

TIP_SPM_IA, Service Problem Management Information Agreement

**TIP_SPM_IA
Version 1.0**



September 2010

Notice

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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 TIP Framework was developed to provide a toolkit of industry-agreed specifications and guidelines that cover key business and technical areas.

There are potential gaps or weaknesses for service problem management, especially for newer, more advanced information and content services. To date, most service assurance activities have focused on a set of network-facing processes aimed at determining and resolving network and service issues and events. With the increased range of services now being offered and the increasingly competitive market-driven environment, new demands are being placed on the service assurance systems to deliver even higher levels of service to customers.

The TM Forum recognizes the service assurance platforms need to evolve at the same rate of speed as the networks used to deliver services.

The Service Problem Management interface is filling this gap and defining an interface to manage Service Problems that is following the SID Model and using the newly developed TIP Framework tooling.

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.

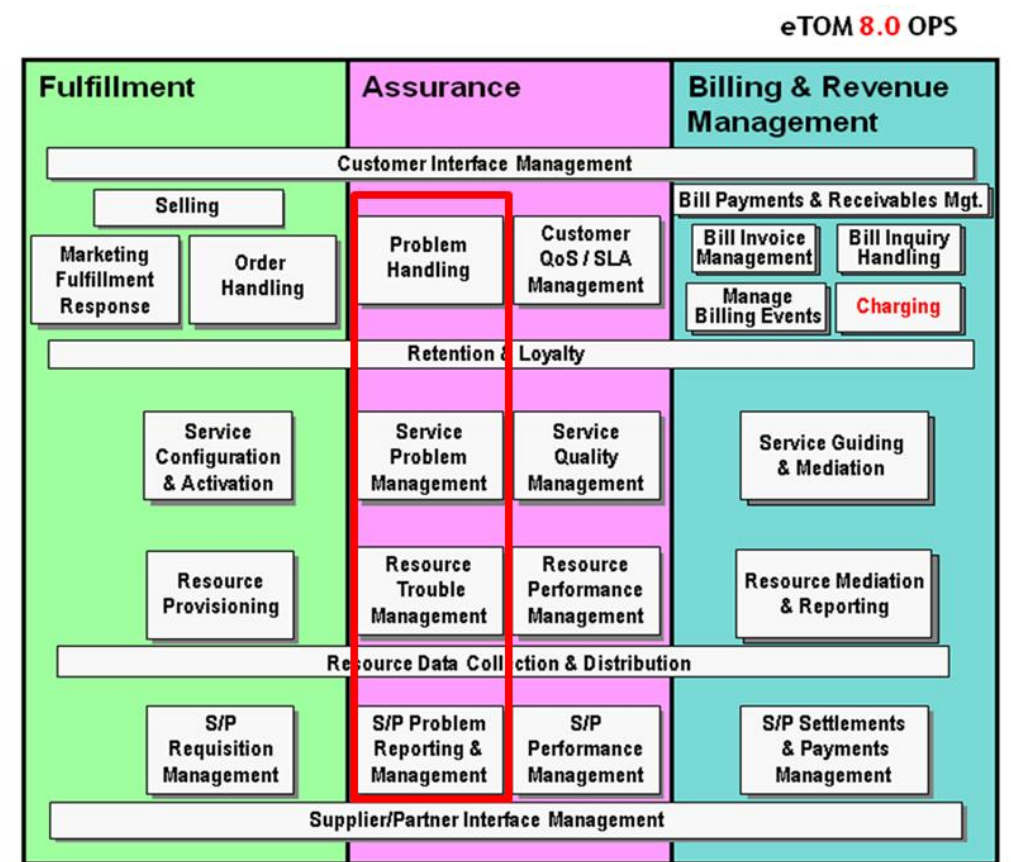
All links are with blue color.

2. Interface Summary

2.1. Context

2.1.1. Relation to eTOM

The Service Problem Management interface is the first 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 Service Problem Management (SPM). In terms of terminology, it should be noted that this interface uses the term Service Problem to refer to both the actual real world problem and the object that represents the problem. The eTOM, however, uses "Service Problem" to reference the problem in the real world and "Service 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 Service Problems. However, the OSS/J Trouble Ticket 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 Service Trouble Report mentioned (but never defined) in the eTOM could be either what is called a Service Problem in this document or a Trouble Ticket as defined in the OSS/J Trouble Ticket API.

