TIP_RAM_IA, TIP Resource Alarm Management Information Agreement

TIP_RAM_IA

Version 1.0

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Notice

1. Introduction

The TM Forum has given much attention to the evolution of next generation networks and the business and operational support systems needed to manage them. As a result, the Frameworx was developed to provide a toolkit of industry-agreed specifications and guidelines that cover key business and technical areas. This is reinforced by a set of unified open interfaces used between Operations Systems (OSs) for the purpose of network and service management. Many of these interfaces have been developed by individual groups such as OSS/J, mTOP and SLA management teams and may not be in alignment.

This interface covers Resource Alarm Management as it is a key interface where alignment is needed. This alignment work has been done within TM Forum between OSS/J FM API and MTOSI RTM DDP. The team has also attempted to bring closer the alarm semantics by considering carefully the 3GPP Alarm IRP with the end goal of reducing the integration overhead for Service Providers.

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 Ressource Alarm Management interface should support both and should not add complexity when used in the context of Simple Alarm Reporting.

1.1. Document Structure

The following sections are contained in this document:

- Section 1 is the document introduction
- Section 2 provides a summary description of the interface
- Section 3 describes the Information Model used by this interface
- Section 4 describes all the Service Interfaces contained in this interface

1.2. Conventions Used In This Document

In this document, we use the following color conventions.

In the attribute tables:

- An attribute shown on white background is local.
- An attribute shown on lavender background is inherited.
- An attribute shown on green background is implicit.

Similarly, text in green color indicates implicit data.

Implicit information does not appear in the model, but will be added by the generators in the final interface specification. Implicit data is defined in the Internal Framework Model. Please refer to the Framework Guidebook for details.

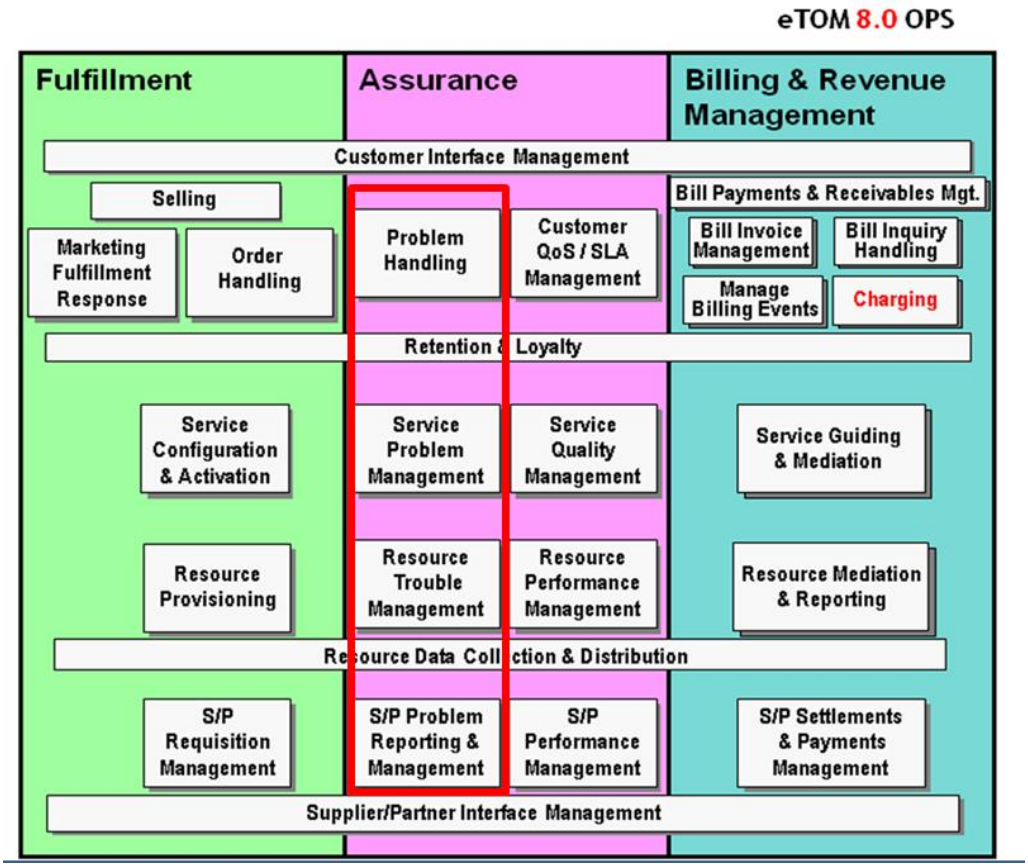
All links are with blue color.

2. Interface Summary

2.1. Context

2.1.1. Relation to eTOM

The Resource Alarm Management interface is the second interface developed to support the problem or trouble area of the Business Process Framework (eTOM) as shown in the figure below. Processes include Problem Handling, Service Problem Management, Resource Trouble Management, and S/P Problem Reporting and Management.



The specific area of interest for this interface is the eTOM level 2 process known as Resource Trouble Management (RTM). In terms of terminology, it should be noted that this interface uses the term ResourceAlarm to refer to both the actual real world alarm and the object that represents the alarm. The eTOM, however, uses "Resource Trouble" to reference the alarm in the real world and "Resource Trouble Report" for the entity (i.e., the object instance) that represents the real world problem. The terminology is further complicated by the fact that the eTOM does not seem to distinguish between Trouble Tickets and Resource Alarms. However, Both the MTOSI RTM DDP, the OSS/J Fault Management API and the interface defined in this document do make such a distinction (as do actual products). It is assumed for the purposes of this discussion that the Resource Trouble Report mentioned (but never defined) in the eTOM could be either what is called a Resource Alarm in this document or a Trouble Ticket as defined in the OSS/J Trouble Ticket API.

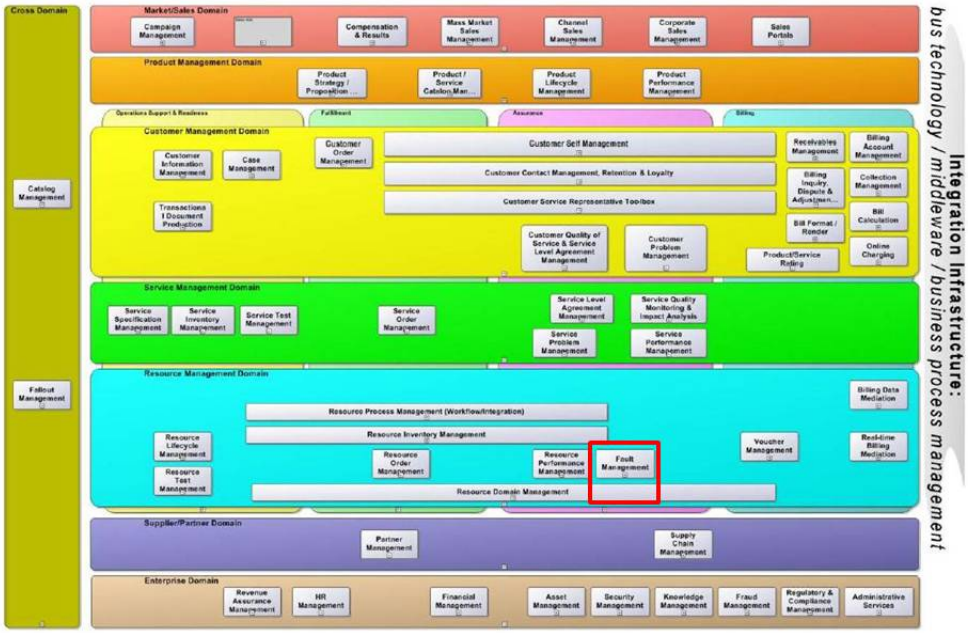
Interface implications for the various eTOM level 3 processes with Resource Alarm Management (RAM) are as follows:

- Create Resource Trouble Report: This is mainly an internal process that would not use the RAM interface defined in this document, although the interface allows for explicit creation of alarms.
- Report Resource Trouble: This process will typically use the RAM interface to announce resource alarms to other interested processes.
- Survey and Analyze Resource Trouble: This is an internal process that would not use the RAM interface defined in this document. This process appears to be out of scope for the RAM interface.
- Localize Resource Trouble: This process is a user of the RAM interface. It will update the resource alarm with its results.
- Correct and Resolve Resource Trouble: This process is a user of the RAM interface. In particular, this process will be a subscriber to notifications related to resource alarms created by instances of the Create Resource Trouble Report process.
- Track and Manage Resource Trouble: This process will use the RAM interface to report on status changes to resource alarms, allow resource alarms to be updated (e.g., add a comment or acknowledge a resource alarm) and to accept requests to retrieve resource alarms.
- Close Resource Trouble Report: This process will use the RAM interface to indicate when a resource alarm has been resolved and closed.

This interface will also use and complement the existing SID Aggregate Business Entity ResourceAlarm to support these processes.

2.1.2. Relation to TAM

In terms of the TAM 4.0, the interface fits the Resource Assurance Management and Resource Domain Management Applications areas as shown on the figure below:



The following item from the TAM Resource Domain Management Applications area is covered:

- Resource Fault Mediation

The following items from the TAM Resource Assurance Management area are covered:

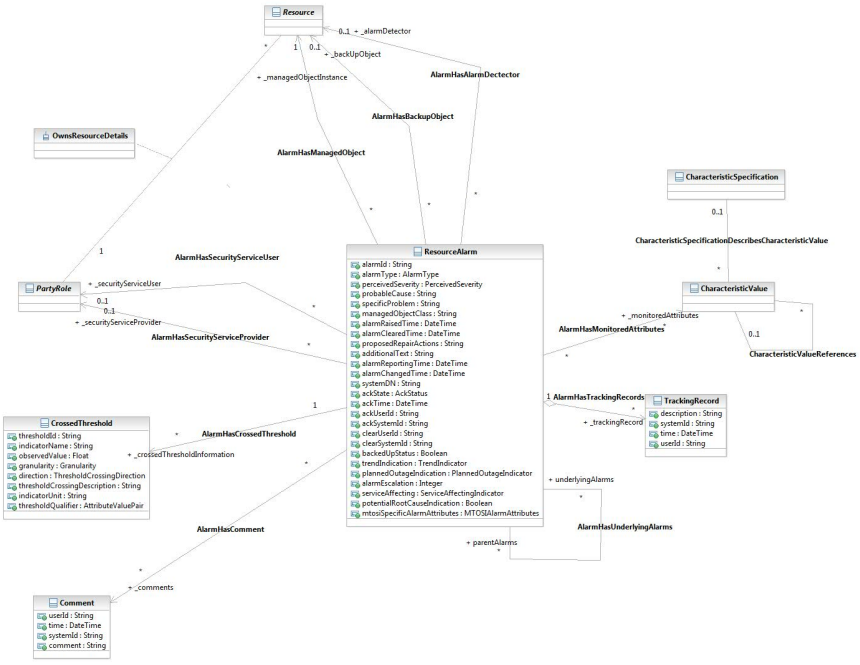
- Correlation and Root Cause Analysis Application. This application would be typically a client of this interface.
- Resource Status Monitoring level 2. This application would typically work as a server for this interface at NMS. It might also consume the interface provided by an EMS acting as Resource Fault Mediation.

2.2. Resource Alarm

A Resource Alarm provides information about a given alarm condition of an alarmed Managed Object.

It has been named Resource Alarm as it applies only to the Resource Domain. At Service level, a Service Problem should be used to report that fact that a service or product or set of those is no longer functioning according to the agreement with its client(s).

The Resource Alarm and its attributes are shown in the figure below:



The Resource Alarm model is the result of the harmonization between OSS/J FM API and MTOSI RTM DDP.

One of the important difference compared to MTOSI is that the alarm is now modeled as an object representing the alarm within the alarm list of the owning system.

Note that the alarm-owning system should expose an Entity Identifier over the interface. It does not imply that alarms are kept as objects within this system. The Entity Identifier has a context part that disambiguates the alarm-owning system and a DN part containing the primary name, which is the Alarm Id.

The use of the identifier allows consistency of identification when the RAM interfaces is used at various levels, i.e. between EMS and NMS and between NMSs.

