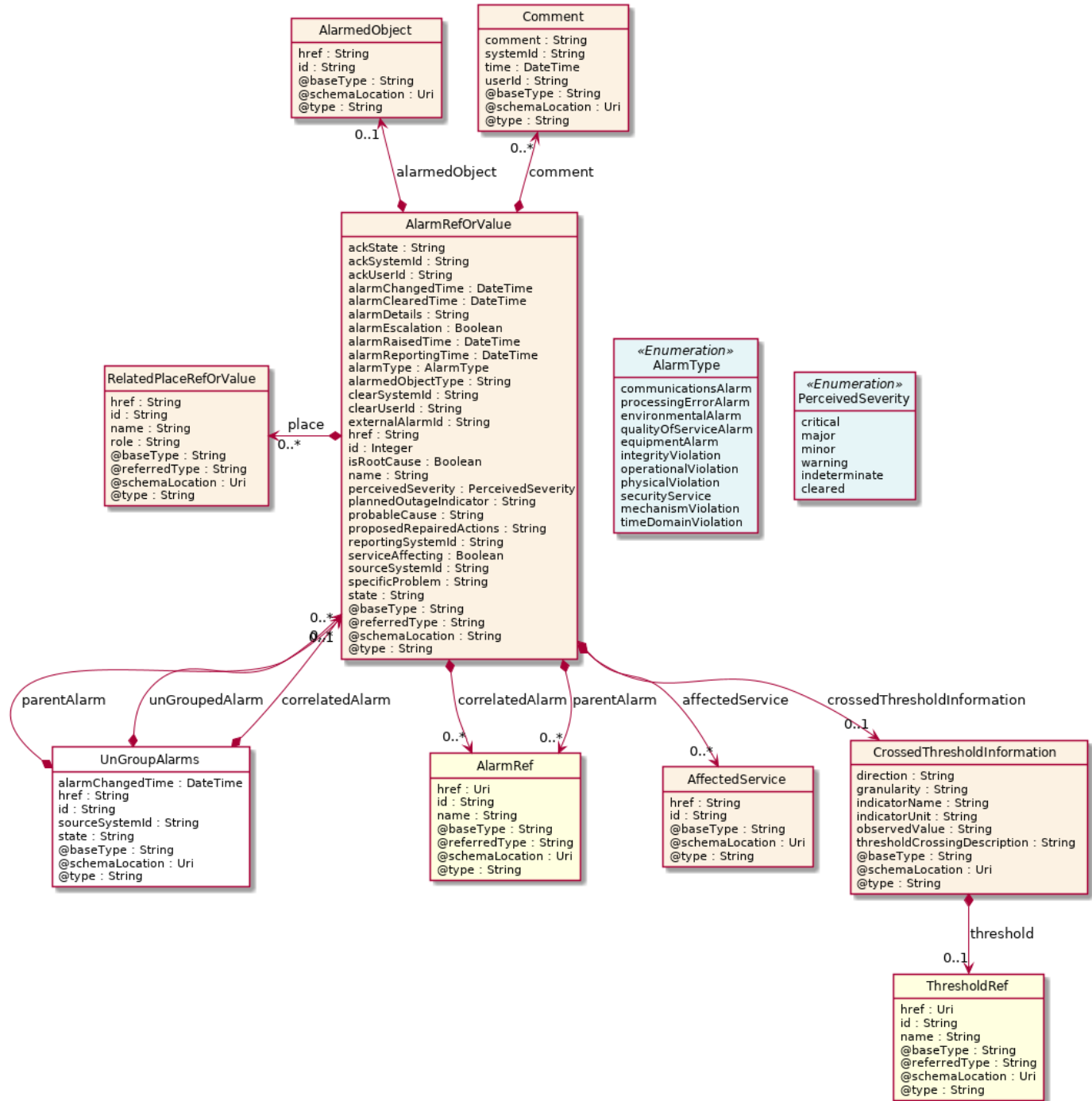
Field descriptions

UnGroupAlarms fields

alarmChangedTime	A date time (DateTime). Time of the uncorrelation.
correlatedAlarm	A list of alarm ref or values (AlarmRefOrValue [*]). Correlated alarms.
href	A string. A reference to the task.
id	A string. The identifier of the task.
parentAlarm	An alarm ref or value (AlarmRefOrValue). Root cause alarm.
sourceSystemId	A string. Source system identifier.
state	A string. Current state of the operation task.
unGroupedAlarm	A list of alarm ref or values (AlarmRefOrValue [*]). The successfully uncorrelated alarms.

AffectedService sub-resource

href	A string. Provides the identifier of the service affected by the alarm.
id	A string.

AlarmRefOrValue sub-resource

An alarm defined by reference or value. The polymorphic attributes @type, @schemaLocation & @referredType are related to the alarm entity and not the RelatedAlarmRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	A string. A reference to the alarm.
id	An integer. Identifier of the alarm, determined by the alarm owning system.
@baseType	A string. The base type of this alarm.
@schemaLocation	A string. A reference to the schema describing this alarm.
@type	A string. The type for this alarm.
ackState	A string. Provides the Acknowledgement State of the alarm (unacknowledged | acknowledged).
ackSystemId	A string. Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.

ackUserId	A string. Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.
alarmChangedTime	A date time (DateTime). Indicates the last date and time when the alarm is changed on the alarm-owning system. Any change to the alarm whether coming from the alarmed resource or triggered by a change from the client is changing this time.
alarmClearedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm is cleared at the source.
alarmDetails	A string. Contains further information on the alarm.
alarmEscalation	A boolean. Indicates if this alarm has been escalated or not.
alarmRaisedTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm occurred at its source.
alarmReportingTime	A date time (DateTime). Indicates the time (as a date + time) at which the alarm was reported by the owning OSS. It might be different from the alarmRaisedTime. For instance, if the alarm list is maintained by an EMS, the alarmRaisedtime would be the time the alarm was detected by the NE, while the alarmReportingTime would be the time this alarm was stored in the alarm list of the EMS.
alarmedObjectType	A string. The type (class) of the managed object associated with the event.
clearSystemId	A string. Provides the id of the system where the user who invoked the alarmCleared operation is located.
clearUserId	A string. Provides the id of the user who invoked the alarmCleared operation.
externalAlarmId	A string. An identifier of the alarm in the source system.
isRootCause	A boolean. Indicates whether the alarm is a root cause alarm.
plannedOutageIndicator	A string. Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service).
probableCause	A string. Provides the probable cause of the alarm. The values are consistent with ITU-T Recommendation X.733 or 3GPP TS 32.111-2 Annex B.
proposedRepairedActions	A string. Indicates proposed repair actions, if known to the system emitting the alarm.
reportingSystemId	A string. Reporting system identity.
serviceAffecting	A boolean. Indicates whether the alarm affects service or not.

sourceSystemId	A string. Source system identity.
specificProblem	A string. Provides more specific information about the alarm.
state	A string. Defines the alarm state during its life cycle (raised | updated | cleared).
affectedService	A list of affected services (AffectedService [*]).
alarmType	An alarm type (AlarmType). Categorizes the alarm (X.733 8.1.1, 3GPP TS 32.111-2 Annex A).
alarmedObject	An alarmed object (AlarmedObject). Identifies the managed object instance associated with the alarm.
comment	A list of comments (Comment [*]). Indicates the comments entered on the alarm.
correlatedAlarm	A list of alarm references (AlarmRef [*]).
crossedThresholdInformation	A crossed threshold information (CrossedThresholdInformation). Identifies the details of the threshold that has been crossed.
parentAlarm	A list of alarm references (AlarmRef [*]).
perceivedSeverity	A perceived severity (PerceivedSeverity). Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. Once an alarm has been cleared, its perceived severity is set to 'cleared' and can no longer be set.
place	A list of related place ref or values (RelatedPlaceRefOrValue [*]). Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

AlarmedObject sub-resource

Identifies the managed object instance associated with the alarm.

href	A string. A reference to the managed object associated with the event.
id	A string. The identifier of the managed object associated with the event.

Comment sub-resource

Indicates the comments entered on the alarm.

comment	A string. Indicates the text of the comment.

systemId	A string. Indicates the system identifier on which the client set the comment.
time	A date time (DateTime). Indicates the time commenting the alarm.
userId	A string. Indicates the user commenting the alarm.

CrossedThresholdInformation sub-resource

Identifies the details of the threshold that has been crossed.

direction	A string. Indicates the threshold crossing direction: up or down.
granularity	A string. Indicates the granularity at which the indicator is evaluated for threshold crossing.
indicatorName	A string. Indicates the name of indicator which crossed the threshold.
indicatorUnit	A string. Indicates the unit of the measurement of the indicator corresponding to the threshold that has been crossed.
observedValue	A string. Indicates the value of the indicator which crossed the threshold.
threshold	A threshold reference (ThresholdRef).
thresholdCrossingDescription	A string. Indicates further information on the threshold crossing alarm.