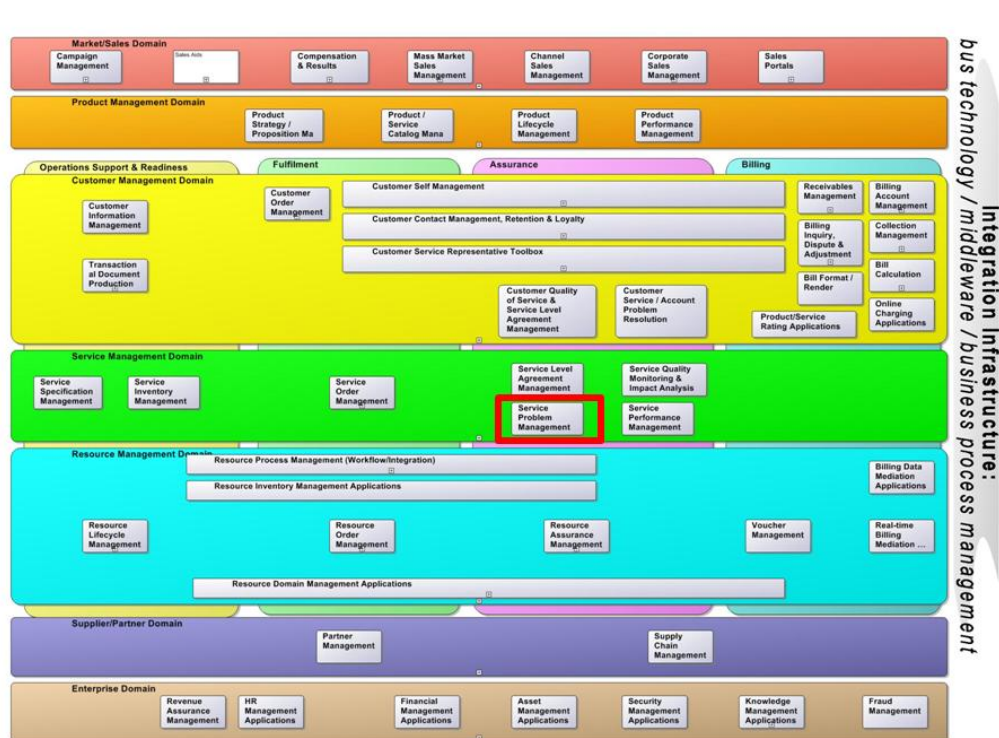
Interface implications for the various eTOM level 3 processes with Service Problem Management (SPM) are as follows:

- Create Service Trouble Report: This seems to be an internal process that would not use the SPM interface defined in this document. [Note: the implied coupling between the Create Service Trouble Report and Report Service Problem processes appears to very tight. In fact, it seems that the only way for this process to communicate with another is via the Report Service Problem process.]
- Diagnose Service Problem: This process is a user of the SPM interface. In particular, this process will be a subscriber to notifications related to service problems created by instances of the Create Service Trouble Report process and forwarded by the Report Service Problem process.
- Correct and Resolve Service Problem: This process is a user of the SPM interface. In particular, this process will be a subscriber to notifications related to service problems created by instances of the Create Service Trouble Report process.
- Track and Manage Service Problem: This process will use the SPM interface to report on status changes to service problems, allow service problems to be updated (e.g., add a comment or acknowledge a service problem) and to accept requests to retrieve service problems.
- Report Service Problem: This process will typically use the SPM interface to announce service problems to other interested processes.
- Close Service Trouble Report: This process will use the SPM interface to indicate when a service problem has been resolved and closed.
- Survey and Analyze Service Problem: This process is out of scope for the SPM interface.

This interface is also the first to develop SID Aggregate Business Entities to support these processes.

2.1.2. Relation to TAM

In terms of the TAM 3.0, the interface fits the Service Problem Management area as shown on the figure below:



The following items from the TAM Service Problem Management area are covered:

- Customer Problem Resolution (this item needs to be considered further)
- Correlation and Root Cause Analysis (as this impacts the interface to be defined)
- Allocating priority (as indicated in a service problem)
- Problem Reception (reception of service problems)
- Problem Consolidation (of service problems)
- Advising the Customer Relationship Management systems (via service problems)
- Advising the Network Operations Center (via service problems)
- Tracking progress (of service problems, e.g., acknowledgement/un-acknowledgement, clearing, escalation)
- Confirming when impact has been removed (via service problems)
- Updating Configuration Management systems (via service problems)
- Updating Inventory Management systems (via service problems)
- Updating Billing systems (via service problems)

Note that the focus is on service problems and not on trouble tickets (as this item is out of scope for this interface).

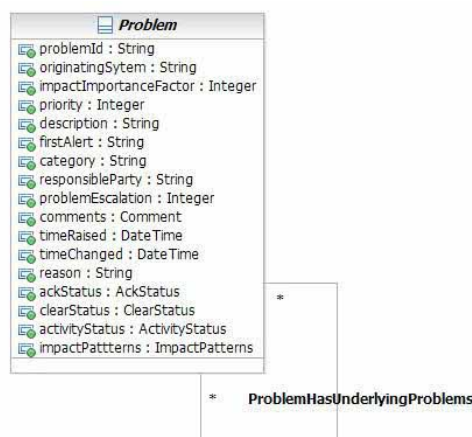
2.2. Problem

A Problem is an indication that a service or product or set of those is no longer functioning according to the agreement with its client(s). It can be considered as in-between an alarm and a trouble ticket.

It is not similar to an alarm, as it can consolidate information on multiple objects and offers more a dashboard view, showing clearly the impact and the root cause of the problem.

It is not similar to a Trouble Ticket, as it does not handle actions and resource assignment.