When an alarm-owning system needs to assign an alarm id, the alarm Id once used in an alarm list should never be reused. Clients might keep reference to alarm ids and if their lifecycle is not fully synchronized and if alarm ids are recycled, then some operations (ack or grouping) might end up being done on the wrong id.

In case the alarm-owning system is not keeping alarms as objects, the choice of the Alarm Id is implementation specific. It can be a table id, a db id or a string built on the fly from alarm information. For example, this field can be constructed by concatenating the ManagedObject identifier, the ProbableCause, the SpecificProblem (or ProbableCause qualifier), the event time and the layer if applicable.

In case the alarm-owning system is keeping alarms as objects, its internal alarm id can be used as identifier, assuming it provides the unicity criteria identified in the requirement above.

The ResourceAlarm model is showing a number of transformation from the Information Model, shown in the picture above and the Implementation Model, shown in section 3.1.1.

These transformations are the following:

- The CrossedThreshold and Comment classes are becoming datatypes in the Implementation Model.
- monitoredAttributes represented as an association to CharacteristicValue in the Information Model is becoming an AttributeValuePair in the Implementaion Model.
- alarmDectector respresented as an association to Resource in the Information Model is becoming a String in the Implementation Model.
- securityAlarmProvider and securityAlarmUser represented as associations to PartyRole in the Information Model are becoming String in the Implementation Model.

The key and mandatory alarm fields are:

- identifier (EntityIdentifier)
- alarmType (enum)
- perceivedSeverity (enum)
- probableCause (string)
- managedObject, defined as Managed Object Class (string) and Managed Object Instance (pointer to Resource, equivalent to ObjectName)
- alarmRaisedTime (dateTime)

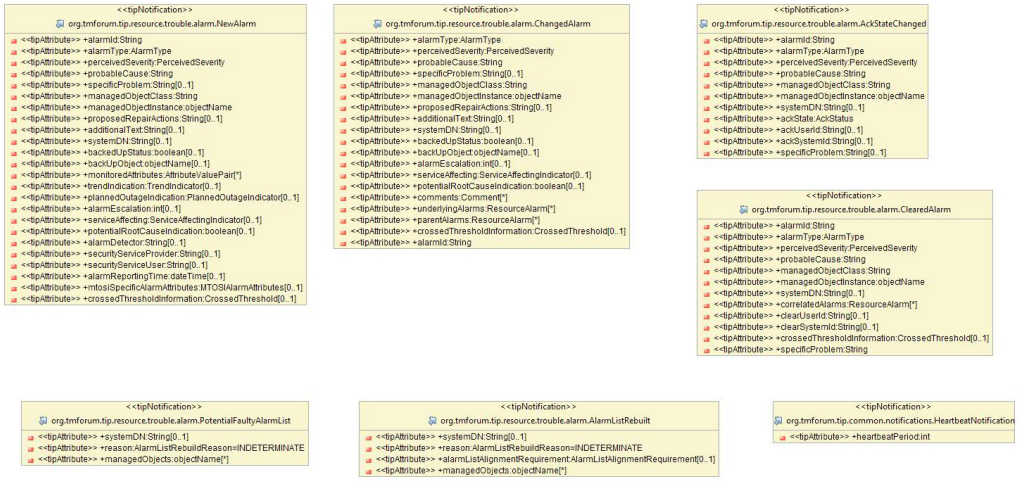
This specification does not use for the probable cause an enumeration, but a string with qualified text. This choice does not imply that the probable cause is a free string, but rather that the recommended values will be specified in a separate document to miminize further changes to the interface.

Note that the list of supported/ optional/mandatory attributes/ notifications or operations varies based on the profile. Please refer to section 2.3 Alarm Profiles for details.

This interface supports the generation of the following notifications:

- NewAlarm, indicating the notification of a new alarm
- ChangedAlarm, indicating the notification of the change in some attributes of the alarm
- ClearedAlarm, indicating the notification of the clearance of an alarm
- AckStateChanged, indicating the notification of the acknowledgement of an alarm
- PotentialFaultyAlarmList, indicating the notification of a potentially faulty alarm list
- AlarmListRebuilt, indicating the notification that the alarm list has been rebuilt and can be resynchronized
- HeartbeatNotification, used for detecting loss of communication between client and server

The notifications associated with the Resource Alarm Management interface are shown in the figure below:



The choice for this interface has been made to use explicit notifications for NewAlarm, ChangedAlarm, ClearedAlarm and AckStateChanged to increase semantic alignment and harmonization of alarm interfaces.

The first 4 notifications (NewAlarm, ChangedAlarm, ClearedAlarm, AckStateChanged) are applied on the ResourceAlarm object. They will contain a sourceTime and an objectType and Id, referring to the ResourceAlarm. For those alarms, the following attributes are used for notification filtering:

- AlarmType
- PerceivedSeverity
- ProbableCause
- SpecificProblem
- ManagedObjectClass
- ManagedObjectInstance
- SystemDN

If present in the original alarm (NewAlarm) they must be added to the ChangedAlarm, ClearedAlarm and AckStateChanged events.

2.2.1. Threshold Crossing Alarm

The results of performance threshold crossing are reported as alarms.

These alarms contains the mandatory alarm fields described above as well as the crossedThresholdInformation attribute containing detailed information on the threshold that has been crossed.

The crossedThresholdInformation attributes contains the followoing fields:

- Threshold Id, identifying the threshold that caused the alarm
- IndicatorName, identifying the name of performance indicator which crossed the threshold
- ObservedValue, providing the value of the performance indicator which crossed the threshold
- IndicatorUnit, identifying the unit of the measurement of the indicator corresponding to the threshold that has been crossed
- Granularity, providing the granularity at which the indicator is evaluated for threshold crossing
- Direction, providing the threshold crossing direction: up or down
- ThresholdQualifier, qualifying the crossed threshold
- ThresholdCrossingDescription, containing further information on the threshold crossing alarm.

If the threshold applies to a single indicator, then the fields IndicatorName, ObservedValue, Granularity and Direction are mandatory.

These fields can only be omitted for complex threshold involving multiple indicators. In this case, the field crossedThresholdCrossingDirection is required to provide a textual description of the threshold crossing condition.

When migrating from MTOSI, the thresholdQualifier attribute can contain the pmLocation and the thresholdType.

Clearance is mandatory for Threshold Crossing Alarms. In case, the threshold is re-evaluated at every granularity, 2 behaviors are possible: Transient ConditionMethod and Standing Condition Method.

In the Transient Condition Method, the Threshold Crossing Alarm is cleared at the end of each evaluation period.

In the Standing Condition Method, the Threshold Crossing Alarm is only cleared when the indicator crosses the clear threashold value. No additional TCAs are generated at each evaluation. This method is recommended to limit the number of Threshold Crossing Alarms generated.

2.3. Interface Profiles

The Resource Alarm Management interface supports 3 profiles:

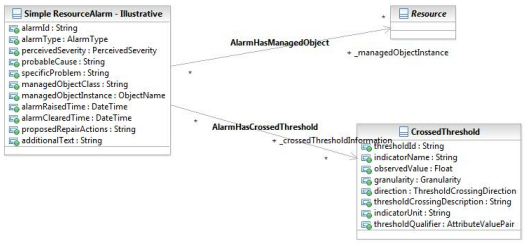
- Simple Alarm Reporting Profile
- Standard Alarm Profile
- Enhanced Alarm Profile

Those 3 profiles are described in the next sections.

The supporting document SD_RAM_01_RAM_Profiles.xls is also providing details on each profile.

2.3.1 Simple Alarm Reporting Profile

This profile is covering the first business scenario defined in the Business Agreement and includes only a subset of the Resource Alarm Management interface and is summarized on the figure shown below:



This profile includes the ResourceAlarm with the following attributes:

- alarmId
- alarmType
- perceivedSeverity
- probableCause
- specificProblem
- managedObjectClass
- managedObjectInstance
- alarmRaisedTime
- alarmClearedTime
- croosedThresholdInformation
- proposedRepairAction
- additionalText

For ease of reading, these attributes have been put first in the ResourceAlarm.

The SimpleAlarmReportingProfile includes the following notifications:

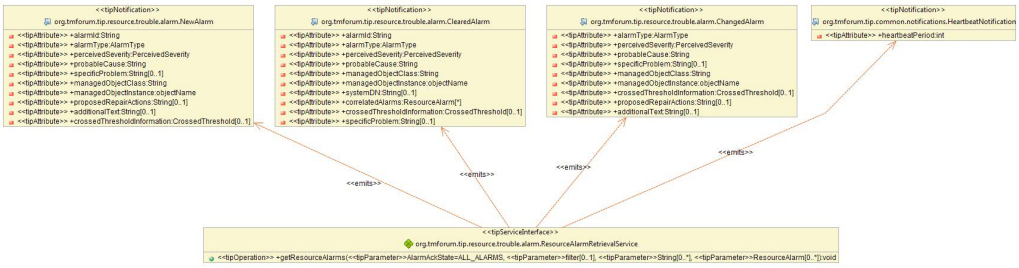
- NewAlarm, mandatory, limited to all attributes above except alarmRaisedTime (replace by sourceTime in the notification) and alarmClearedTime
- ClearedAlarm, mandatory
- ChangedAlarm, optional
- HeartbeatNotification, optional

Note that the filtering attributes defined previously are also applicable to the Simple Alarm Reporting Profile.

The SimpleAlarmReportingProfile includes only 1 operation:

- getResourceAlarms. This operation returns all alarms matching either an alarmAckState or a filter. Only the support of the alarm Ack State with value ALL_ACTIVE_ALARMS is mandatory to allow for resynchronization. Alarms are returned using an iterator pattern.

The figure below provides a summary of the Simple Alarm Reporting profile:



2.3.2 Standard Alarm Profile

The Resource Alarm Management interface supports a Standard Alarm profile that is applicable to all business scenarios defined in the Business Agreement,even if it is more focused on the last 2 scenarios.

This profile is the harmonization target from OSS/J Fault Management and MTOSI AlarmHandlingService and AlarmRetrievalService. It is also the one most closely aligned with 3GPP Alarm IRP.

This profile is a superset of the Simple Alarm Reporting Profile

This profile includes all the ResourceAlarm attributes, except alarmEscalation which is not supported in this profile.

The following attributes are settable in this profile:

- aliasName
- extensionInfo
- serviceAffecting
- potentialRootCauseIndication

This profile includes all the notifications with the following support:

- NewAlarm, mandatory
- ClearedAlarm, mandatory
- ChangedAlarm, optional
- AckStateChanged, optional
- AlarmListRebuilt, imandatory
- PotentialFaultyAlarmList, optional
- HeartbeatNotification, optional

This profile includes all operations, except the createResourceAlarm, groupResourceAlarms and ungroupResourceAlarms which are not supported in this profile.

2.3.3 Enhanced Alarm Profile

The Resource Alarm Management interface supports a Enhanced Alarm profile that is applicable to the OSS-to-OSS business scenario defined in the Business Agreement.

This profile is a superset of the Standard Alarm profile.

This profile includes all the ResourceAlarm attributes. Note that the systemDN attribute, optional in the Standard Alarm profile is mandatory in this profile, as an NMS is likely to include alarms coming from several systemDN.

The following attributes are settable in this profile:

- aliasName
- extensionInfo
- serviceAffecting
- potentialRootCauseIndication
- perceivedSeverity
- specificProblem
- proposedRepairAction
- AdditionalText
- backedUpStatus
- backUpObject
- alarmEscalation

While one of the primary use cases for modifying an alarm through the interface is to change an alarm created through the interface, nothing prevents modifying any other alarm. It is up to the alarm-owning NMS to decide if such an action is valid or not.

This profile includes all the notifications with the following support:

- NewAlarm, mandatory
- ClearedAlarm, mandatory
- ChangedAlarm, mandatory
- AckStateChanged, optional
- AlarmListRebuilt, imandatory
- PotentialFaultyAlarmList, optional
- HeartbeatNotification, optional

The main difference with the Standard Alarm profile is that the ChangedAlarm notification is mandatory in this profile.

This profile includes all operations, including the createResourceAlarm, groupResourceAlarms and ungroupResourceAlarms which are only supported in this profile.