RelatedPlaceRefOrValue sub-resource

Related Entity reference. A related place defines a place described by reference or by value linked to a specific entity. The polymorphic attributes @type, @schemaLocation & @referredType are related to the place entity and not the RelatedPlaceRefOrValue class itself.

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. A user-friendly name for the place, such as [Paris Store], [London Store], [Main Home].
href	A string. Unique reference of the place.
id	A string. Unique identifier of the place.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.
role	A string.

AlarmRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

ThresholdRef relationship

@referredType	A string. The actual type of the target instance when needed for disambiguation.
name	A string. Name of the related entity.
href	An uri (Uri). Hyperlink reference.
id	A string. unique identifier.
@baseType	A string. When sub-classing, this defines the super-class.
@schemaLocation	An uri (Uri). A URI to a JSON-Schema file that defines additional attributes and relationships.
@type	A string. When sub-classing, this defines the sub-class Extensible name.

Json representation sample

We provide below the json representation of an example of a 'UnGroupAlarms' resource object

```
{
  "id": "1069",
  "href": "/alarmManagement/v4/groupAlarms/1069",
  "sourceSystemId": "ems-1",
  "alarmChangedTime": "2019-07-03T03:42:12.861Z",
  "parentAlarm": {
    "id": "8675309"
  },
  "correlatedAlarm": [
    {
      "id": "8675399"
    },
```

```
      {
        "id": "8675399"
      }
    ],
    "state": "done",
    "unGroupedAlarm": [
      {
        "id": "8675309",
        "href": "/alarmManagement/v4/alarm/8675309",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551212",
        "state": "raised",
        "alarmType": "environmentalAlarm",
        "perceivedSeverity": "minor",
        "probableCause": "rectifierLowVoltage",
        "specificProblem": "ps=3,sl=1,in=8",
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
          "id": "93051825",
          "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=204",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "alarmChangedTime": "2019-07-03T03:42:12.861Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:38:06.890Z",
        "ackState": "UNacknowledged",
        "comment": [
          {
            "userId": "bob@example.net",
            "systemId": "ems-1",
            "time": "2019-07-03T03:37:33.827Z",
            "comment": "Dispatched"
          }
        ]
      },
      {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551234",
        "state": "raised",
        "alarmType": "equipmentAlarm",
        "perceivedSeverity": "minor",
        "probableCause": "powerSupplyFailure",
        "specificProblem": "ch=1,ps=3",
        "alarmedObjectType": "Chassis",
        "alarmedObject": {
```

```
        "id": "95830731",
        "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "alarmChangedTime": "2019-07-03T03:42:12.861Z",
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:38:06.890Z",
      "ackState": "unacknowledged",
      "comment": [
        {
          "userId": "bob@example.net",
          "systemId": "ems-1",
          "time": "2019-07-03T03:37:33.827Z",
          "comment": "Dispatched"
        }
      ]
    }
  ]
}
```

Notification Resource Models

16 notifications are defined for this API

Notifications related to Alarm:
  - AlarmCreateEvent
  - AlarmAttributeValueChangeEvent
  - AlarmStateChangeEvent
  - AlarmDeleteEvent

Notifications related to AckAlarms:
  - AckAlarmsCreateEvent
  - AckAlarmsStateChangeEvent

Notifications related to UnAckAlarms:
  - UnAckAlarmsCreateEvent
  - UnAckAlarmsStateChangeEvent

Notifications related to ClearAlarms:
  - ClearAlarmsCreateEvent
  - ClearAlarmsStateChangeEvent

Notifications related to CommentAlarms:
  - CommentAlarmsCreateEvent
  - CommentAlarmsStateChangeEvent

Notifications related to GroupAlarms:
   - GroupAlarmsCreateEvent
   - GroupAlarmsStateChangeEvent

Notifications related to UnGroupAlarms:
   - UnGroupAlarmsCreateEvent
   - UnGroupAlarmsStateChangeEvent

The notification structure for all notifications in this API follow the pattern depicted by the figure below.

A notification event resource (depicted by "SpecificEvent" placeholder) is a sub class of a generic Event structure containing at least an id of the event occurrence (eventId), an event timestamp (eventTime), and the name of the resource (eventType).

This notification structure owns an event payload structure ("SpecificEventPayload" placeholder) linked to the resource concerned by the notification using the resource name as access field ("resourceName" placeholder).
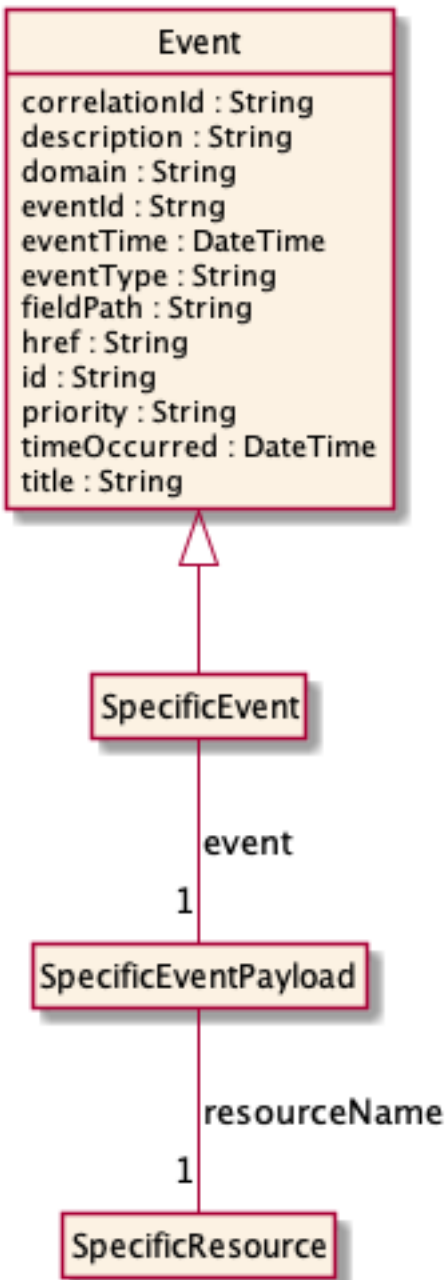
Alarm Create Event

Notification AlarmCreateEvent case for resource Alarm

Json representation sample

We provide below the json representation of an example of a 'AlarmCreateEvent' notification event object

```
{
  "eventId":"00001",
  "eventTime":"2015-11-16T16:42:25-04:00",
  "eventType":"AlarmCreateEvent",
  "event": {
```

```
      "alarm" :
         {-- SEE Alarm RESOURCE SAMPLE --}
   }
}
```

Alarm Attribute Value Change Event

Notification AlarmAttributeValueChangeEvent case for resource Alarm

Json representation sample

We provide below the json representation of an example of a 'AlarmAttributeValueChangeEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"AlarmAttributeValueChangeEvent",
   "event": {
      "alarm" :
         {-- SEE Alarm RESOURCE SAMPLE --}
   }
}
```

Alarm State Change Event

Notification AlarmStateChangeEvent case for resource Alarm

Json representation sample

We provide below the json representation of an example of an 'AlarmStateChangeEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"AlarmStateChangeEvent",
   "event": {
      "alarm" :
         {-- SEE Alarm RESOURCE SAMPLE --}
   }
}
```

Alarm Delete Event

Notification AlarmDeleteEvent case for resource Alarm

Json representation sample

We provide below the json representation of an example of an 'AlarmDeleteEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"AlarmDeleteEvent",
    "event": {
        "alarm" :
            {-- SEE Alarm RESOURCE SAMPLE --}
    }
}
```

Ack Alarms Create Event

Notification AckAlarmsCreateEvent case for resource AckAlarms

Json representation sample

We provide below the json representation of an example of an 'AckAlarmsCreateEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"AckAlarmsCreateEvent",
    "event": {
        "ackAlarms" :
            {-- SEE AckAlarms RESOURCE SAMPLE --}
    }
}
```

Ack Alarms State Change Event

Notification AckAlarmsStateChangeEvent case for resource AckAlarms

Json representation sample

We provide below the json representation of an example of a 'AckAlarmsStateChangeEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"AckAlarmsStateChangeEvent",
    "event": {
        "ackAlarms" :
            {-- SEE AckAlarms RESOURCE SAMPLE --}
    }
}
```

Un Ack Alarms Create Event

Notification UnAckAlarmsCreateEvent case for resource UnAckAlarms

Json representation sample

We provide below the json representation of an example of a 'UnAckAlarmsCreateEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"UnAckAlarmsCreateEvent",
     "event": {
       "unAckAlarms" :
           {-- SEE UnAckAlarms RESOURCE SAMPLE --}
    }
}
```

Un Ack Alarms State Change Event

Notification UnAckAlarmsStateChangeEvent case for resource UnAckAlarms

Json representation sample

We provide below the json representation of an example of a 'UnAckAlarmsStateChangeEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"UnAckAlarmsStateChangeEvent",
     "event": {
       "unAckAlarms" :
           {-- SEE UnAckAlarms RESOURCE SAMPLE --}
    }
}
```

Clear Alarms Create Event

Notification ClearAlarmsCreateEvent case for resource ClearAlarms

Json representation sample

We provide below the json representation of an example of a 'ClearAlarmsCreateEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"ClearAlarmsCreateEvent",
     "event": {
       "clearAlarms" :
           {-- SEE ClearAlarms RESOURCE SAMPLE --}
    }
}
```

Clear Alarms State Change Event

Notification ClearAlarmsStateChangeEvent case for resource ClearAlarms

Json representation sample

We provide below the json representation of an example of a 'ClearAlarmsStateChangeEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"ClearAlarmsStateChangeEvent",
    "event": {
      "clearAlarms" :
          {-- SEE ClearAlarms RESOURCE SAMPLE --}
   }
}
```

Comment Alarms Create Event

Notification CommentAlarmsCreateEvent case for resource CommentAlarms

Json representation sample

We provide below the json representation of an example of a 'CommentAlarmsCreateEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"CommentAlarmsCreateEvent",
    "event": {
      "commentAlarms" :
          {-- SEE CommentAlarms RESOURCE SAMPLE --}
   }
}
```

Comment Alarms State Change Event

Notification CommentAlarmsStateChangeEvent case for resource CommentAlarms

Json representation sample

We provide below the json representation of an example of a 'CommentAlarmsStateChangeEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
```

```
    "eventType":"CommentAlarmsStateChangeEvent",
     "event": {
       "commentAlarms" :
          {-- SEE CommentAlarms RESOURCE SAMPLE --}
    }
  }
```

Group Alarms Create Event

Notification GroupAlarmsCreateEvent case for resource GroupAlarms

Json representation sample

We provide below the json representation of an example of a 'GroupAlarmsCreateEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"GroupAlarmsCreateEvent",
     "event": {
       "groupAlarms" :
          {-- SEE GroupAlarms RESOURCE SAMPLE --}
    }
}
```

Group Alarms State Change Event

Notification GroupAlarmsStateChangeEvent case for resource GroupAlarms

Json representation sample

We provide below the json representation of an example of a 'GroupAlarmsStateChangeEvent' notification event object

```
{
    "eventId":"00001",
    "eventTime":"2015-11-16T16:42:25-04:00",
    "eventType":"GroupAlarmsStateChangeEvent",
     "event": {
       "groupAlarms" :
          {-- SEE GroupAlarms RESOURCE SAMPLE --}
    }
}
```

Un Group Alarms Create Event

Notification UnGroupAlarmsCreateEvent case for resource UnGroupAlarms

Json representation sample

We provide below the json representation of an example of a 'UnGroupAlarmsCreateEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"UnGroupAlarmsCreateEvent",
    "event": {
      "unGroupAlarms" :
         {-- SEE UnGroupAlarms RESOURCE SAMPLE --}
   }
}
```

Un Group Alarms State Change Event

Notification UnGroupAlarmsStateChangeEvent case for resource UnGroupAlarms

Json representation sample

We provide below the json representation of an example of a 'UnGroupAlarmsStateChangeEvent' notification event object

```
{
   "eventId":"00001",
   "eventTime":"2015-11-16T16:42:25-04:00",
   "eventType":"UnGroupAlarmsStateChangeEvent",
    "event": {
      "unGroupAlarms" :
         {-- SEE UnGroupAlarms RESOURCE SAMPLE --}
   }
}
```

API OPERATIONS

Remember the following Uniform Contract:

Operation on Entities	Uniform API Operation	Description
Query Entities	GET Resource	GET must be used to retrieve a representation of a resource.
Create Entity	POST Resource	POST must be used to create a new resource
Partial Update of an Entity	PATCH Resource	PATCH must be used to partially update a resource
Complete Update of an Entity	PUT Resource	PUT must be used to completely update a resource identified by its resource URI
Remove an Entity	DELETE Resource	DELETE must be used to remove a resource
Execute an Action on an Entity	POST on TASK Resource	POST must be used to execute Task Resources
Other Request Methods	POST on TASK Resource	GET and POST must not be used to tunnel other request methods.

Filtering and attribute selection rules are described in the TMF REST Design Guidelines.

Notifications are also described in a subsequent section.

Operations on Alarm

List alarms

```
GET /alarm?fields=...&{filtering}
```

Description

This operation list alarm entities.
Attribute selection is enabled for all first level attributes.
Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of alarms:

Request
GET /tmf-api/alarmManagement/v4/alarm Accept: application/json

Response

200
 	
[
  {
    "id": "8675309",
    "href": "/alarmManagement/v4/alarm/8675309",
    "@baseType": "Alarm",
    "@type": "Alarm",
    "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
    "externalAlarmId": "5551212",
    "state": "updated",
    "alarmType": "environmentalAlarm",
    "perceivedSeverity": "major",
    "probableCause": "rectifierLowVoltage",
    "specificProblem": "ps=3,sl=1,in=8",
    "alarmedObjectType": "Rectifier",
    "alarmedObject": {
      "id": "93051825",
      "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=95",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z",
    "alarmChangedTime": "2019-07-03T03:32:24.715Z"
  },

```
    {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551234",
        "state": "updated",
        "alarmType": "equipmentAlarm",
        "perceivedSeverity": "minor",
        "probableCause": "powerSupplyFailure",
        "specificProblem": "ch=1,ps=3",
        "alarmedObjectType": "Chassis",
        "alarmedObject": {
            "id": "95830731",
            "href": "/resourceInventoryManagement/v4/resource/95830731"
        },
        "sourceSystemId": "ems-1",
        "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
        "alarmReportingTime": "2019-07-03T03:32:18.102Z"
    }
]
```

Retrieve alarm

`GET /alarm/{id}?fields=...&{filtering}`

Description

This operation retrieves an alarm entity.

Attribute selection is enabled for all first level attributes.

Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving an alarm:

Request
GET /tmf-api/alarmManagement/v4/alarm/8675309 Accept: application/json
Response
200

```
{
    "id": "8675309",
    "href": "/alarmManagement/v4/alarm/8675309",
    "@baseType": "Alarm",
    "@type": "Alarm",
    "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
    "externalAlarmId": "5551212",
    "state": "updated",
    "alarmType": "environmentalAlarm",
    "perceivedSeverity": "major",
    "probableCause": "rectifierLowVoltage",
    "specificProblem": "ps=3,sl=1,in=8",
    "alarmedObjectType": "Rectifier",
    "alarmedObject": {
        "id": "93051825",
        "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=95",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z",
    "alarmChangedTime": "2019-07-03T03:32:24.715Z",
    "ackState": "unacknowledged"
}
```

Create alarm

POST /alarm

Description

This operation creates an alarm entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a Alarm, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
alarmType	
perceivedSeverity	
probableCause	
alarmedObject	
sourceSystemId	
state	
alarmRaisedTime	

Non Mandatory Attributes	Rule
@baseType	
@schemaLocation	
@type	
ackState	
ackSystemId	
ackUserId	
affectedService	
alarmChangedTime	
alarmClearedTime	
alarmDetails	
alarmEscalation	
alarmReportingTime	
alarmedObjectType	
clearSystemId	
clearUserId	
comment	
correlatedAlarm	
crossedThresholdInformation	
externalAlarmId	
isRootCause	
parentAlarm	
place	
plannedOutageIndicator	
proposedRepairedActions	
reportingSystemId	
serviceAffecting	
specificProblem	

Usage Samples

Example of a request for creating an alarm:

Request

```
POST /tmf-api/alarmManagement/v4/alarm
Content-Type: application/json

{
   "externalAlarmId": "5551212",
   "state": "raised",
   "alarmType": "environmentalAlarm",
   "perceivedSeverity": "minor",
   "probableCause": "rectifierLowVoltage",
   "specificProblem": "ps=3,sl=1,in=8",
   "alarmedObjectType": "NePowerSupply",
   "alarmedObject": {
      "id": "93051825",
```

```
        "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=204",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z"
}
```

Response