2.4. Interface Summary

The Resource Alarm Management interface is covering 1 new SID Aggregate Business Entities (ABE):

- Alarm ABE, part of the Resource Domain, under the Resource Trouble ABE.

The Resource Alarm Management interface is an entity-centric interface, so all the operations are related to the Alarm entity.

The Resource Alarm Management provides only a single interface ResourceAlarmInterface, but supports 3 profiles: Simple Alarm Reporting profile, Standard Alarm profile and Enhanced Alarm profile.

The implementation package that corresponds to the Alarm ABE will be described first, then the service interface will be described.

The picture below presents an overall view of the Information Model of the Resource Alarm Management Interface:

3. Information Model

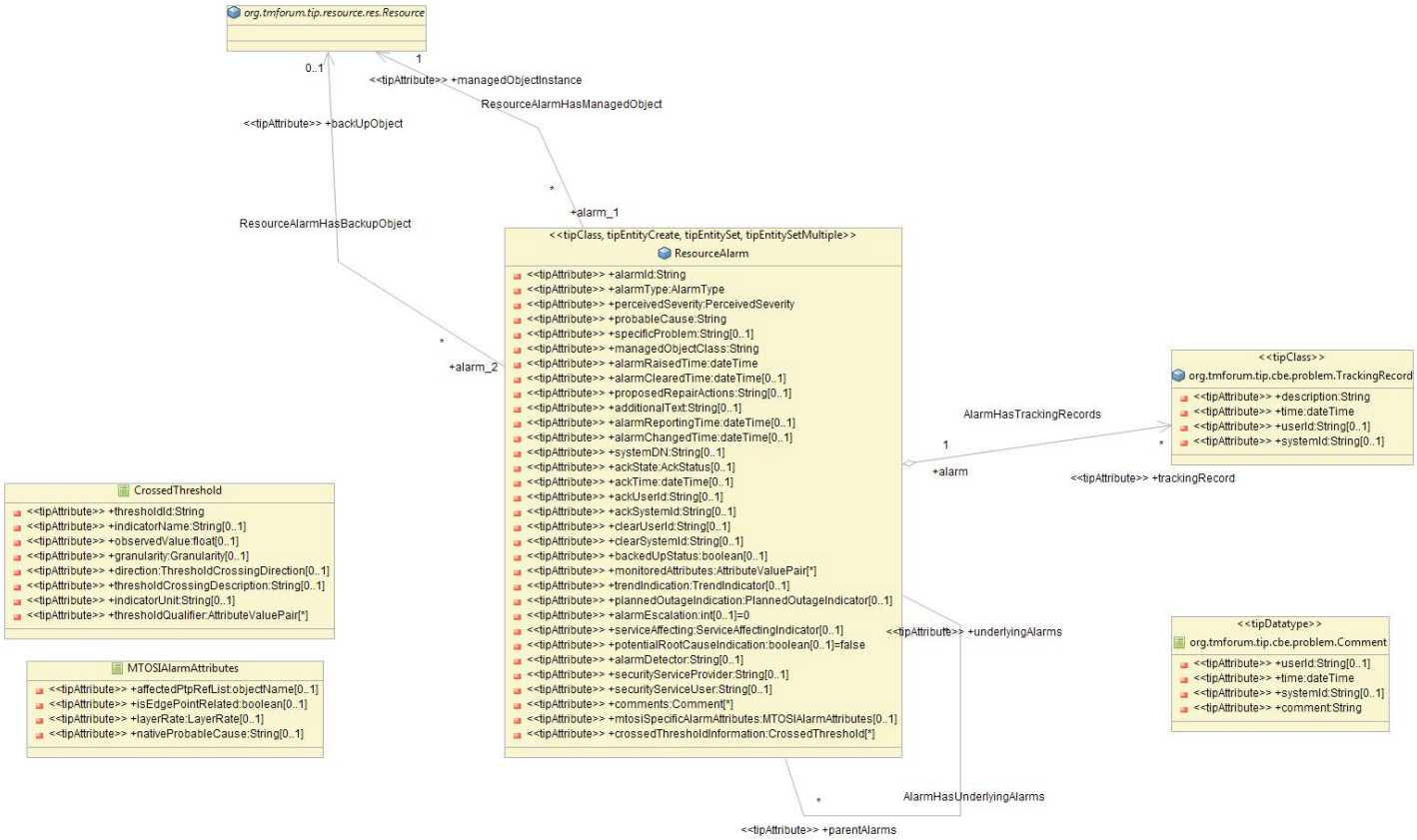
Packages available from TIP Resource Alarm Management:
- org.tmforum.tip.resource.trouble.alarm

3.1. Package org.tmforum.tip.resource.trouble.alarm

3.1.1. Entities

3.1.1.1. ResourceAlarm

- Type: Entity Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:
  org.tmforum.tip.internal.entity.EntityBase
- Description:
The ResourceAlarm entity contains information about a given alarm condition of an Managed Object.Note that the automatic Object Creation notification generation is disabled as a specific New Alarm notification is generated for a new alarm.
The alarmType, perceivedSeverity, probableCause, specificProblem, managedObjectClass, managedObjectInstance and systemDN attributes are used for filtering. They must be added to the events if present in the original alarm.
- Properties:
  This entity is mandatory
  This entity is extendable
  This entity does not generate Object Creation notifications
  This entity does not generate Object Deletion notifications
  This entity does not generate Object Discovery notifications
  This entity supports the Common Set operation
  This entity supports the Common Create operation
  This entity supports the Common Set Multiple operation



3.1.1.1.1. Attributes

name	datatype	properties	description
alarmId	String	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled	Local identifier of the Alarm. Note that this identifier is local to the server side of the interface, i.e. the alarm-owning system.Only EntityIdentifier can be considered as global. This attribute is mandatory in all 3 profiles.
alarmType	AlarmType	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled - used for Notification Filtering	Categorizes the alarm. This attribute is mandatory in all 3 profiles.
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - unique - mandatory - AVC disabled - used for Notification Filtering	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. This attribute is mandatory in all 3 profiles.
probableCause	String	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled - used for Notification Filtering	Further qualifies the alarm in complement of the alarmType. This specification does not use an enumeration, but a string with qualified text. Recommended values will be specified separately. This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - unique - optional - AVC disabled - used for Notification Filtering	Further qualifies the alarm in addition to the probableCause. This attribute is defined as a string. Values are defined by vendors. This attribute is optional in all 3 profiles.
managedObjectClass	String	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled - used for Notification Filtering	Identifies, in terms of object class, the resource that is in alarm. This attribute is mandatory in all 3 profiles.

alarmRaisedTime	dateTime	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled	Indicates the time (as a date + time) at which the alarm occurred at its source. This attribute is mandatory in all 3 profiles.
alarmClearedTime	dateTime	- multiplicity is 0..1 - read only - unique - mandatory - AVC disabled	Indicates the time (as a date + time) at which the alarm is cleared at the source.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for alarm clearance.It is not filled on an alarm for which the clearance has not been received, but it is mandatory for a cleared alarm.This attribute is mandatory in all 3 profiles.
crossedThresholdInformation	CrossedThreshold	- multiplicity is * - read only - unique - optional - AVC disabled	Identifies the details of the threshold that has been crossed.Multiple values are possible in case of multiple threshold crossing applying to the same threshold id. The ThresholdInfo corresponding to the clearance can also be recorded in the original alarm for completeness. This attribute is optional in all 3 profiles.
proposedRepairActions	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates proposed repair actions, if known to the system emitting the alarm. This attribute is optional in all 3 profiles.
additionalText	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Contains further information on the alarm. Vendors should avoid using this field to put additional information identifying the alarmed object or the specific problem. The corresponding fields should be use for better alarm quality. This attribute is optional in all 3 profiles.
alarmReportingTime	dateTime	- multiplicity is 0..1 - read only - unique - invariant - optional - AVC disabled	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. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmChangedTime	dateTime	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	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. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
systemDN	String	- multiplicity is 0..1 - read only - unique - invariant - optional - AVC disabled - used for Notification Filtering	Identifies the alarm-owning system, i.e. the one owning the alarm list. This attribute is not supported in the Simple Alarm Reporting profile, optional in the Standard profile and mandatory in the Enhanced profile.
ackState	AckStatus	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the Acknowledgement State of the alarm.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for acknowledgement state change.If the acknowledgeResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
ackTime	dateTime	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the time when the alarm has been last acknowledged or unacknowledged.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for acknowledgement state change.If the acknowledgeResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
ackUserId	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the id of the user who has last changed the ack state of the alarm, i.e. acknowledged or unacknowledged the alarm.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for acknowledgement state change.If the acknowledgeResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
ackSystemId	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the name of the system that last changed the ackState of an alarm, i.e. acknowledged or unacknowledged the alarm.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for acknowledgement state change.If the acknowledgeResourceAlarms is supported, then this attribute is optional. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

clearUserId	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the id of the user who invoked the clearResourceAlarm operation.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for alarm clearance. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
clearSystemId	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the id of the system where the user who invoked the clearResourceAlarm operation is located. This might be different from the alarm-owning system.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for alarm clearance. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
backedUpStatus	boolean	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates if the Managed Object (related to this alarm) has a back up or has been backed up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
monitoredAttributes	AttributeValuePair	- multiplicity is * - read only - unique - optional - AVC disabled	The Monitored Attributes parameter, when present, defines one or more attributes of the Managed Object (related to this alarm) and their corresponding values at the time of the alarm. Managed object definers may specify the set of attributes which are of interest, if any. This allows, for example, the timely reporting of changing conditions prevalent at the time of the alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
trendIndication	TrendIndicator	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Indicates the current severity trend of the Managed Object (related to this alarm). This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
plannedOutageIndication	PlannedOutageIndicator	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service). This might also be used when an equipment is being commissioned to avoid the alarms propagating to other systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmEscalation	int	- multiplicity is 0..1 - unique - default value is '0' - optional - AVC disabled	Indicates if this alarm has been escalated or not. Possible values are 0 to 10. A value of zero means no escalation.The meanings of values 1-10 are to be determined by the user of the interface, but they show increasing levels of escalation. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
serviceAffecting	ServiceAffectingIndicator	- multiplicity is 0..1 - unique - optional - AVC disabled	Provides the alarm-owning system determination of whether or not the alarm affects service. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
potentialRootCauseIndication	boolean	- multiplicity is 0..1 - unique - default value is 'false' - optional - AVC disabled	Indicates whether an alarm is a raw (uncorrelated) alarm (when false) or a potential root cause alarm indication (when true). A fault has typically one root cause, but identifying the true root cause of a fault might be difficult. However, with the scope of an alarm-owning system, it might possible to identify a potential root cause indication that might be useful for client systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmDetector	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the identity of the detector of the alarm.This attribute can also be used for non security alarms, when the object detecting the problem is not the Managed Object related to the alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
securityServiceProvider	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Identifies the service provider whose service request provokes the generation of the security alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
securityServiceUser	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Identifies the service user whose request for service led to the generation of the security alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
comments	Comment	- multiplicity is * - read only - unique - optional - AVC disabled	Indicates the comments entered on the alarm, as a list.If the commentResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

mtosiSpecificAlarmAttributes	MTOSIAlarmAttributes	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	This attribute groups wireline specific alarm attributes coming from MTOSI. It is present to ease migration from MTOSI RTM implementation and can be considered as conditional for MTOSI. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
identifer	EntityIdentifier	- multiplicity is 1 - unique - invariant - mandatory - AVC enabled	The entity instance identifier EID.
extensionInfo	Any	- multiplicity is 0..1 - unique - optional - AVC enabled	A generic list of any type of elements. Used for vendor Extensions or loose element encapsulation from other namespaces.
aliasNames	CheckedCollection	- multiplicity is 1 - unique - optional - AVC enabled	The aliasNames attribute contains implementation specific name value pairs for local alternative names for the Entity. This is provided to pass more user friendly names for entities between systems or for debugging. The aliasNames attribute MUST NOT be used by an implimentation when comparing EntityIdentifiers. There is NO GUARANTEE that the contents of the aliasNames attribute is unique.

3.1.1.1.2. Associations

name	datatype	properties	description
trackingRecord	TrackingRecord	- multiplicity is * - aggregation is none - navigable - read only - unique - passed by value - optional - AVC disabled - association is AlarmHasTrackingRecords	Allows the tracking of modifications on the alarm.The tracking records should not be returned by default with the alarm to allow retrieving the alarm without the tracking records.Whether the tracking records is stored with the alarm or outside of it is implementation specific. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
underlyingAlarms	ResourceAlarm	- multiplicity is * - aggregation is none - navigable - read only - unique - passed by id - optional - AVC disabled - association is AlarmHasUnderlyingAlarms	It indicates the alarms attached to this alarm as underlying alarms from a correlation point of view.An alarm can be correlated to one or more underlying alarms. There might be multiple levels of alarm correlation and an underlying alarm in one relation can be itself a parent alarm for other underlying alarms. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
parentAlarms	ResourceAlarm	- multiplicity is * - aggregation is none - navigable - read only - unique - passed by id - optional - AVC disabled - association is AlarmHasUnderlyingAlarms	It indicates the parent alarms for this alarm from a correlation point of view.An alarm can be correlated to one or more underlying alarms. There might be multiple levels of alarm correlation and an underlying alarm in one relation can be itself a parent alarm for other underlying alarms. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
backUpObject	Resource	- multiplicity is 0..1 - aggregation is none - navigable - unique - passed by id - optional - AVC disabled - association is ResourceAlarmHasBackupObject	In case the Managed Object (related to this alarm) has a back up, it specifies the value of the object providing the back-up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
managedObjectInstance	Resource	- multiplicity is 1 - aggregation is none - navigable - read only - unique - invariant - passed by id - mandatory - AVC disabled - used for Notification Filtering - association is ResourceAlarmHasManagedObject	Identifies, in terms of object instance, the resource that is in alarm. This attribute is mandatory in all 3 profiles.

3.1.2. Data Types

3.1.2.1. SetDataForResourceAlarm

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype conains all the attributes of the ResourceAlarm that are settable after object creation.

3.1.2.1.1. Attributes

name	datatype	properties	description
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - unique - mandatory - AVC disabled - used for Notification Filtering	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. This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - unique - optional - AVC disabled - used for Notification Filtering	Further qualifies the alarm in addition to the probableCause. This attribute is defined as a string. Values are defined by vendors. This attribute is optional in all 3 profiles.
proposedRepairActions	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates proposed repair actions, if known to the system emitting the alarm. This attribute is optional in all 3 profiles.
additionalText	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Contains further information on the alarm. Vendors should avoid using this field to put additional information identifying the alarmed object or the specific problem. The corresponding fields should be use for better alarm quality. This attribute is optional in all 3 profiles.
backedUpStatus	boolean	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates if the Managed Object (related to this alarm) has a back up or has been backed up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
plannedOutageIndication	PlannedOutageIndicator	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service). This might also be used when an equipment is being commissioned to avoid the alarms propagating to other systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmEscalation	int	- multiplicity is 0..1 - unique - default value is '0' - optional - AVC disabled	Indicates if this alarm has been escalated or not. Possible values are 0 to 10. A value of zero means no escalation.The meanings of values 1-10 are to be determined by the user of the interface, but they show increasing levels of escalation. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
serviceAffecting	ServiceAffectingIndicator	- multiplicity is 0..1 - unique - optional - AVC disabled	Provides the alarm-owning system determination of whether or not the alarm affects service. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
potentialRootCauseIndication	boolean	- multiplicity is 0..1 - unique - default value is 'false' - optional - AVC disabled	Indicates whether an alarm is a raw (uncorrelated) alarm (when false) or a potential root cause alarm indication (when true). A fault has typically one root cause, but identifying the true root cause of a fault might be difficult. However, with the scope of an alarm-owning system, it might possible to identify a potential root cause indication that might be useful for client systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

aliasNames	CheckedCollection	- multiplicity is 1 - unique - optional - AVC enabled	The aliasNames attribute contains implementation specific name value pairs for local alternative names for the Entity. This is provided to pass more user friendly names for entities between systems or for debugging. The aliasNames attribute MUST NOT be used by an implimentation when comparing EntityIdentifiers. There is NO GUARANTEE that the contents of the aliasNames attribute is unique.
backUpObject	Resource	- multiplicity is 0..1 - aggregation is none - navigable - unique - passed by id - optional - AVC disabled - association is ResourceAlarmHasBackupObject	In case the Managed Object (related to this alarm) has a back up, it specifies the value of the object providing the back-up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

3.1.2.2. RemoveDataForResourceAlarm

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype conains all the attributes of the ResourceAlarm that are settable after object creation and are set-valued (multiplicity *, or 1..*).

3.1.2.2.1. Attributes

There are no attributes (local or inherited or implicit) available.

3.1.2.3. AddDataForResourceAlarm

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype conains all the attributes of the ResourceAlarm that are settable after object creation and are set-valued (multiplicity *, or 1..*).

3.1.2.3.1. Attributes

There are no attributes (local or inherited or implicit) available.

3.1.2.4. CreateDataForResourceAlarm

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype conains all the attributes of the ResourceAlarm that are settable at time of object creation.

3.1.2.4.1. Attributes

name	datatype	properties	description

alarmType	AlarmType	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled - used for Notification Filtering	Categorizes the alarm. This attribute is mandatory in all 3 profiles.
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - unique - mandatory - AVC disabled - used for Notification Filtering	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. This attribute is mandatory in all 3 profiles.
probableCause	String	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled - used for Notification Filtering	Further qualifies the alarm in complement of the alarmType. This specification does not use an enumeration, but a string with qualified text. Recommended values will be specified separately. This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - unique - optional - AVC disabled - used for Notification Filtering	Further qualifies the alarm in addition to the probableCause. This attribute is defined as a string. Values are defined by vendors. This attribute is optional in all 3 profiles.
managedObjectClass	String	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled - used for Notification Filtering	Identifies, in terms of object class, the resource that is in alarm. This attribute is mandatory in all 3 profiles.
crossedThresholdInformation	CrossedThreshold	- multiplicity is * - read only - unique - optional - AVC disabled	Identifies the details of the threshold that has been crossed.Multiple values are possible in case of multiple threshold crossing applying to the same threshold id. The ThresholdInfo corresponding to the clearance can also be recorded in the original alarm for completeness. This attribute is optional in all 3 profiles.
proposedRepairActions	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates proposed repair actions, if known to the system emitting the alarm. This attribute is optional in all 3 profiles.
additionalText	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Contains further information on the alarm. Vendors should avoid using this field to put additional information identifying the alarmed object or the specific problem. The corresponding fields should be use for better alarm quality. This attribute is optional in all 3 profiles.
systemDN	String	- multiplicity is 0..1 - read only - unique - invariant - optional - AVC disabled - used for Notification Filtering	Identifies the alarm-owning system, i.e. the one owning the alarm list. This attribute is not supported in the Simple Alarm Reporting profile, optional in the Standard profile and mandatory in the Enhanced profile.
backedUpStatus	boolean	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates if the Managed Object (related to this alarm) has a back up or has been backed up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
monitoredAttributes	AttributeValuePair	- multiplicity is * - read only - unique - optional - AVC disabled	The Monitored Attributes parameter, when present, defines one or more attributes of the Managed Object (related to this alarm) and their corresponding values at the time of the alarm. Managed object definers may specify the set of attributes which are of interest, if any. This allows, for example, the timely reporting of changing conditions prevalent at the time of the alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
trendIndication	TrendIndicator	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Indicates the current severity trend of the Managed Object (related to this alarm). This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
plannedOutageIndication	PlannedOutageIndicator	- multiplicity is 0..1 - unique - optional - AVC disabled	Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service). This might also be used when an equipment is being commissioned to avoid the alarms propagating to other systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

alarmEscalation	int	- multiplicity is 0..1 - unique - default value is '0' - optional - AVC disabled	Indicates if this alarm has been escalated or not. Possible values are 0 to 10. A value of zero means no escalation.The meanings of values 1-10 are to be determined by the user of the interface, but they show increasing levels of escalation. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
serviceAffecting	ServiceAffectingIndicator	- multiplicity is 0..1 - unique - optional - AVC disabled	Provides the alarm-owning system determination of whether or not the alarm affects service. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
potentialRootCauseIndication	boolean	- multiplicity is 0..1 - unique - default value is 'false' - optional - AVC disabled	Indicates whether an alarm is a raw (uncorrelated) alarm (when false) or a potential root cause alarm indication (when true). A fault has typically one root cause, but identifying the true root cause of a fault might be difficult. However, with the scope of an alarm-owning system, it might possible to identify a potential root cause indication that might be useful for client systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmDetector	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Provides the identity of the detector of the alarm.This attribute can also be used for non security alarms, when the object detecting the problem is not the Managed Object related to the alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
securityServiceProvider	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Identifies the service provider whose service request provokes the generation of the security alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
securityServiceUser	String	- multiplicity is 0..1 - read only - unique - optional - AVC disabled	Identifies the service user whose request for service led to the generation of the security alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
extensionInfo	Any	- multiplicity is 0..1 - unique - optional - AVC enabled	A generic list of any type of elements. Used for vendor Extensions or loose element encapsulation from other namespaces.
aliasNames	CheckedCollection	- multiplicity is 1 - unique - optional - AVC enabled	The aliasNames attribute contains implementation specific name value pairs for local alternative names for the Entity. This is provided to pass more user friendly names for entities between systems or for debugging. The aliasNames attribute MUST NOT be used by an implimentation when comparing EntityIdentifiers. There is NO GUARANTEE that the contents of the aliasNames attribute is unique.
backUpObject	Resource	- multiplicity is 0..1 - aggregation is none - navigable - unique - passed by id - optional - AVC disabled - association is ResourceAlarmHasBackupObject	In case the Managed Object (related to this alarm) has a back up, it specifies the value of the object providing the back-up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
managedObjectInstance	Resource	- multiplicity is 1 - aggregation is none - navigable - read only - unique - invariant - passed by id - mandatory - AVC disabled - used for Notification Filtering - association is ResourceAlarmHasManagedObject	Identifies, in terms of object instance, the resource that is in alarm. This attribute is mandatory in all 3 profiles.

3.1.2.5. BadAlarmReference

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype is used as return as directives (acknowledge, unacknowledge and comment) to return the alarm that failed along

with a failure reason.
- Properties:

3.1.2.5.1. Attributes

name	datatype	properties	description
badAlarmId	ResourceAlarm	- multiplicity is 1 - unique - passed by id - mandatory	Id of failing alarm
failureReason	String	- multiplicity is 1 - unique - mandatory	reason for the failure as qualified text

3.1.2.6. CrossedThreshold

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
This datatype provides crossed threshold information when the alarm is a result of crossing a threshold.It consists of :- Threshold Id, identifying the threshold that caused the alarm- Indicator Name, identifying the name of performance indicator which crossed the threshold- Observed Value, providing the value of the performance indicator which crossed the threshold- Granularity, providing the granularity at which the indicator is evaluated for threshold crossing- Direction, providing the threshold crossing direction: up or down- ThresholdQualifier, qualifying the crossed threshold- Threshold Crossing Description, containing further information on the threshold crossing alarm.
Note that some of the information present in the Threshold object , like indicator name or granularity is repeated here in order to have a contained alarm report.
- Properties:

3.1.2.6.1. Attributes

name	datatype	properties	description
thresholdId	String	- multiplicity is 1 - unique - mandatory	Indicates the identifier of the threshold that caused the alarm.
indicatorName	String	- multiplicity is 0..1 - unique - optional	Indicates the name of performance indicator, KPI, gauge or counter which crossed the threshold. If the threshold applies to a single indicator, then this attribute is mandatory. It can only be omitted for complex threshold involving multiple indicators.
observedValue	float	- multiplicity is 0..1 - unique - optional	Indicates the observed value: the value of the indicator which crossed the threshold. This may be different from the threshold value if, for example, the indicator is a gauge and this gauge only takes on discrete values. If the threshold applies to a single indicator, then this attribute is mandatory. It can only be omitted for complex threshold involving multiple indicators.
indicatorUnit	String	- multiplicity is 0..1 - unique - optional	This attribute identifies the unit of the measurement of the indicator corresponding to the threshold that has been crossed in a free format string.
granularity	Granularity	- multiplicity is 0..1 - unique - optional	Indicates the granularity at which the indicator is evaluated for threshold crossing. If the threshold applies to a single indicator, then this attribute is mandatory. It can only be omitted for complex threshold involving multiple indicators.

direction	ThresholdCrossingDirection	- multiplicity is 0..1 - unique - optional	Indicates the threshold crossing direction: up or down. If the threshold applies to a single indicator, then this attribute is mandatory. It can only be omitted for complex threshold involving multiple indicators.
thresholdQualifier	AttributeValuePair	- multiplicity is * - unique - optional	This attribute contains a set of name/ value pairs used to qualify the crossed threshold. When migrating from MTOSI, this attribute can contain the pmLocation and the thresholdType.For pmLocation, the name would be pmLocation and the values would be Contra_Near_End_Rx, Contra_Far_End_Rx, Near_End_Rx, Near_End_Tx, Far_End_Rx, Far_End_Tx, Bidirectional.For thresholdType, the name is thresholdType and the possible values are Low, Lowest, Highest and High.
thresholdCrossingDescription	String	- multiplicity is 0..1 - unique - optional	Contains further information on the threshold crossing alarm. Vendors should avoid using this field to put additional information identifying the indicator or the threshold id. The corresponding fields should be use for better alarm quality. For complex thresholds involving multiple indicators, this field is required to provide a textual description of the threshold crossing condition.