```
201

{
    "id": "8675309",
    "href": "/alarmManagement/v4/alarm/8675309",
    "externalAlarmId": "5551212",
    "state": "raised",
    "alarmType": "environmentalAlarm",
    "perceivedSeverity": "minor",
    "probableCause": "rectifierLowVoltage",
    "specificProblem": "ps=3,sl=1,in=8",
    "alarmedObjectType": "Rectifier",
    "alarmedObject": {
        "id": "93051825",
        "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=204",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z"
}
```

Patch alarm

PATCH /alarm/{id}

Description

This operation allows partial updates of an alarm entity. Support of json/merge (https://tools.ietf.org/html/rfc7386) is mandatory, support of json/patch (http://tools.ietf.org/html/rfc5789) is optional.

Note: If the update operation yields to the creation of sub-resources or relationships, the same rules concerning mandatory sub-resource attributes and default value settings in the POST operation applies to the PATCH operation. Hence these tables are not repeated here.

Patchable and Non Patchable Attributes

The tables below provide the list of patchable and non patchable attributes, including constraint rules on their usage.

Patchable Attributes	Rule
@baseType	
@schemaLocation	
@type	
ackState	
ackSystemId	
ackUserId	
affectedService	
alarmChangedTime	
alarmClearedTime	
alarmDetails	
alarmEscalation	
alarmReportingTime	
alarmType	
alarmedObject	
alarmedObjectType	
clearSystemId	
clearUserId	
comment	
correlatedAlarm	
crossedThresholdInformation	
externalAlarmId	
isRootCause	
parentAlarm	
perceivedSeverity	
place	
plannedOutageIndicator	
probableCause	
proposedRepairedActions	
reportingSystemId	
serviceAffecting	
specificProblem	
state	

Non Patchable Attributes	Rule
id	
href	
alarmRaisedTime	
sourceSystemId	

Usage Samples

Example of updating an alarm using json-patch:

Request

```
PATCH /tmf-api/alarmManagement/v4/alarm/8675309
Content-Type: application/json-patch+json

[
   {
      "op": "replace",
      "path": "/state",
      "value": "updated"
   },
   {
      "op": "replace",
      "path": "/perceivedSeverity",
      "value": "major"
   },
   {
      "op": "replace",
      "path": "/alarmChangedTime",
      "value": "2019-07-03T03:32:24.715Z"
   },
   {
      "op": "replace",
      "path": "/alarmDetails",
      "value": "voltage=95"
   }
]
```

Response

```
200

{
   "id": "8675309",
   "href": "/alarmManagement/v4/alarm/8675309",
   "externalAlarmId": "5551212",
   "state": "updated",
   "alarmType": "environmentalAlarm",
   "perceivedSeverity": "major",
   "probableCause": "rectifierLowVoltage",
   "specificProblem": "ps=3,sl=1,in=8",
   "alarmedObjectType": "Rectifier",
   "alarmedObject": {
      "id": "93051825",
      "href": "/resourceInventoryManagement/v4/resource/93051825"
   },
   "sourceSystemId": "ems-1",
   "alarmDetails": "voltage=95",
   "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
   "alarmReportingTime": "2019-07-03T03:32:17.552Z",
   "alarmChangedTime": "2019-07-03T03:32:24.715Z"
```

```
}
```

Example of updating an alarm using merge-patch:

Request

```
PATCH /tmf-api/alarmManagement/v4/alarm/8675309
Content-Type: application/merge-patch+json

{
    "state": "updated",
    "perceivedSeverity": "major",
    "alarmDetails": "voltage=95",
    "alarmChangedTime": "2019-07-03T03:32:24.715Z"
}
```

Response

```
200

{
    "id": "8675309",
    "href": "/alarmManagement/v4/alarm/8675309",
    "externalAlarmId": "5551212",
    "state": "updated",
    "alarmType": "environmentalAlarm",
    "perceivedSeverity": "major",
    "probableCause": "rectifierLowVoltage",
    "specificProblem": "ps=3,sl=1,in=8",
    "alarmedObjectType": "Rectifier",
    "alarmedObject": {
        "id": "93051825",
        "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=95",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z",
    "alarmChangedTime": "2019-07-03T03:32:24.715Z"
}
```

Example of acknowledging an alarm:

Request

```
PATCH /tmf-api/alarmManagement/v4/alarm/8675309
```

```
Content-Type: application/json-patch+json

[
  {
    "op": "replace",
    "path": "/ackState",
    "value": "acknowledged"
  },
  {
    "op": "replace",
    "path": "/ackSystemId",
    "value": "ems-1"
  },
  {
    "op": "replace",
    "path": "/ackUserId",
    "value": "bob@example.net"
  },
  {
    "op": "replace",
    "path": "/ackTime",
    "value": "2019-07-03T03:33:12.623Z"
  }
]
```

Response

```
200

{
  "id": "8675309",
  "href": "/alarmManagement/v4/alarm/8675309",
  "externalAlarmId": "5551212",
  "state": "updated",
  "alarmType": "environmentalAlarm",
  "perceivedSeverity": "major",
  "probableCause": "rectifierLowVoltage",
  "specificProblem": "ps=3,sl=1,in=8",
  "alarmedObjectType": "Rectifier",
  "alarmedObject": {
    "id": "93051825",
    "href": "/resourceInventoryManagement/v4/resource/93051825"
  },
  "sourceSystemId": "ems-1",
  "alarmDetails": "voltage=95",
  "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
  "alarmReportingTime": "2019-07-03T03:32:17.552Z",
  "alarmChangedTime": "2019-07-03T03:32:24.715Z",
  "ackTime": "2019-07-03T03:33:12.623Z",
  "ackState": "acknowledged",
  "ackSystemId": "ems-1",
  "ackUserId": "bob@example.net"
```

```
    }
```

Example of clearing an alarm:

Request

```
PATCH /tmf-api/alarmManagement/v4/alarm/8675309
Content-Type: application/json-patch+json

[
  {
    "op": "replace",
    "path": "/state",
    "value": "cleared"
  },
  {
    "op": "replace",
    "path": "/perceivedSeverity",
    "value": "cleared"
  },
  {
    "op": "replace",
    "path": "/alarmClearedTime",
    "value": "2019-07-03T03:55:45.937Z"
  },
  {
    "op": "replace",
    "path": "/clearSystemId",
    "value": "ems-1"
  },
  {
    "op": "replace",
    "path": "/clearUserId",
    "value": "bob@example.net"
  }
]
```

Response

```
200

{
  "id": "8675309",
  "href": "/alarmManagement/v4/alarm/8675309",
  "externalAlarmId": "5551212",
  "state": "cleared",
  "alarmType": "environmentalAlarm",
  "perceivedSeverity": "cleared",
  "probableCause": "rectifierLowVoltage",
```

```
    "specificProblem": "ps=3,sl=1,in=8",
    "alarmedObjectType": "Rectifier",
    "alarmedObject": {
       "id": "93051825",
       "href": "/resourceInventoryManagement/v4/resource/93051825"
    },
    "sourceSystemId": "ems-1",
    "alarmDetails": "voltage=95",
    "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
    "alarmReportingTime": "2019-07-03T03:32:17.552Z",
    "alarmChangedTime": "2019-07-03T03:35:45.923Z",
    "alarmClearedTime": "2019-07-03T03:55:45.937Z",
    "clearSystemId": "ems-1",
    "clearUserId": "bob@example.net"
}
```

Delete alarm

DELETE /alarm/{id}

Description

This operation deletes an alarm entity.

Usage Samples

Example of a request for deleting an alarm:

Request
DELETE /tmf-api/alarmManagement/v4/alarm/8675309
Response
204

Operations on Ack Alarms

List ack alarmses

GET /ackAlarms?fields=...&{filtering}

Description

This operation list ack alarms entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of acknowledge alarms tasks:

Request
GET /tmf-api/alarmManagement/v4/ackAlarms Accept: application/json

Response

200
 	
[
  {
    "id": "1038",
    "href": "/alarmManagement/v4/ackAlarms/1038",
    "ackSystemId": "ems-1",
    "ackUserId": "bob@example.net",
    "ackTime": "2019-07-03T03:33:12.623Z",
    "alarmPattern": [
      {
        "id": "8675309"
      },
      {
        "id": "8675399"
      }
    ],
    "state": "inProgress",
    "ackedAlarm": []
  }
]

Retrieve ack alarms