3.1.2.7. MTOSIAlarmAttributes

- Type: Datatype Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype contains wireline specific alarm attributes coming from MTOSI.

It is present to ease migration from MTOSI RTM implementation and can be considered as conditional for MTOSI.

- Properties:

3.1.2.7.1. Attributes

name	datatype	properties	description
affectedPtpRefList	objectName	- multiplicity is 0..1 - read only - unique - optional	This attribute identifies all affected associated PTP names.
isEdgePointRelated	boolean	- multiplicity is 0..1 - read only - unique - optional	This attribute indicates whether the event is related to a Termination Point (TP) at the edge of a subnetwork.It is True for edge points and their contained CTPs although it is always False as a CTP's attribute if the CTP doesn't terminate a Topological Link.Note that the value is True for all notifications reporting a value change of the TP's attribute 'isEdgePoint' even if the new value is False.
layerRate	LayerRate	- multiplicity is 0..1 - read only - unique - optional	This attribute identifies the layer rate to which the Alarm is relevant to.
nativeProbableCause	String	- multiplicity is 0..1 - read only - unique - optional	Represents the probable cause attribute as defined at the source, before any normalization.It might be different from the probable cause if the latter has been normalized by an OSS (EMS or NMS) receiving the alarm.

3.1.3. Notifications

3.1.3.1. AckStateChanged

- Type: Event Artifact

- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:
    org.tmforum.tip.common.notifications.CommonNotification
    org.tmforum.tip.internal.notifications.NotificationBase
- Description:

Notification of the acknowledgement of the alarm.The alarm acknowledgement can be done either by the client through the acknowledge directive or by the alarm-owning system using some internal policy.
The objectId carries the identifier (EntityIdentifier) of the alarm.The alarmType, perceivedSeverity, probableCause, specificProblem, managedObjectClass, managedObjectInstance and systemDN attributes are used for filtering. They must be added to the event if present in the original alarm.
This notification is not supported in the Simple Alarm Reporting profile, optional in the Standard and in the Enhanced profiles.

- Properties:
    This notification is optional

3.1.3.1.1. Attributes

name	datatype	properties	description
alarmId	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the alarmId attribute of the ResourceAlarm. This attribute is mandatory in all 3 profiles.
alarmType	AlarmType	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the alarmType attribute of the ResourceAlarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - read only - unique - mandatory	Corresponds to the PerceivedSeverity attribute of the ResourceAlarm. This attribute is used for notification filtering.This attribute is mandatory in all 3 profiles.
probableCause	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the perceivedSeverity attribute of the ResourceAlarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - unique - optional	
managedObjectClass	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object class, the resource that is in alarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
managedObjectInstance	objectName	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object instance, the resource that is in alarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
systemDN	String	- multiplicity is 0..1 - read only - unique - invariant - optional	Corresponds to the systemDN attribute of the ResourceAlarm. This attribute, if present, is used for notfication filtering.This attribute is not supported in the Simple Alarm Reporting profile, optional in the Standard profile and mandatory in the Enhanced profile.
ackState	AckStatus	- multiplicity is 1 - read only - unique - mandatory	Corresponds to the ackState attribute of the ResourceAlarm.If the acknowledgeResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
ackUserId	String	- multiplicity is 0..1 - read only - unique - optional	Corresponds to the ackUserId attribute of the ResourceAlarm. Only when the alarm is acknowledged through the acknowledge directive.If the acknowledgeResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

ackSystemId	String	- multiplicity is 0..1 - read only - unique - optional	Corresponds to the ackSystemId attribute of the ResourceAlarm.If the acknowledgeResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
sourceTime	time	- multiplicity is 0..1 - unique - mandatory	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - mandatory	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - mandatory	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.

3.1.3.2. AlarmListRebuilt

- Type: Event Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:

    org.tmforum.tip.internal.notifications.NotificationBase

- Description:

This notification is used by the alarm-owning system to indicate that it has rebuilt part or the whole of its alarm list.
If the managedObjects attribute is present, then only the part of the alarm list related to the list of MOs present in the attribute and their subordinate has been rebuilt. Otherwise, the whole alarm list has been rebuilt.
This notification is not supported in the Simple Alarm Reporting profile, mandatory in the Standard and in the Enhanced profiles.

- Properties:

    This notification is optional

3.1.3.2.1. Attributes

name	datatype	properties	description
managedObjects	objectName	- multiplicity is * - read only - unique - optional	If present, the alarms related to the objects pointed by the ManagedObjects and their subordinate MOs have been rebuilt. The other alarms related to different MOs were not rebuiltIf absent, then the whole alarm list has been rebuilt.
systemDN	String	- multiplicity is 0..1 - read only - unique - optional	Corresponds to the systemDN attribute of the ResourceAlarm.
reason	AlarmListRebuildReason	- multiplicity is 1 - read only - unique - default value is 'INDETERMINATE' - mandatory	It carries the reason why the alarm list has been rebuilt.
alarmListAlignmentRequirement	AlarmListAlignmentRequirement	- multiplicity is 0..1 - read only - unique - optional	Indicates to the client if it needs to realign with the alarm list on the alarm-owning system.If not present, it means the client has to realign its alarm list.
sourceTime	time	- multiplicity is 0..1 - unique - mandatory	The time at which the event was reported by the source system (NE, EMS or OS).

3.1.3.3. ChangedAlarm

- Type: Event Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:
    org.tmforum.tip.common.notifications.AVCNotification
    org.tmforum.tip.common.notifications.CommonNotification
    org.tmforum.tip.internal.notifications.NotificationBase
- Description:

Notification of changes in an alarm.The time at which the alarm has been changed corresponding to the alarmChangedTime is carried in the sourceTime attribute.The objectId carries the identifier (EntityIdentifier) of the alarm.
The alarmType, perceivedSeverity, probableCause, specificProblem, managedObjectClass, managedObjectInstance and systemDN attributes are used for filtering. They must be added to the event if present in the original alarm.This notification is extendable as the AVCNotification it inherits from is extendable.
This notification is optional in the Simple Alarm Reporting and Standard profiles and mandatory in the Enhanced profile.

- Properties:
    This notification is optional

3.1.3.3.1. Attributes

name	datatype	properties	description
alarmId	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the alarmId attribute of the ResourceAlarm. This attribute is mandatory in all 3 profiles.
alarmType	AlarmType	- multiplicity is 1 - read only - unique - invariant - mandatory	Categorizes the alarm. This attribute is used for notification filtering.This attribute is mandatory in all 3 profiles
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - read only - unique - mandatory	Lists the possible severities that can be allocated to an Alarm. The values are consistent with ITU-T Recommendation X.733. This attribute is used for notification filtering.This attribute is mandatory in all 3 profiles.
probableCause	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Further qualifies the alarm in complement of the alarmType. This specification does not use an enumeration, but a string with qualified text. Recommended values will be specified separately. This attribute is used for notification filtering.This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - read only - unique - optional	Further qualifies the alarm in addition to the probableCause. This attribute is defined as a string. Values are defined by vendors.This attribute is used for notification filtering and must be present if present in the original alarm. This attribute is optional in all 3 profiles.
managedObjectClass	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object class, the resource that is in alarm. This attribute is used for notification filtering.This attribute is mandatory in all 3 profiles.
managedObjectInstance	objectName	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object instance, the resource that is in alarm. This attribute is used for notification filtering.This attribute is mandatory in all 3 profiles.
crossedThresholdInformation	CrossedThreshold	- multiplicity is 0..1 - read only - unique - optional	Identifies the details of the threshold that has been crossed. This attribute is optional in all 3 profiles.
proposedRepairActions	String	- multiplicity is 0..1 - read only - unique - optional	Indicates proposed repair actions, if known to the system emitting the alarm. This attribute is optional in all 3 profiles.

additionalText	String	- multiplicity is 0..1 - read only - unique - optional	Contains further information on the alarm. Vendors should avoid using this field to put additional information identifying the alarmed object or the specific problem. The corresponding fields should be use for better alarm quality. This attribute is optional in all 3 profiles.
systemDN	String	- multiplicity is 0..1 - read only - unique - invariant - optional	Identifies the alarm-owning system, i.e. the one owning the alarm list. This attribute is used for notification filtering and must be present if present in the original alarm.This attribute is not supported in the Simple Alarm Reporting profile, optional in the Standard profile and mandatory in the Enhanced profile.
backedUpStatus	boolean	- multiplicity is 0..1 - read only - unique - optional	Indicates if the Managed Object (related to this alarm) has a back up or has been backed up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
backUpObject	objectName	- multiplicity is 0..1 - read only - unique - optional	In case the Managed Object (related to this alarm) has a back up, it specifies the value of the object providing the back-up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmEscalation	int	- multiplicity is 0..1 - read only - unique - optional	Indicates if this alarm has been escalated or not. Possible values are 0 to 10. A value of zero means no escalation.The meanings of values 1-10 are to be determined by the user of the interface, but they show increasing levels of escalation. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
serviceAffecting	ServiceAffectingIndicator	- multiplicity is 0..1 - read only - unique - optional	Provides the alarm-owning system determination of whether or not the alarm affects service. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
potentialRootCauseIndication	boolean	- multiplicity is 0..1 - read only - unique - optional	Indicates whether an alarm is a raw (uncorrelated) alarm (when false) or a potential root cause alarm indication (when true). A fault has typically one root cause, but identifying the true root cause of a fault might be difficult. However, with the scope of an alarm-owning system, it might possible to identify a potential root cause indication that might be useful for client systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
comments	Comment	- multiplicity is * - read only - unique - optional	Indicates the comments entered on the alarm, as a list.If the commentResourceAlarms is supported, then this attribute shall also be supported. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
underlyingAlarms	ResourceAlarm	- multiplicity is * - read only - unique - passed by id - optional	It indicates the alarms attached to this alarm as underlying alarms from a correlation point of view.An alarm can be correlated to one or more underlying alarms. There might be multiple levels of alarm correlation and an underlying alarm in one relation can be itself a parent alarm for other underlying alarms. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
parentAlarms	ResourceAlarm	- multiplicity is * - read only - unique - passed by id - optional	It indicates the parent alarms for this alarm from a correlation point of view.An alarm can be correlated to one or more underlying alarms. There might be multiple levels of alarm correlation and an underlying alarm in one relation can be itself a parent alarm for other underlying alarms. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
aliasNames	checkedCollection	- multiplicity is 1 - unique - mandatory	The aliasNames attribute contains implimentation specific name value pairs for local alternative names for the Entity.
sourceTime	time	- multiplicity is 0..1 - unique - mandatory	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - mandatory	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - mandatory	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.