```
GET /ackAlarms/{id}?fields=...&{filtering}
```

Description

This operation retrieves an ack alarms entity.

Attribute selection is enabled for all first level attributes.

Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving an acknowledge alarms task:

Request
GET /tmf-api/alarmManagement/v4/ackAlarms/1038 Accept: application/json
Response

200
 	
{
   "id": "1038",
   "href": "/alarmManagement/v4/ackAlarms/1038",
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:33:12.623Z",
   "alarmPattern": [
     {
       "id": "8675309"
     },
     {
       "id": "8675399"
     }
   ],
   "state": "inProgress",
   "ackedAlarm": []
}

Create ack alarms

POST /ackAlarms

Description

This operation creates an ack alarms entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating an AckAlarms, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
ackSystemId	
ackUserId	
alarmPattern	

Non Mandatory Attributes	Rule
ackTime	
ackedAlarm	
state	

Usage Samples

Example of a request for creating a task to acknowledge alarms:

Request

```
POST /tmf-api/alarmManagement/v4/ackAlarms
Content-Type: application/json

{
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:33:12.623Z",
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "id": "8675399"
      }
   ]
}
```

Response

```
201

{
   "id": "1038",
   "href": "/alarmManagement/v4/ackAlarms/1038",
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:33:12.623Z",
```

```json
"alarmPattern": [
    {
        "id": "8675309"
    },
    {
        "id": "8675399"
    }
],
"state": "done",
"ackedAlarm": [
    {
        "id": "8675309",
        "href": "/alarmManagement/v4/alarm/8675309",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551212",
        "state": "updated",
        "alarmType": "environmentalAlarm",
        "perceivedSeverity": "major",
        "probableCause": "rectifierLowVoltage",
        "specificProblem": "ps=3,sl=1,in=8",
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
            "id": "93051825",
            "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=204",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "alarmChangedTime": "2019-07-03T03:32:24.715Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:33:12.623Z",
        "ackState": "acknowledged",
        "correlatedAlarm": [
            {
                "id": "8675399",
                "href": "/alarmManagement/v4/alarm/868675399"
            }
        ]
    },
    {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551234",
        "state": "raised",
        "alarmType": "Equipment Alarm",
        "perceivedSeverity": "minor",
        "probableCause": "powerSupplyFailure",
```

```
      "specificProblem": "ch=1,ps=3",
      "alarmedObjectType": "Chassis",
      "alarmedObject": {
         "id": "95830731",
         "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:33:12.623Z",
      "ackState": "acknowledged",
      "parentAlarm": [
        {
           "id": "8675309",
           "href": "/alarmManagement/v4/alarm/868675309"
        }
      ]
    }
  ]
}
```

Example of a request using the external identifier:

Request

POST /tmf-api/alarmManagement/v4/ackAlarms
Content-Type: application/json
 	
{
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:33:12.623Z",
   "alarmPattern": [
     {
       "sourceSystemId": "ems-1",
       "externalAlarmId": "5551212"
     }
   ]
}

Response

201
 	
{
   "id": "1039",
   "href": "/alarmManagement/v4/ackAlarms/1039",

```json
    "ackSystemId": "ems-1",
    "ackUserId": "bob@example.net",
    "ackTime": "2019-07-03T03:33:12.623Z",
    "alarmPattern": [
      {
        "sourceSystemId": "ems-1",
        "externalAlarmId": "5551212"
      }
    ],
    "state": "done",
    "ackedAlarm": [
      {
        "id": "8675309",
        "href": "/alarmManagement/v4/alarm/8675309",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551212",
        "state": "updated",
        "alarmType": "environmentalAlarm",
        "perceivedSeverity": "major",
        "probableCause": "rectifierLowVoltage",
        "specificProblem": "ps=3,sl=1,in=8",
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
          "id": "93051825",
          "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=204",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "alarmChangedTime": "2019-07-03T03:32:24.715Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:33:12.623Z",
        "ackState": "acknowledged",
        "correlatedAlarm": [
          {
            "id": "8675399",
            "href": "/alarmManagement/v4/alarm/868675399"
          }
        ]
      }
    ]
}
```

Example of a request matching correlated alarms:

Request
POST /tmf-api/alarmManagement/v4/ackAlarms

```
Content-Type: application/json

{
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:33:12.623Z",
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "parentAlarm": {
            "id": "8675309"
         }
      }
   ]
}
```

Response

```
201

{
   "id": "1040",
   "href": "/alarmManagement/v4/ackAlarms/1040",
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:33:12.623Z",
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "parentAlarm": {
            "id": "8675309"
         }
      }
   ],
   "state": "done",
   "ackedAlarm": [
      {
         "id": "8675309",
         "href": "/alarmManagement/v4/alarm/8675309",
         "@baseType": "Alarm",
         "@type": "Alarm",
         "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
         "externalAlarmId": "5551212",
         "state": "updated",
         "alarmType": "environmentalAlarm",
         "perceivedSeverity": "major",
         "probableCause": "rectifierLowVoltage",
         "specificProblem": "ps=3,sl=1,in=8",
```

```
      "alarmedObjectType": "Rectifier",
      "alarmedObject": {
         "id": "93051825",
         "href": "/resourceInventoryManagement/v4/resource/93051825"
      },
      "sourceSystemId": "ems-1",
      "alarmDetails": "voltage=204",
      "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
      "alarmReportingTime": "2019-07-03T03:32:17.552Z",
      "alarmChangedTime": "2019-07-03T03:32:24.715Z",
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:33:12.623Z",
      "ackState": "acknowledged",
      "correlatedAlarm": [
         {
            "id": "8675399",
            "href": "/alarmManagement/v4/alarm/868675399"
         }
      ]
   },
   {
      "id": "8675399",
      "href": "/alarmManagement/v4/alarm/8675399",
      "@baseType": "Alarm",
      "@type": "Alarm",
      "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
      "externalAlarmId": "5551234",
      "state": "raised",
      "alarmType": "equipmentAlarm",
      "perceivedSeverity": "minor",
      "probableCause": "powerSupplyFailure",
      "specificProblem": "ch=1,ps=3",
      "alarmedObjectType": "Chassis",
      "alarmedObject": {
         "id": "95830731",
         "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "ackSystemId": "ems-1",
      "ackUserId": "bob@example.net",
      "ackTime": "2019-07-03T03:33:12.623Z",
      "ackState": "acknowledged",
      "parentAlarm": [
         {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/868675309"
         }
      ]
   }
 ]
}
```

Operations on Un Ack Alarms

List un ack alarmses

```
GET /unAckAlarms?fields=...&{filtering}
```

Description

This operation list un ack alarms entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of unacknowledged alarms tasks:

Request
GET /tmf-api/alarmManagement/v4/unAckAlarms Accept: application/json

Response

200
 	
[
  {
    "id": "1052",
    "href": "/alarmManagement/v4/unAckAlarms/1052",
    "ackSystemId": "ems-1",
    "ackUserId": "bob@example.net",
    "ackTime": "2019-07-03T03:38:06.890Z",
    "alarmPattern": [
      {
        "id": "8675309"
      },
      {
        "id": "8675399"
      }
    ],
    "state": "inProgress",
    "unAckedAlarm": []
  }
]

Retrieve un ack alarms

```
GET /unAckAlarms/{id}?fields=...&{filtering}
```

Description

This operation retrieves an un ack alarms entity.

Attribute selection is enabled for all first level attributes.

Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving an unacknowledged alarms task:

Request
GET /tmf-api/alarmManagement/v4/unAckAlarms/1052 Accept: application/json
Response

200
 	
{
   "id": "1052",
   "href": "/alarmManagement/v4/unAckAlarms/1052",
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:38:06.890Z",
   "alarmPattern": [
     {
       "id": "8675309"
     },
     {
       "id": "8675399"
     }
   ],
   "state": "inProgress",
   "unAckedAlarm": []
}

Create un ack alarms

POST /unAckAlarms

Description

This operation creates an un ack alarms entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a UnAckAlarms, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
ackSystemId	
ackUserId	
alarmPattern	

Non Mandatory Attributes	Rule
ackTime	
state	
unAckedAlarm	

Usage Samples

Example of a request for creating a task to unacknowledge alarms:

Request

POST /tmf-api/alarmManagement/v4/unAckAlarms
Content-Type: application/json

```
{
   "ackSystemId": "ems-1",
   "ackUserId": "bob@example.net",
   "ackTime": "2019-07-03T03:38:06.890Z",
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "id": "8675399"
      }
   ]
}
```

Response