3.1.3.4. ClearedAlarm

- Type: Event Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:
    org.tmforum.tip.common.notifications.CommonNotification
    org.tmforum.tip.internal.notifications.NotificationBase
- Description:

Notification of the clearance of the alarm.
The objectId carries the identifier (EntityIdentifier) of the alarm.
When the correlatedNotifications attribute is present, it references other alarms that are cleared at the same time.ThresholdInfo is required for the clearance of the threshold crossing alarm.
The alarmType, perceivedSeverity, probableCause, managedObjectClass, managedObjectInstance and systemDN attributes are used for filtering. They must be added to the event if present in the original alarm.
This notification is mandatory in all 3 profiles.

- Properties:
    This notification is mandatory

3.1.3.4.1. Attributes

name	datatype	properties	description
alarmId	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the alarmId attribute of the ResourceAlarm. This attribute is mandatory in all 3 profiles.
alarmType	AlarmType	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the alarmType attribute of the ResourceAlarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - read only - unique - mandatory	Corresponds to the perceivedSeverity attribute of the ResourceAlarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
probableCause	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Corresponds to the probableCause attribute of the ResourceAlarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - unique - optional	Further qualifies the alarm in addition to the probableCause. This attribute is defined as a string. Values are defined by vendors.This attribute is used for notification filtering and must be present if present in the original alarm. This attribute is optional in all 3 profiles.
managedObjectClass	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object class, the resource that is in alarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
managedObjectInstance	objectName	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object instance, the resource that is in alarm. This attribute is used for notfication filtering.This attribute is mandatory in all 3 profiles.
crossedThresholdInformation	CrossedThreshold	- multiplicity is 0..1 - read only - unique - optional	Identifies the details of the threshold that has been crossed when this clearance corresponds to a threshold crossing clearance. This attribute is optional in all 3 profiles.
systemDN	String	- multiplicity is 0..1 - read only - unique - invariant - optional	Corresponds to the systemDN attribute of the ResourceAlarm. This attribute. if present, is used for notfication filtering.This attribute is not supported in the Simple Alarm Reporting profile, optional in the Standard profile and mandatory in the Enhanced profile.

correlatedAlarms	ResourceAlarm	- multiplicity is * - read only - unique - passed by id - optional	Indicates the list of alarms that are cleared along with this one. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
clearUserId	String	- multiplicity is 0..1 - read only - unique - optional	Provides the id of the user who invoked the clearResourceAlarm operation.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for alarm clearance. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
clearSystemId	String	- multiplicity is 0..1 - read only - unique - optional	Provides the id of the system where the user who invoked the clearResourceAlarm operation is located. This might be different from the alarm-owning system.Note that the automatic AVC notification generation is disabled for this attribute as a specific notification is generated for alarm clearance. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
sourceTime	time	- multiplicity is 0..1 - unique - mandatory	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - mandatory	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - mandatory	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.

3.1.3.5. NewAlarm

- Type: Event Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:
    org.tmforum.tip.common.notifications.OCNotification
    org.tmforum.tip.common.notifications.CommonNotification
    org.tmforum.tip.internal.notifications.NotificationBase
- Description:

Notification of a new alarm.The time at which the alarm occurred at its source, corresponding to the alarmRaisedTime is carried in the sourceTime attribute.The objectId carries the identifier (EntityIdentifier) of the alarm.This notification is extendable as the OCNotification it inherits from is extendable.

This notification is mandatory in all 3 profiles.

- Properties:
    This notification is mandatory

3.1.3.5.1. Attributes

name	datatype	properties	description
alarmId	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Unique identifier of the Alarm. Note that this identifier is local to the server side of the interface, i.e. the alarm-owning system.Only EntityIdentifier can be considered as global. This attribute is mandatory in all 3 profiles.
alarmType	AlarmType	- multiplicity is 1 - read only - unique - invariant - mandatory	Categorizes the alarm. This attribute is mandatory in all 3 profiles.
perceivedSeverity	PerceivedSeverity	- multiplicity is 1 - read only - unique - mandatory	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. This attribute is mandatory in all 3 profiles.

probableCause	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Further qualifies the alarm in complement of the alarmType. This specification does not use an enumeration, but a string with qualified text. Recommended values will be specified separately. This attribute is mandatory in all 3 profiles.
specificProblem	String	- multiplicity is 0..1 - read only - unique - optional	Further qualifies the alarm in addition to the probableCause. This attribute is defined as a string. Values are defined by vendors. This attribute is optional in all 3 profiles.
managedObjectClass	String	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object class, the resource that is in alarm. This attribute is mandatory in all 3 profiles.
managedObjectInstance	objectName	- multiplicity is 1 - read only - unique - invariant - mandatory	Identifies, in terms of object instance, the resource that is in alarm. This attribute is mandatory in all 3 profiles.
crossedThresholdInformation	CrossedThreshold	- multiplicity is 0..1 - read only - unique - optional	Identifies the details of the threshold that has been crossed. This attribute is optional in all 3 profiles.
proposedRepairActions	String	- multiplicity is 0..1 - read only - unique - optional	Indicates proposed repair actions, if known to the system emitting the alarm. This attribute is optional in all 3 profiles.
additionalText	String	- multiplicity is 0..1 - read only - unique - optional	Contains further information on the alarm. Vendors should avoid using this field to put additional information identifying the alarmed object or the specific problem. The corresponding fields should be use for better alarm quality. This attribute is optional in all 3 profiles.
alarmReportingTime	dateTime	- multiplicity is 0..1 - read only - unique - optional	Indicates the time (as a date + time) at which the alarm was reported by the owning system.The time at which the alarm occurred at its source, corresponding to the alarmRaisedTime is carried in the sourceTime attribute. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
systemDN	String	- multiplicity is 0..1 - read only - unique - invariant - optional	Identifies the alarm-owning system, i.e. the one owning the alarm list. This attribute is not supported in the Simple Alarm Reporting profile, optional in the Standard profile and mandatory in the Enhanced profile.
backedUpStatus	boolean	- multiplicity is 0..1 - read only - unique - optional	Indicates if the Managed Object (related to this alarm) has a back up or has been backed up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
backUpObject	objectName	- multiplicity is 0..1 - read only - unique - optional	In case the Managed Object (related to this alarm) has a back up, it specifies the value of the object providing the back-up. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
monitoredAttributes	AttributeValuePair	- multiplicity is * - read only - unique - optional	The Monitored Attributes parameter, when present, defines one or more attributes of the Managed Object (related to this alarm) and their corresponding values at the time of the alarm. Managed object definers may specify the set of attributes which are of interest, if any. This allows, for example, the timely reporting of changing conditions prevalent at the time of the alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
trendIndication	TrendIndicator	- multiplicity is 0..1 - read only - unique - optional	Indicates the current severity trend of the Managed Object (related to this alarm). This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
plannedOutageIndication	PlannedOutageIndicator	- multiplicity is 0..1 - read only - unique - optional	Indicates that the Managed Object (related to this alarm) is in planned outage (in planned maintenance, or out-of-service). This might also be used when an equipment is being commissioned to avoid the alarms propagating to other systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmEscalation	int	- multiplicity is 0..1 - read only - unique - optional	Indicates if this alarm has been escalated or not. Possible values are 0 to 10. A value of zero means no escalation.The meanings of values 1-10 are to be determined by the user of the interface, but they show increasing levels of escalation. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
serviceAffecting	ServiceAffectingIndicator	- multiplicity is 0..1 - read only - unique - optional	Provides the alarm-owning system determination of whether or not the alarm affects service. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.

potentialRootCauseIndication	boolean	- multiplicity is 0..1 - read only - unique - optional	Indicates whether an alarm is a raw (uncorrelated) alarm (when false) or a potential root cause alarm indication (when true). A fault has typically one root cause, but identifying the true root cause of a fault might be difficult. However, with the scope of an alarm-owning system, it might possible to identify a potential root cause indication that might be useful for client systems. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
alarmDetector	String	- multiplicity is 0..1 - read only - unique - optional	Provides the identity of the detector of the alarm.This attribute can also be used for non security alarms, when the object detecting the problem is not the Managed Object related to the alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
securityServiceProvider	String	- multiplicity is 0..1 - read only - unique - optional	Identifies the service provider whose service request provokes the generation of the security alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
securityServiceUser	String	- multiplicity is 0..1 - read only - unique - optional	Identifies the service user whose request for service led to the generation of the security alarm. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
mtosiSpecificAlarmAttributes	MTOSIAlarmAttributes	- multiplicity is 0..1 - read only - unique - optional	This attribute groups wireline specific alarm attributes coming from MTOSI. It is present to ease migration from MTOSI RTM implementation and can be considered as conditional for MTOSI. This attribute is not supported in the Simple Alarm Reporting profile and optional in the Standard and Enhanced profiles.
aliasNames	checkedCollection	- multiplicity is 1 - unique - mandatory	The aliasNames attribute contains implimentation specific name value pairs for local alternative names for the Entity.
sourceTime	time	- multiplicity is 0..1 - unique - mandatory	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - mandatory	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - mandatory	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.

3.1.3.6. PotentialFaultyAlarmList

- Type: Event Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- All super types:

    org.tmforum.tip.internal.notifications.NotificationBase

- Description:

This notification is used by the alarm-owning system to indicate that it has lost confidence in a part or the whole of its alarm list, most likely due to a loss of synchronzation with the underlying alarm sources.

If the managedObjects is present, then only the part of the alarm list related to the list of MOs presnet in this attribute and their subordinate is not reliable. Otherwise, the whole alarm list is not reliable.

This notification is not supported in the Simple Alarm Reporting profile, optional in the Standard and in the Enhanced profiles.

- Properties:

    This notification is optional

3.1.3.6.1. Attributes

name	datatype	properties	description
managedObjects	objectName	- multiplicity is * - read only - unique - optional	If present, the alarms related to the objects pointed by the ManagedObjects and their subordinate MOs are not reliable. The other alarms related to different MOs are still reliable.If absent, then the whole alarm list is not reliable.
systemDN	String	- multiplicity is 0..1 - read only - unique - optional	Corresponds to the systemDN attribute of the ResourceAlarm.
reason	AlarmListRebuildReason	- multiplicity is 1 - read only - unique - default value is 'INDETERMINATE' - mandatory	It carries the reason why the alarm list has to be rebuilt.
sourceTime	time	- multiplicity is 0..1 - unique - mandatory	The time at which the event was reported by the source system (NE, EMS or OS).

3.1.4. Enumerations

3.1.4.1. AlarmAckState

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

It defines the various alarm states that can be returned using a get operation.

- Properties:

3.1.4.1.1. Literals

name	datatype	properties	description
ALL_ALARMS	String	value is "ALL_ALARMS"	
ALL_ACTIVE_ALARMS	String	value is "ALL_ACTIVE_ALARMS"	
ALL_ACTIVE_AND_ACKNOWLEDGED_ALARMS	String	value is "ALL_ACTIVE_AND_ACKNOWLEDGED_ALARMS"	
ALL_ACTIVE_AND_UNACKNOWLEDGED_ALARMS	String	value is "ALL_ACTIVE_AND_UNACKNOWLEDGED_ALARMS"	
ALL_CLEARED_AND_UNACKNOWLEDGED_ALARMS	String	value is "ALL_CLEARED_AND_UNACKNOWLEDGED_ALARMS"	
ALL_UNACKNOWLEDGED_ALARMS	String	value is "ALL_UNACKNOWLEDGED_ALARMS"	

3.1.4.2. AlarmListAlignmentRequirement

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

The enumeration indicates to the client if it needs to realign with the alarm list on the alarm-owning system.

- Properties:

3.1.4.2.1. Literals

name	datatype	properties	description
ALIGNMENT_REQUIRED	String	value is "ALIGNMENT_REQUIRED"	
ALIGNMENT_NOT_REQUIRED	String	value is "ALIGNMENT_NOT_REQUIRED"	

3.1.4.3. AlarmListRebuildReason

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype indicates the reason for which the alarm list was rebuilt.

- Properties:

3.1.4.3.1. Literals

name	datatype	properties	description
AGENT_NE_COMMUNICATION_ERROR	String	value is "AGENT_NE_COMMUNICATION_ERROR"	
AGENT_RESTARTS	String	value is "AGENT_RESTARTS"	
INDETERMINATE	String	value is "INDETERMINATE"	

3.1.4.4. AlarmType

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

This datatype defines the possible alarm values. It includes security alarm types and is aligned with 3GPP EventType datatype.

- Properties:

3.1.4.4.1. Literals

name	datatype	properties	description
COMMUNICATIONS_ALARM	String	value is "COMMUNICATIONS_ALARM"	
PROCESSING_ERROR_ALARM	String	value is "PROCESSING_ERROR_ALARM"	
ENVIRONMENTAL_ALARM	String	value is "ENVIRONMENTAL_ALARM"	
QUALITY_OF_SERVICE_ALARM	String	value is "QUALITY_OF_SERVICE_ALARM"	
EQUIPMENT_ALARM	String	value is "EQUIPMENT_ALARM"	
INTEGRITY_VIOLATION	String	value is "INTEGRITY_VIOLATION"	
OPERATIONAL_VIOLATION	String	value is "OPERATIONAL_VIOLATION"	
PHYSICAL_VIOLATION	String	value is "PHYSICAL_VIOLATION"	

SECURITY_SERVICE_OR_MECHANISM_VIOLATION	String	value is "SECURITY_SERVICE_OR_MECHANISM_VIOLATION"	
TIME_DOMAIN_VIOLATION	String	value is "TIME_DOMAIN_VIOLATION"	

3.1.4.5. PerceivedSeverity

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
This datatype lists the possible severities that can be allocated to a Alarm. The values are consistent with ITU-T Recommendation X.733. This specification does not recommend the use of indeterminate.
- Properties:

3.1.4.5.1. Literals

name	datatype	properties	description
CRITICAL	String	value is "CRITICAL"	
MAJOR	String	value is "MAJOR"	
MINOR	String	value is "MINOR"	
WARNING	String	value is "WARNING"	
INDETERMINATE	String	value is "INDETERMINATE"	
CLEARED	String	value is "CLEARED"	

3.1.4.6. PlannedOutageIndicator

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
This datatype indicates that the Managed Object (related to the alarm) is in planned outage (out-of-service or in planned maintenance). This might also be used when an equipment is being commissioned to avoid the alarms propagating to other systems.
- Properties:

3.1.4.6.1. Literals

name	datatype	properties	description
IN_SERVICE	String	value is "IN_SERVICE"	
OUT_OF_SERVICE	String	value is "OUT_OF_SERVICE"	

3.1.4.7. ServiceAffectingIndicator

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
This datatype provides the alarm-owning system determination of whether or not the alarm affects service. The possible values for this attribute are: service affecting, not service affecting, unknown as to whether it is service affecting.
- Properties:

3.1.4.7.1. Literals

name	datatype	properties	description
SERVICE_AFFECTING	String	value is "SERVICE_AFFECTING"	
NOT_SERVICE_AFFECTING	String	value is "NOT_SERVICE_AFFECTING"	
UNKNOWN	String	value is "UNKNOWN"	

3.1.4.8. ThresholdCrossingDirection

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
This datatype specifies the possible crossing directions: up or down.
- Properties:

3.1.4.8.1. Literals

name	datatype	properties	description
UP	String	value is "UP"	
DOWN	String	value is "DOWN"	

3.1.4.9. TrendIndicator

- Type: Enumeration Artifact
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
This datatype indicates the current severity trend of the Managed Object (related to the alarm).
- Properties:

3.1.4.9.1. Literals

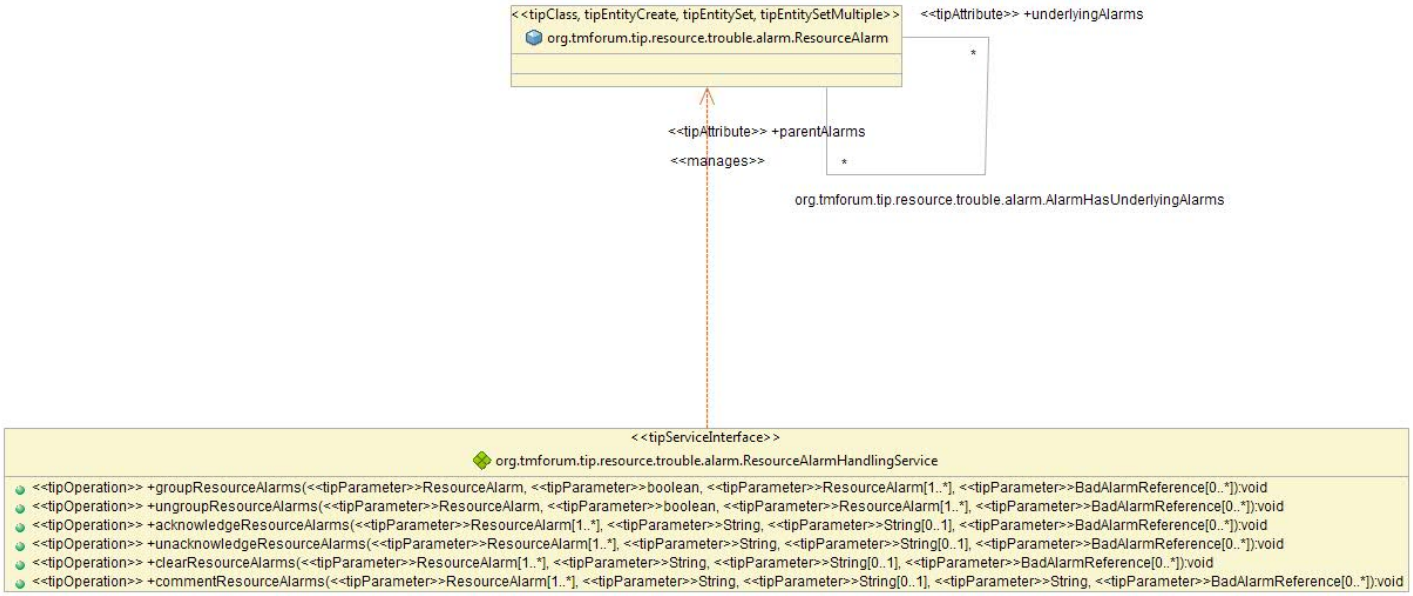
name	datatype	properties	description
LESS_SEVERE	String	value is "LESS_SEVERE"	
NO_CHANGE	String	value is "NO_CHANGE"	
MORE_SEVERE	String	value is "MORE_SEVERE"	

4. Service Interfaces

Service interfaces available from TIP Resource Alarm Management model:
- ResourceAlarmHandlingService
- ResourceAlarmRetrievalService

4.1. ResourceAlarmHandlingService

- Type: Session Artifact (Service Interface)
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:
Service Interface containing all the control operations offered on Resource Alarms.
It includes common set and create operations.
- Operations exposed:
    groupResourceAlarms
    ungroupResourceAlarms
    acknowledgeResourceAlarms
    unacknowledgeResourceAlarms
    clearResourceAlarms
    commentResourceAlarms
- Common Operations
    setResourceAlarm
    setResourceAlarms
    createResourceAlarm
- Managed entities:
    org.tmforum.tip.resource.trouble.alarm.ResourceAlarm
- Properties:
    This service interface is optional



4.1.1. groupResourceAlarms

- Type: Operation
- Description:

Group one or more underlying alarms to a parent alarm.The parent alarm can be marked at the same time as potential root cause indication.

This operation is not supported in the Simple Alarm Reporting and Standard profiles and optional in Enhanced profile.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.1.1. Arguments

name	datatype	properties	description
parentAlarm	ResourceAlarm	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	ParentAlarm

markAsPotentialRootCauseIndication	boolean	- input parameter - multiplicity is 0..1 - unique - optional	Allow marking the parent alarm as potential root cause indication if set to true. If false, the attribute potentialRootCauseIndication is not changed.
underlyingAlarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	Underlying alarms to group with the parent
failingAlarms	BadAlarmReference	- output parameter - multiplicity is 0..* - unique - optional	List of failing alarm ids with failure code. These alarms could not get grouped.

4.1.2. ungroupResourceAlarms

- Type: Operation
- Description:

Ungroup one or more underlying alarms from a parent alarm.

This operation is not supported in the Simple Alarm Reporting and Standard profiles and optional in Enhanced profile.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.2.1. Arguments

name	datatype	properties	description
parentAlarm	ResourceAlarm	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	Parent alarm
unmarkAsPotentialRootCauseIndication	boolean	- input parameter - multiplicity is 0..1 - unique - optional	Allow unmarking the parent alarm as potential root cause indication if set to true. If false, the attribute potentialRootCauseIndication is not changed.
underlyingAlarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	Underlying alarms to ungroup with parent alarms
groupedAlarms	BadAlarmReference	- output parameter - multiplicity is 0..* - unique - optional	List of failing alarm ids with failure code. These alarms could not get ungrouped.

4.1.3. acknowledgeResourceAlarms

- Type: Operation
- Description:
Acknowledges one or more Resource Alarms.Note that this operation is optional as it is not needed for the Simple Alarm Reporting profile.
This operation is not idempotent. Alarms already in acknowledged state should be returned as failing alarms with a failure code of ALREADY_IN_TARGET_STATE.
The 2 exceptions NotInValidState and EntityNotFound are only applicable when trying to acknowledge a single alarm.
This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.
- Properties:
    This operation is not extendable
    This operation is optional
- Return:
    void
- Exceptions:
    NotInValidState
    EntityNotFound
    AccessDenied
    CommunicationLoss
    InternalError
    InvalidInput
    NotImplemented
    UnableToComply

4.1.3.1. Arguments

name	datatype	properties	description
inputAlarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	inputs alarms to acknowledge
userId	String	- input parameter - multiplicity is 1 - unique - mandatory	Identifies the user acknowledging the alarm
systemId	String	- input parameter - multiplicity is 0..1 - unique - optional	Identifies the system on which the client doing the acknowlegement runs.
failingAlarms	BadAlarmReference	- output parameter - multiplicity is 0..* - unique - optional	List of failing alarm ids with failure code

4.1.4. unacknowledgeResourceAlarms

- Type: Operation
- Description:
Un-acknowledges one or more Resource Alarms.
This operation is not idempotent. Alarms already in acknowledged state should be returned as failing alarms with a failure code of

ALREADY_IN_TARGET_STATE.
The 2 exceptions NotInValidState and EntityNotFound are only applicable when trying to unacknowledge a single alarm.
This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.
- Properties:
This operation is not extendable
This operation is optional
- Return:
void
- Exceptions:
NotInValidState
EntityNotFound
AccessDenied
CommunicationLoss
InternalError
InvalidInput
NotImplemented
UnableToComply

4.1.4.1. Arguments

name	datatype	properties	description
inputAlarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	alarms to un-ack
userId	String	- input parameter - multiplicity is 1 - unique - mandatory	Identifies the user unacknowledging the alarm
systemId	String	- input parameter - multiplicity is 0..1 - unique - optional	Identifies the system on which the client doing the unacknowlegement runs.
failingAlarms	BadAlarmReference	- output parameter - multiplicity is 0..* - unique - optional	List of failing alarm ids with failure code

4.1.5. clearResourceAlarms

- Type: Operation
- Description:
Clear an alarm.
This operation is not idempotent. Alarms already in acknowledged state should bereturned as failing alarms with a failure code of ALREADY_IN_TARGET_STATE.
The 2 exceptions NotInValidState and EntityNotFound are only applicable when trying to clear a single alarm.
This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.
- Properties:
This operation is not extendable
This operation is optional
- Return:

void

- Exceptions:

NotInValidState

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.5.1. Arguments

name	datatype	properties	description
inputAlarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	input alarms to clear
userId	String	- input parameter - multiplicity is 1 - unique - mandatory	Identifies the user clearing the alarm
systemId	String	- input parameter - multiplicity is 0..1 - unique - optional	Identifies the system on which the client doing the clearance runs.
failingAlarms	BadAlarmReference	- output parameter - multiplicity is 0..* - unique - optional	List of failing alarm ids with failure code

4.1.6. commentResourceAlarms

- Type: Operation
- Description:

Comment one or more alarms. If several alarms are specified, then the same comment will apply to all alarms.

The 2 exceptions NotInValidState and EntityNotFound are only applicable when trying to clear a single alarm.