```
201

{
    "id": "1052",
    "href": "/alarmManagement/v4/unAckAlarms/1052",
    "ackSystemId": "ems-1",
    "ackUserId": "bob@example.net",
    "ackTime": "2019-07-03T03:38:06.890Z",
    "alarmPattern": [
        {
            "id": "8675309"
        },
        {
            "id": "8675399"
        }
    ],
    "state": "done",
    "unAckedAlarm": [
        {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/8675309",
            "@baseType": "Alarm",
            "@type": "Alarm",
            "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
            "externalAlarmId": "5551212",
            "state": "updated",
            "alarmType": "environmentalAlarm",
            "perceivedSeverity": "major",
            "probableCause": "rectifierLowVoltage",
            "specificProblem": "ps=3,sl=1,in=8",
            "alarmedObjectType": "Rectifier",
            "alarmedObject": {
                "id": "93051825",
                "href": "/resourceInventoryManagement/v4/resource/93051825"
            },
            "sourceSystemId": "ems-1",
            "alarmDetails": "voltage=95",
            "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
            "alarmReportingTime": "2019-07-03T03:32:17.552Z",
            "ackSystemId": "ems-1",
            "ackUserId": "bob@example.net",
            "ackTime": "2019-07-03T03:38:06.890Z",
            "ackState": "UNacknowledged",
            "correlatedAlarm": [
                {
                    "id": "8675399",
                    "href": "/alarmManagement/v4/alarm/868675399"
                }
            ],
            "comment": [
                {
                    "userId": "bob@example.net",
                    "systemId": "ems-1",
```

```
            "time": "2019-07-03T03:37:33.827Z",
            "comment": "Dispatched"
          }
        ]
      },
      {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551234",
        "state": "raised",
        "alarmType": "equipmentAlarm",
        "perceivedSeverity": "minor",
        "probableCause": "powerSupplyFailure",
        "specificProblem": "ch=1,ps=3",
        "alarmedObjectType": "Chassis",
        "alarmedObject": {
          "id": "95830731",
          "href": "/resourceInventoryManagement/v4/resource/95830731"
        },
        "sourceSystemId": "ems-1",
        "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
        "alarmReportingTime": "2019-07-03T03:32:18.102Z",
        "alarmChangedTime": "2019-07-03T03:32:52.744Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:38:06.890Z",
        "ackState": "unacknowledged",
        "parentAlarm": [
          {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/868675309"
          }
        ],
        "comment": [
          {
            "userId": "bob@example.net",
            "systemId": "ems-1",
            "time": "2019-07-03T03:37:33.827Z",
            "comment": "Dispatched"
          }
        ]
      }
    ]
}
```

Operations on Clear Alarms

List clear alarms

GET /clearAlarms?fields=...&{filtering}

Description

This operation list clear alarms entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of clear alarms tasks:

Request
GET /tmf-api/alarmManagement/v4/clearAlarms Accept: application/json

Response

200
 	
[
  {
    "id": "1089",
    "href": "/alarmManagement/v4/commentAlarms/1089",
    "clearSystemId": "ems-1",
    "clearUserId": "bob@example.net",
    "alarmClearedTime": "2019-07-03T03:55:45.937Z",
    "alarmPattern": [
      {
        "id": "8675309"
      },
      {
        "id": "8675399"
      }
    ],
    "state": "inProgress",
    "clearedAlarm": []
  }
]

Retrieve clear alarms

GET /clearAlarms/{id}?fields=...&{filtering}

Description

This operation retrieves a clear alarms entity.

Attribute selection is enabled for all first level attributes.

Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a clear alarms task:

Request
GET /tmf-api/alarmManagement/v4/clearAlarms/1089 Accept: application/json
Response

200
 	
{
  "id": "1089",
  "href": "/alarmManagement/v4/commentAlarms/1089",
  "clearSystemId": "ems-1",
  "clearUserId": "bob@example.net",
  "alarmClearedTime": "2019-07-03T03:55:45.937Z",
  "alarmPattern": [
    {
      "id": "8675309"
    },
    {
      "id": "8675399"
    }
  ],
  "state": "inProgress",
  "clearedAlarm": []
}

Create clear alarms

POST /clearAlarms

Description

This operation creates a clear alarms entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a ClearAlarms, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
clearSystemId	
clearUserId	
alarmClearedTime	
alarmPattern	

Non Mandatory Attributes	Rule
clearedAlarm	
state	

Usage Samples

Example of a request for creating a task to clear alarms:

Request

```
POST /tmf-api/alarmManagement/v4/clearAlarms
Content-Type: application/json

{
   "clearSystemId": "ems-1",
   "clearUserId": "bob@example.net",
   "alarmClearedTime": "2019-07-03T03:55:45.937Z",
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "id": "8675399"
      }
   ]
}
```

Response

```
201

{
   "id": "1089",
   "href": "/alarmManagement/v4/commentAlarms/1089",
   "clearSystemId": "ems-1",
   "clearUserId": "bob@example.net",
   "alarmClearedTime": "2019-07-03T03:55:45.937Z",
```

```
  "alarmPattern": [
     {
        "id": "8675309"
     },
     {
        "id": "8675399"
     }
  ],
  "state": "done",
  "clearedAlarm": [
     {
        "id": "8675309",
        "href": "/alarmManagement/v4/alarm/8675309",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551212",
        "state": "cleared",
        "alarmType": "environmentalAlarm",
        "perceivedSeverity": "cleared",
        "probableCause": "rectifierLowVoltage",
        "specificProblem": "ps=3,sl=1,in=8",
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
           "id": "93051825",
           "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=95",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "alarmChangedTime": "2019-07-03T03:42:12.861Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:38:06.890Z",
        "ackState": "UNacknowledged",
        "comment": [
           {
              "userId": "bob@example.net",
              "systemId": "ems-1",
              "time": "2019-07-03T03:37:33.827Z",
              "comment": "Dispatched"
           }
        ],
        "clearSystemId": "ems-1",
        "clearUserId": "bob@example.net",
        "alarmClearedTime": "2019-07-03T03:55:45.937Z"
     },
     {
        "id": "8675399",
        "href": "/alarmManagement/v4/alarm/8675399",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
```

```
    "externalAlarmId": "5551234",
    "state": "cleared",
    "alarmType": "equipmentAlarm",
    "perceivedSeverity": "cleared",
    "probableCause": "powerSupplyFailure",
    "specificProblem": "ch=1,ps=3",
    "alarmedObjectType": "Chassis",
    "alarmedObject": {
      "id": "95830731",
      "href": "/resourceInventoryManagement/v4/resource/95830731"
    },
    "sourceSystemId": "ems-1",
    "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
    "alarmReportingTime": "2019-07-03T03:32:18.102Z",
    "alarmChangedTime": "2019-07-03T03:42:12.861Z",
    "ackSystemId": "ems-1",
    "ackUserId": "bob@example.net",
    "ackTime": "2019-07-03T03:38:06.890Z",
    "ackState": "unacknowledged",
    "comment": [
      {
        "userId": "bob@example.net",
        "systemId": "ems-1",
        "time": "2019-07-03T03:37:33.827Z",
        "comment": "Dispatched"
      }
    ],
    "clearSystemId": "ems-1",
    "clearUserId": "bob@example.net",
    "alarmClearedTime": "2019-07-03T03:55:45.937Z"
    }
  ]
}
```

Operations on Comment Alarms

List comment alarmses

GET /commentAlarms?fields=...&{filtering}

Description

This operation list comment alarms entities.
Attribute selection is enabled for all first level attributes.
Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of comment alarms tasks:

<table>
<tr><td>

Request

</td></tr>
<tr><td>

GET /tmf-api/alarmManagement/v4/commentAlarms
Accept: application/json

</td></tr>
<tr><td>

Response

</td></tr>
<tr><td>

```
200

[
  {
    "id": "1045",
    "href": "/alarmManagement/v4/ackAlarms/1045",
    "comment": {
      "userId": "bob@example.net",
      "systemId": "ems-1",
      "time": "2019-07-03T03:37:33.827Z",
      "comment": "Dispatched"
    },
    "alarmPattern": [
      {
        "id": "8675309"
      },
      {
        "id": "8675399"
      }
    ],
    "state": "inProgress",
    "commentedAlarm": []
  }
]
```

</td></tr>
</table>

Retrieve comment alarms

```
GET /commentAlarms/{id}?fields=...&{filtering}
```

Description

This operation retrieves a comment alarms entity.
Attribute selection is enabled for all first level attributes.
Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a comment alarms task:

Request
GET /tmf-api/alarmManagement/v4/commentAlarms/1045 Accept: application/json
Response

200
 	
{
   "id": "1045",
   "href": "/alarmManagement/v4/ackAlarms/1045",
   "comment": {
      "userId": "bob@example.net",
      "systemId": "ems-1",
      "time": "2019-07-03T03:37:33.827Z",
      "comment": "Dispatched"
   },
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "id": "8675399"
      }
   ],
   "state": "inProgress",
   "commentedAlarm": []
}

Create comment alarms

POST /commentAlarms

Description

This operation creates a comment alarms entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a CommentAlarms, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
comment	
alarmPattern	

Non Mandatory Attributes	Rule
commentedAlarm	
state	

Usage Samples

Example of a request for creating a task to comment alarms:

Request