This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

NotInValidState

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.6.1. Arguments

name	datatype	properties	description
inputAlarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	alarms to be commented
userId	String	- input parameter - multiplicity is 1 - unique - mandatory	Identifies the user commenting the alarm
systemId	String	- input parameter - multiplicity is 0..1 - unique - optional	Identifies the system on which the client set the comment runs.
commentText	String	- input parameter - multiplicity is 1 - unique - mandatory	text of the comment
failingAlarms	BadAlarmReference	- output parameter - multiplicity is 0..* - unique - optional	List of failing alarm ids with failure code

4.1.7. setResourceAlarm

- Type: Operation
- Description:
This operation will set a single Resource alarm. The operation is atomic, all attributes should be set. The SetDataForResourceAlarm and AddDataForResourceAlarm are specific structures based on the attributes of the given object type that are settable (resp. settable and are set-valued (multiplicity *, or 1..*) for AddData) after object creation. One or more of the parameters valuesToBeSet, valuesToAdd, valuesToRemove can be provided in the same operation, but at least one of those parameters should be present. The entire modified alarm is returned and an AVC notification is sent when this operation is successful. In the Standard profile, only serviceAffecting and potentialRootCauseIndication are settable. In the Enhanced profile, the following attributes are settable: : perceivedSeverity, specificProblem, proposedRepairActions, additionalText, backupStatus, BackedUpObject, alarmEscalation, serviceAffecting, potential rootCauseIndication. This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.
- Properties:
    This operation is extendable
    This operation is optional
- Return:
    void
- Exceptions:
    AccessDenied
    CommunicationLoss
    InternalError
    InvalidInput
    NotImplemented
    UnableToComply

4.1.7.1. Arguments

name	datatype	properties	description
objectToSet	ResourceAlarm	-input parameter -multiplicity is 1 -unique -passed by Id -mandatory	object to set,passed as an EntityIdentifier
valuesToBeSet	SetDataForResourceAlarm	-input parameter -multiplicity is 0..1 -unique -optional	values to be added, using datatype build by generators.Note that at least one of the parameter valuesToBeSet, valuesToAdd and valuesToRemove should be present
valuesToAdd	AddDataForResourceAlarm	-input parameter -multiplicity is 0..1 -unique -optional	values to add, using datatype build by generators.Note that at least one of the parameter valuesToBeSet, valuesToAdd and valuesToRemove should be present
valuesToRemove	RemoveDataForResourceAlarm	-input parameter -multiplicity is 0..1 -unique -optional	values to remove, using datatype build by generators.Note that at least one of the parameter valuesToBeSet, valuesToAdd and valuesToRemove should be present
modifiedObject	ResourceAlarm	-output parameter -multiplicity is 1 -unique -passed by value -mandatory	modified object by value
extensionInfo	Any	- multiplicity is 0..1 - input/output parameter - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

4.1.8. setResourceAlarms

- Type: Operation
- Description:

This operation set all the alarms matching a filter. Best effort only applies at the entire object level, i.e., either all the requested attributes for an given alarm are set or no attribute is changed. In the Standard profile, only serviceAffecting and potentialRootCauseIndication are settable. In the Enhanced profile, the following attributes are settable: : perceivedSeverity, specificProblem, proposedRepairActions, additionalText, backupStatus, BackedUpObject, alarmEscalation, serviceAffecting, potential rootCauseIndication. This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.

- Properties:
  - This operation is extendable
  - This operation is optional
- Return:
  - void
- Exceptions:
  - FilterNotSupported
  - AccessDenied
  - CommunicationLoss
  - InternalError
  - InvalidInput
  - NotImplemented
  - UnableToComply

4.1.8.1. Arguments

name	datatype	properties	description

filter	Filter	-input parameter -multiplicity is 1 -unique -mandatory -template + query filter	input filter
valuesToBeSet	SetDataForResourceAlarm	-input parameter -multiplicity is 0..1 -unique -optional	values to be added, using datatype build by generators.Note that at least one of the parameter valuesToBeSet, valuesToAdd and valuesToRemove should be present
valuesToAdd	AddDataForResourceAlarm	-input parameter -multiplicity is 0..1 -unique -optional	values to add, using datatype build by generators.Note that at least one of the parameter valuesToBeSet, valuesToAdd and valuesToRemove should be present
valuesToRemove	RemoveDataForResourceAlarm	-input parameter -multiplicity is 0..1 -unique -optional	values to remove, using datatype build by generators.Note that at least one of the parameter valuesToBeSet, valuesToAdd and valuesToRemove should be present
modifiedObjects	ResourceAlarm	-output parameter -multiplicity is 0..* -ordered -unique -passed by value -bulk potential -optional	modified objects by value
failedIds	ResourceAlarm	-output parameter -multiplicity is 0..* -passed by id	failed objects by id
extensionInfo	Any	- multiplicity is 0..1 - input/output parameter - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

4.1.9. createResourceAlarm

- Type: Operation
- Description:

This operation creates a Resource Alarm in the alarm-owning OSS. The optional referenceObject argument specifies an existing instance of a Resource Alarm. Attribute values associated with the reference object instance become the default values for those not specified by the createData parameter. The createDataForResourceAlarm datatype is a specific structure based on the attributes of the object type that are settable at time of object creation. This operation is not supported in the Simple Alarm Reporting and Standard profiles and optional in the Enhanced profile.

- Properties:

    This operation is optional

- Return:

    void

- Exceptions:

    Duplicate

    CapacityExceeded

    AccessDenied

    CommunicationLoss

    InternalError

    InvalidInput

    NotImplemented

    UnableToComply

4.1.9.1. Arguments

name	datatype	properties	description

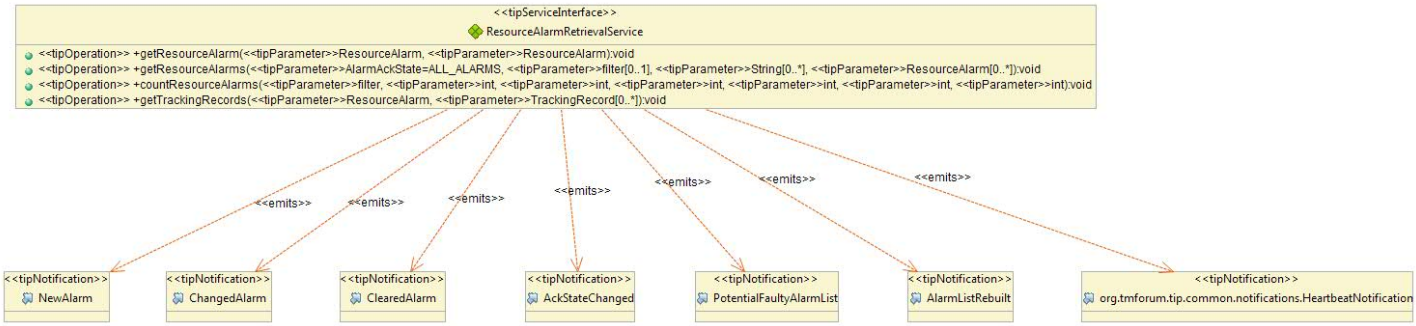
referenceObject	ResourceAlarm	-input parameter -multiplicity is 0..1 -unique -passed by Id -optional	It specifies an exisitng instance of a managed object of the same class as the new object to be created
createData	CreateDataForResourceAlarm	-input parameter -multiplicity is 1 -unique -mandatory	create data using the datatype generated
createdObject	ResourceAlarm	-output parameter -multiplicity is 1 -unique -passed by value -mandatory	created object

4.2. ResourceAlarmRetrievalService

- Type: Session Artifact (Service Interface)
- Package: org.tmforum.tip.resource.trouble.alarm
- Description:

Service Interface containing all the retrieval operations offered on Resource Alarms.This service interface supports the various notfications, both the specific alarm notifications and the Heartbeat notification.

- Operations exposed:
  - getResourceAlarm
  - getResourceAlarms
  - countResourceAlarms
  - getTrackingRecords
- Common Operations
- Emitted events:
  - org.tmforum.tip.resource.trouble.alarm.NewAlarm
  - org.tmforum.tip.resource.trouble.alarm.AckStateChanged
  - org.tmforum.tip.resource.trouble.alarm.ClearedAlarm
  - org.tmforum.tip.resource.trouble.alarm.ChangedAlarm
  - org.tmforum.tip.resource.trouble.alarm.AlarmListRebuilt
  - org.tmforum.tip.resource.trouble.alarm.PotentialFaultyAlarmList
  - org.tmforum.tip.common.notifications.HeartbeatNotification
- Properties:
  - This service interface is mandatory



4.2.1. getResourceAlarm

- Type: Operation
- Description:
This operation returns a single Resource Alarm.
This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.
- Properties:
This operation is extendable
This operation is optional
- Return:
void
- Exceptions:
EntityNotFound
AccessDenied
CommunicationLoss
InternalError
InvalidInput
NotImplemented
UnableToComply

4.2.1.1. Arguments

name	datatype	properties	description
objectToGet	ResourceAlarm	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	object to get by identifier
object	ResourceAlarm	- output parameter - multiplicity is 1 - unique - passed by value - mandatory	object returned by value
extensionInfo	Any	- multiplicity is 0..1 - input/output parameter - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

4.2.2. getResourceAlarms

- Type: Operation
- Description:
This operation returns all the alarms matching the alarmAckState and the filter. It needs to be noted that the results is the AND of the 2 conditions: the alarmAckState and the filter. If poorly designed, the resulting AND can be empty.
Using this operation with alarmAckState = ALL_ACTIVE_ALARMS and no filter allows returning all the active alarms present in the alarm-owning system to resynchrinize the client.This operation is mandatory in all 3 profiles. In the simple Alarm Reporting profile, only support of the alarm Ack State is mandatory.
- Properties:
This operation uses iterator bulk transfer pattern
This operation is extendable
This operation is mandatory
- Return:

void

- Exceptions:

FilterNotSupported

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.2.2.1. Arguments

name	datatype	properties	description
alarmAckState	AlarmAckState	- input parameter - multiplicity is 1 - unique - default value is 'ALL_ALARMS' - mandatory	Return alarms matching the provided ack state. Default is to return all alarms.
filter	filter	- input parameter - multiplicity is 0..1 - unique - query filter - optional	optional filter
attributeSelector	String	- input parameter - multiplicity is 0..* - unique - optional	Allow to specify which attributes to return. It allows to return only a subset of the object instead of the full object. If empty, the whole object is returned.
objects	ResourceAlarm	- output parameter - multiplicity is 0..* - unique - passed by value - bulk potential - mandatory	Objects returned by value.
extensionInfo	Any	- multiplicity is 0..1 - input/output parameter - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

4.2.3. countResourceAlarms

- Type: Operation
- Description:

Provides the count of alarms per severity matching the input filter.

This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

FilterNotSupported

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented
UnableToComply

4.2.3.1. Arguments

name	datatype	properties	description
filter	filter	- input parameter - multiplicity is 1 - unique - query filter - mandatory	
criticalCount	int	- output parameter - multiplicity is 1 - unique - mandatory	
majorCount	int	- output parameter - multiplicity is 1 - unique - mandatory	
minorCount	int	- output parameter - multiplicity is 1 - unique - mandatory	
warningCount	int	- output parameter - multiplicity is 1 - unique - mandatory	
indeterminateCount	int	- output parameter - multiplicity is 1 - unique - mandatory	
clearedCount	int	- output parameter - multiplicity is 1 - unique - mandatory	

4.2.4. getTrackingRecords

- Type: Operation
- Description:
Returns the tracking records for a given resource alarm.Tracking records allow the tracking of modifications on the Resource Alarm.The tracking records should not be embedded in the alarm to allow retrieving it without the tracking records. So a specific operation is needed to retrieve them on demand.
This operation is not supported in the Simple Alarm Reporting profile and optional in Standard and Enhanced profiles.
- Properties:
This operation uses iterator bulk transfer pattern
This operation is not extendable
This operation is optional
- Return:
void
- Exceptions:
EntityNotFound
AccessDenied
CommunicationLoss
InternalError
InvalidInput
NotImplemented

UnableToComply

4.2.4.1. Arguments

name	datatype	properties	description
alarmId	ResourceAlarm	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	
trackingRecords	TrackingRecord	- output parameter - multiplicity is 0..* - unique - passed by value - bulk potential - mandatory	