```
POST /tmf-api/alarmManagement/v4/commentAlarms
Content-Type: application/json

{
   "comment": {
      "userId": "bob@example.net",
      "systemId": "ems-1",
      "time": "2019-07-03T03:37:33.827Z",
      "comment": "Dispatched"
   },
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "id": "8675399"
      }
   ]
}
```

Response

```
201

{
   "id": "1045",
   "href": "/alarmManagement/v4/ackAlarms/1045",
   "comment": {
      "userId": "bob@example.net",
      "systemId": "ems-1",
      "time": "2019-07-03T03:37:33.827Z",
      "comment": "Dispatched"
   },
   "alarmPattern": [
      {
         "id": "8675309"
      },
      {
         "id": "8675399"
```

```json
        }
      ],
      "state": "done",
      "commentedAlarm": [
        {
          "id": "8675309",
          "href": "/alarmManagement/v4/alarm/8675309",
          "@baseType": "Alarm",
          "@type": "Alarm",
          "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
          "externalAlarmId": "5551212",
          "state": "updated",
          "alarmType": "environmentalAlarm",
          "perceivedSeverity": "major",
          "probableCause": "rectifierLowVoltage",
          "specificProblem": "ps=3,sl=1,in=8",
          "alarmedObjectType": "Rectifier",
          "alarmedObject": {
            "id": "93051825",
            "href": "/resourceInventoryManagement/v4/resource/93051825"
          },
          "sourceSystemId": "ems-1",
          "alarmDetails": "voltage=95",
          "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
          "alarmReportingTime": "2019-07-03T03:32:17.552Z",
          "alarmChangedTime": "2019-07-03T03:32:52.744Z",
          "ackSystemId": "ems-1",
          "ackUserId": "bob@example.net",
          "ackTime": "2019-07-03T03:33:12.623Z",
          "ackState": "acknowledged",
          "correlatedAlarm": [
            {
              "id": "8675399",
              "href": "/alarmManagement/v4/alarm/868675399"
            }
          ],
          "comment": [
            {
              "userId": "bob@example.net",
              "systemId": "ems-1",
              "time": "2019-07-03T03:37:33.827Z",
              "comment": "Dispatched"
            }
          ]
        },
        {
          "id": "8675399",
          "href": "/alarmManagement/v4/alarm/8675399",
          "@baseType": "Alarm",
          "@type": "Alarm",
          "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
          "externalAlarmId": "5551234",
          "state": "raised",
          "alarmType": "equipmentAlarm",
```

```
        "perceivedSeverity": "minor",
        "probableCause": "powerSupplyFailure",
        "specificProblem": "ch=1,ps=3",
        "alarmedObjectType": "Chassis",
        "alarmedObject": {
            "id": "95830731",
            "href": "/resourceInventoryManagement/v4/resource/95830731"
        },
        "sourceSystemId": "ems-1",
        "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
        "alarmReportingTime": "2019-07-03T03:32:18.102Z",
        "alarmChangedTime": "2019-07-03T03:32:52.744Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:33:12.623Z",
        "ackState": "acknowledged",
        "parentAlarm": [
            {
                "id": "8675309",
                "href": "/alarmManagement/v4/alarm/868675309"
            }
        ],
        "comment": [
            {
                "userId": "bob@example.net",
                "systemId": "ems-1",
                "time": "2019-07-03T03:37:33.827Z",
                "comment": "Dispatched"
            }
        ]
    }
  ]
}
```

Operations on Group Alarms

List group alarmses

GET /groupAlarms?fields=...&{filtering}

Description

This operation list group alarms entities.
Attribute selection is enabled for all first level attributes.
Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of group alarms tasks:

Request
GET /tmf-api/alarmManagement/v4/groupAlarms Accept: application/json

Response

200
 	
`[`
  `{`
    `"id": "1029",`
    `"href": "/alarmManagement/v4/groupAlarms/1029",`
    `"sourceSystemId": "ems-1",`
    `"alarmChangedTime": "2019-07-03T03:32:52.744Z",`
    `"parentAlarm": {`
      `"id": "8675309"`
    `},`
    `"correlatedAlarm": [`
      `{`
        `"id": "8675399"`
      `}`
    `],`
    `"state": "inProgress",`
    `"groupedAlarm": []`
  `}`
`]`

Retrieve group alarms

```
GET /groupAlarms/{id}?fields=...&{filtering}
```

Description

This operation retrieves a group alarms entity.

Attribute selection is enabled for all first level attributes.

Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving an group alarms task:

Request
GET /tmf-api/alarmManagement/v4/groupAlarms/1029

Accept: application/json

Response

```
200

{
    "id": "1029",
    "href": "/alarmManagement/v4/groupAlarms/1029",
    "sourceSystemId": "ems-1",
    "alarmChangedTime": "2019-07-03T03:32:52.744Z",
    "parentAlarm": {
        "id": "8675309"
    },
    "correlatedAlarm": [
        {
            "id": "8675399"
        }
    ],
    "state": "inProgress",
    "groupedAlarm": []
}
```

Create group alarms

POST /groupAlarms

Description

This operation creates a group alarms entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a GroupAlarms, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
sourceSystemId	
alarmChangedTime	
parentAlarm	
correlatedAlarm	

Non Mandatory Attributes	Rule
groupedAlarm	
state	

Usage Samples

Example of a request for creating a task to group alarms:

Request

```
POST /tmf-api/alarmManagement/v4/groupAlarms
Content-Type: application/json

{
   "sourceSystemId": "ems-1",
   "alarmChangedTime": "2019-07-03T03:32:52.744Z",
   "parentAlarm": {
      "id": "8675309"
   },
   "correlatedAlarm": [
      {
         "id": "8675399"
      }
   ]
}
```

Response

```
201

{
   "id": "1029",
   "href": "/alarmManagement/v4/groupAlarms/1029",
   "sourceSystemId": "ems-1",
   "alarmChangedTime": "2019-07-03T03:32:52.744Z",
   "parentAlarm": {
      "id": "8675309"
   },
   "correlatedAlarm": [
      {
         "id": "8675399"
      }
   ],
   "state": "done",
   "groupedAlarm": [
      {
         "id": "8675309",
         "href": "/alarmManagement/v4/alarm/8675309",
         "@baseType": "Alarm",
         "@type": "Alarm",
         "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
         "externalAlarmId": "5551212",
         "state": "updated",
         "alarmType": "environmentalAlarm",
         "perceivedSeverity": "major",
```

```
      "probableCause": "rectifierLowVoltage",
      "specificProblem": "ps=3,sl=1,in=8",
      "alarmedObjectType": "Rectifier",
      "alarmedObject": {
         "id": "93051825",
         "href": "/resourceInventoryManagement/v4/resource/93051825"
      },
      "sourceSystemId": "ems-1",
      "alarmDetails": "voltage=95",
      "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
      "alarmReportingTime": "2019-07-03T03:32:17.552Z",
      "alarmChangedTime": "2019-07-03T03:32:52.744Z",
      "correlatedAlarm": [
         {
            "id": "8675399",
            "href": "/alarmManagement/v4/alarm/868675399"
         }
      ]
   },
   {
      "id": "8675399",
      "href": "/alarmManagement/v4/alarm/8675399",
      "@baseType": "Alarm",
      "@type": "Alarm",
      "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
      "externalAlarmId": "5551234",
      "state": "raised",
      "alarmType": "equipmentAlarm",
      "perceivedSeverity": "minor",
      "probableCause": "powerSupplyFailure",
      "specificProblem": "ch=1,ps=3",
      "alarmedObjectType": "Chassis",
      "alarmedObject": {
         "id": "95830731",
         "href": "/resourceInventoryManagement/v4/resource/95830731"
      },
      "sourceSystemId": "ems-1",
      "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
      "alarmReportingTime": "2019-07-03T03:32:18.102Z",
      "alarmChangedTime": "2019-07-03T03:32:52.744Z",
      "parentAlarm": [
         {
            "id": "8675309",
            "href": "/alarmManagement/v4/alarm/868675309"
         }
      ]
   }
  ]
}
```

Operations on Un Group Alarms

List un group alarms

GET /unGroupAlarms?fields=...&{filtering}

Description

This operation list ungroup alarms entities.

Attribute selection is enabled for all first level attributes.

Filtering may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving a list of ungroup alarms tasks:

Request
GET /tmf-api/alarmManagement/v4/unGroupAlarms Accept: application/json
Response

200
 	
[
  {
    "id": "1069",
    "href": "/alarmManagement/v4/groupAlarms/1069",
    "sourceSystemId": "ems-1",
    "alarmChangedTime": "2019-07-03T03:42:12.861Z",
    "parentAlarm": {
      "id": "8675309"
    },
    "correlatedAlarm": [
      {
        "id": "8675399"
      },
      {
        "id": "8675399"
      }
    ],
    "state": "inProgress",
    "unGroupedAlarm": []
  }
]

Retrieve ungroup alarms

GET /unGroupAlarms/{id}?fields=...&{filtering}

Description

This operation retrieves an ungroup alarms entity.
Attribute selection is enabled for all first level attributes.
Filtering on sub-resources may be available depending on the compliance level supported by an implementation.

Usage Samples

Example of a request for retrieving an ungroup alarms task:

Request
GET /tmf-api/alarmManagement/v4/unGroupAlarms/1069 Accept: application/json
Response

200
 	
{
  "id": "1069",
  "href": "https://host:port/alarmManagement/v4/groupAlarms/1069",
  "sourceSystemId": "ems-1",
  "alarmChangedTime": "2019-07-03T03:42:12.861Z",
  "parentAlarm": {
    "id": "8675309"
  },
  "correlatedAlarm": [
    {
      "id": "8675399"
    },
    {
      "id": "8675399"
    }
  ],
  "state": "inProgress",
  "unGroupedAlarm": []
}

Create ungroup alarms

POST /unGroupAlarms

Description

This operation creates an ungroup alarms entity.

Mandatory and Non Mandatory Attributes

The following tables provide the list of mandatory and non mandatory attributes when creating a UnGroupAlarms, including any possible rule conditions and applicable default values. Notice that it is up to an implementer to add additional mandatory attributes.

Mandatory Attributes	Rule
sourceSystemId	
alarmChangedTime	
parentAlarm	
correlatedAlarm	

Non Mandatory Attributes	Rule
state	
unGroupedAlarm	

Usage Samples

Example of a request for creating a task to ungroup alarms:

Request

```
POST /tmf-api/alarmManagement/v4/unGroupAlarms
Content-Type: application/json

{
   "sourceSystemId": "ems-1",
   "alarmChangedTime": "2019-07-03T03:42:12.861Z",
   "parentAlarm": {
      "id": "8675309"
   },
   "correlatedAlarm": [
      {
         "id": "8675399"
      },
      {
         "id": "8675399"
      }
   ]
}
```

Response

```
201

{
```

```
"id": "1069",
"href": "/alarmManagement/v4/groupAlarms/1069",
"sourceSystemId": "ems-1",
"alarmChangedTime": "2019-07-03T03:42:12.861Z",
"parentAlarm": {
    "id": "8675309"
},
"correlatedAlarm": [
    {
        "id": "8675399"
    },
    {
        "id": "8675399"
    }
],
"state": "done",
"unGroupedAlarm": [
    {
        "id": "8675309",
        "href": "/alarmManagement/v4/alarm/8675309",
        "@baseType": "Alarm",
        "@type": "Alarm",
        "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
        "externalAlarmId": "5551212",
        "state": "updated",
        "alarmType": "environmentalAlarm",
        "perceivedSeverity": "major",
        "probableCause": "rectifierLowVoltage",
        "specificProblem": "ps=3,sl=1,in=8",
        "alarmedObjectType": "Rectifier",
        "alarmedObject": {
            "id": "93051825",
            "href": "/resourceInventoryManagement/v4/resource/93051825"
        },
        "sourceSystemId": "ems-1",
        "alarmDetails": "voltage=95",
        "alarmRaisedTime": "2019-07-03T03:32:17.235Z",
        "alarmReportingTime": "2019-07-03T03:32:17.552Z",
        "alarmChangedTime": "2019-07-03T03:42:12.861Z",
        "ackSystemId": "ems-1",
        "ackUserId": "bob@example.net",
        "ackTime": "2019-07-03T03:38:06.890Z",
        "ackState": "UNacknowledged",
        "comment": [
            {
                "userId": "bob@example.net",
                "systemId": "ems-1",
                "time": "2019-07-03T03:37:33.827Z",
                "comment": "Dispatched"
            }
        ]
    },
    {
        "id": "8675399",
```

```
            "href": "/alarmManagement/v4/alarm/8675399",
            "@baseType": "Alarm",
            "@type": "Alarm",
            "@schemaLocation": "/alarmManagement/v4/schema/Alarm.schema.json",
            "externalAlarmId": "5551234",
            "state": "updated",
            "alarmType": "equipmentAlarm",
            "perceivedSeverity": "minor",
            "probableCause": "powerSupplyFailure",
            "specificProblem": "ch=1,ps=3",
            "alarmedObjectType": "Chassis",
            "alarmedObject": {
               "id": "95830731",
               "href": "/resourceInventoryManagement/v4/resource/95830731"
            },
            "sourceSystemId": "ems-1",
            "alarmRaisedTime": "2019-07-03T03:32:17.843Z",
            "alarmReportingTime": "2019-07-03T03:32:18.102Z",
            "alarmChangedTime": "2019-07-03T03:42:12.861Z",
            "ackSystemId": "ems-1",
            "ackUserId": "bob@example.net",
            "ackTime": "2019-07-03T03:38:06.890Z",
            "ackState": "unacknowledged",
            "comment": [
               {
                  "userId": "bob@example.net",
                  "systemId": "ems-1",
                  "time": "2019-07-03T03:37:33.827Z",
                  "comment": "Dispatched"
               }
            ]
         }
      ]
}
```

API NOTIFICATIONS

For every single of operation on the entities use the following templates and provide sample REST notification POST calls.

It is assumed that the Pub/Sub uses the Register and UnRegister mechanisms described in the REST Guidelines reproduced below.

Register listener

POST /hub

Description

Sets the communication endpoint address the service instance must use to deliver information about its health state, execution state, failures and metrics. Subsequent POST calls will be rejected by the service if it does not support multiple listeners. In this case DELETE /api/hub/{id} must be called before an endpoint can be created again.

Behavior

Returns HTTP/1.1 status code 204 if the request was successful.

Returns HTTP/1.1 status code 409 if request is not successful.

Usage Samples

Here's an example of a request for registering a listener.

Request
POST /api/hub Accept: application/json {"callback": "http://in.listener.com"}
Response
201 Content-Type: application/json Location: /api/hub/42 {"id":"42","callback":"http://in.listener.com","query":null}

Unregister listener

`DELETE /hub/{id}`

Description

Clears the communication endpoint address that was set by creating the Hub.

Behavior

Returns HTTP/1.1 status code 204 if the request was successful.

Returns HTTP/1.1 status code 404 if the resource is not found.

Usage Samples

Here's an example of a request for un-registering a listener.

Request
DELETE /api/hub/42 Accept: application/json
Response
204

Publish Event to listener

`POST /client/listener`

Description

Clears the communication endpoint address that was set by creating the Hub.

Provides to a registered listener the description of the event that was raised. The /client/listener url is the callback url passed when registering the listener.

Behavior

Returns HTTP/1.1 status code 201 if the service is able to set the configuration.

Usage Samples

Here's an example of a notification received by the listener. In this example "EVENT TYPE" should be replaced by one of the notification types supported by this API (see Notification resources Models section) and EVENT BODY refers to the data structure of the given notification type.

Request
| ```
POST /client/listener
Accept: application/json

{
   "event": {
          EVENT BODY
       },
   "eventType": "EVENT_TYPE"
}
``` |
| **Response** |
| 201 |

For detailed examples on the general TM Forum notification mechanism, see the TMF REST Design Guidelines.

Acknowledgements

Version History

Release Number	Date	Release led by:	Description
1.0	20-Sep-2017	Yuval Stein, TEOCO Pierre Gauthier, TM Forum <pgauthier@tmforum.org>	First Release of the Document.
1.0.1	04-Dec-2017	Adrienne Walcott, TM Forum	Updated to reflect TM Forum Approved Status
	14-Nov-2019	Vance Shipley, SigScale <vances@sigscale.com>	Schemafication project.
4.0.0	03-Apr-2020	Vance Shipley, SigScale <vances@sigscale.com>	Update for User Guide format.

Release History

Release Number	Date	Release led by:	Description
Release 17.0.0	20-Sep-2017	Yuval Stein, TEOCO Pierre Gauthier, TM Forum <pgauthier@tmforum.org>	First Release of the Document.
Release 17.0.1	04-Dec-2017	Adrienne Walcott, TM Forum	Updated to reflect TM Forum Approved Status
	14-Nov-2019	Vance Shipley, SigScale <vances@sigscale.com>	Schemafication project.
Pre-production	03-Apr-2020	Vance Shipley, SigScale <vances@sigscale.com>	Update for User Guide format.

Contributors to Document

Yuval Stein, TEOCO	Vance Shipley, SigScale <vances@sigscale.com>