A generalized Problem entity was defined in order to support the four eTOM processes and to avoid duplication in the SID. Each type (sub-class) of Problem, such as Service Problem, reuses this entity. The generalized Problem entity and its attributes are shown in the figure below:



A large number of attributes are maintained at problem level, as common to all types of problem. All the lifecycle management, most of the characteristics and all of the root cause related attributes are kept at problem level. The main exception is for the impact-related attributes, where the common one like "impact Importance Factor" or

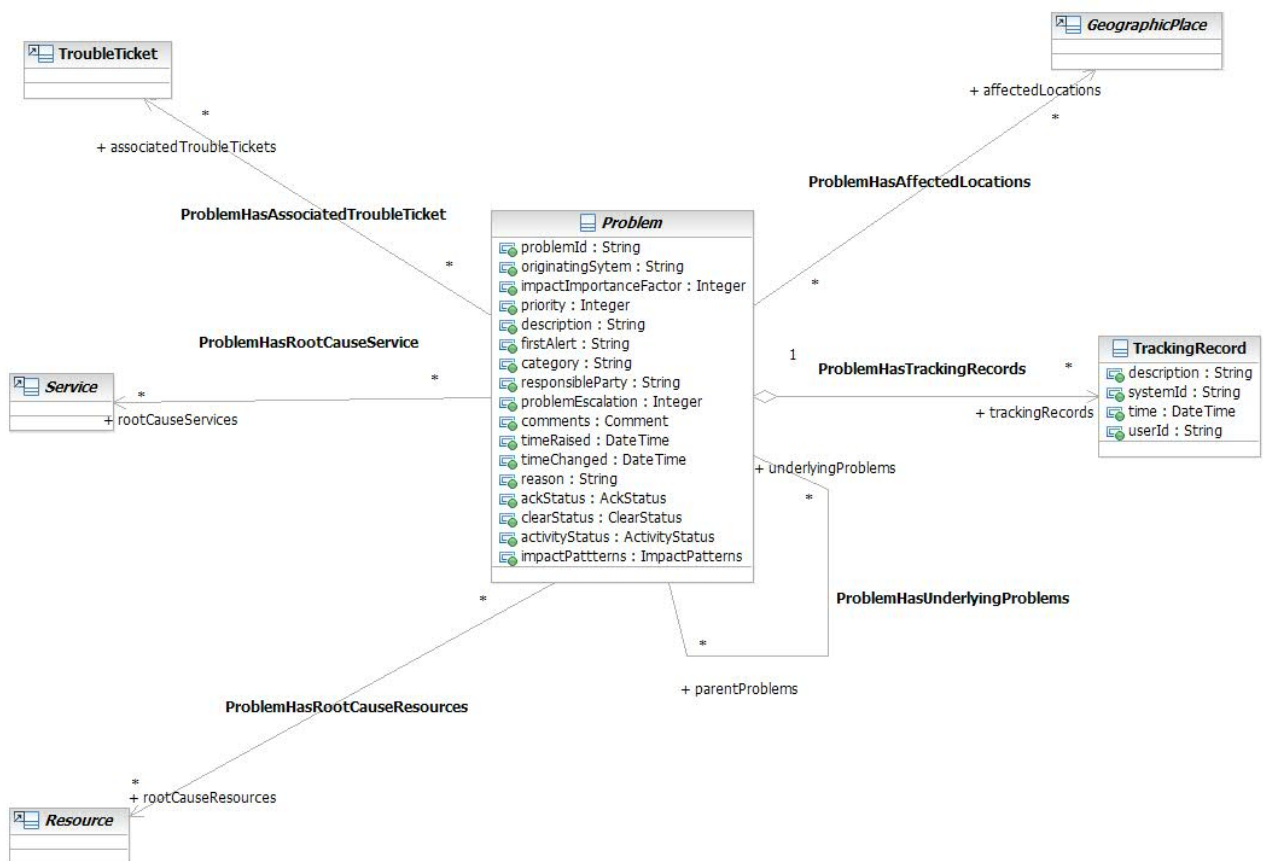
"affected Locations" are part of the problem, while the others, more specific to the Service Problem are kept at that level.

A problem does not have a severity. Two fields are used to indicate its criticality:

1. The Impact Importance Factor: this field provides the overall importance of the impact of all the affected services/products, e.g. 0 (zero impact) to 100 (worst impact). The Impact Importance is a calculated field which is set by the OSS determining the impact.
2. Priority: this field provides an indication of how important it is for the service provider to correct the Problem. The priority can be changed by the human operator while the impact importance can only be changed by the system which determines the impact.

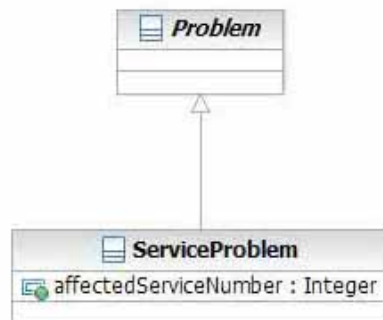
Problem has been defined as abstract, so it needs to be specialized for a given type of object: service, product, customer...

The following figure shows the Problem entity along with relationships to existing SID entities as well as a Tracking Record entity. Tracking entities allow the tracking of modifications to the Problem.



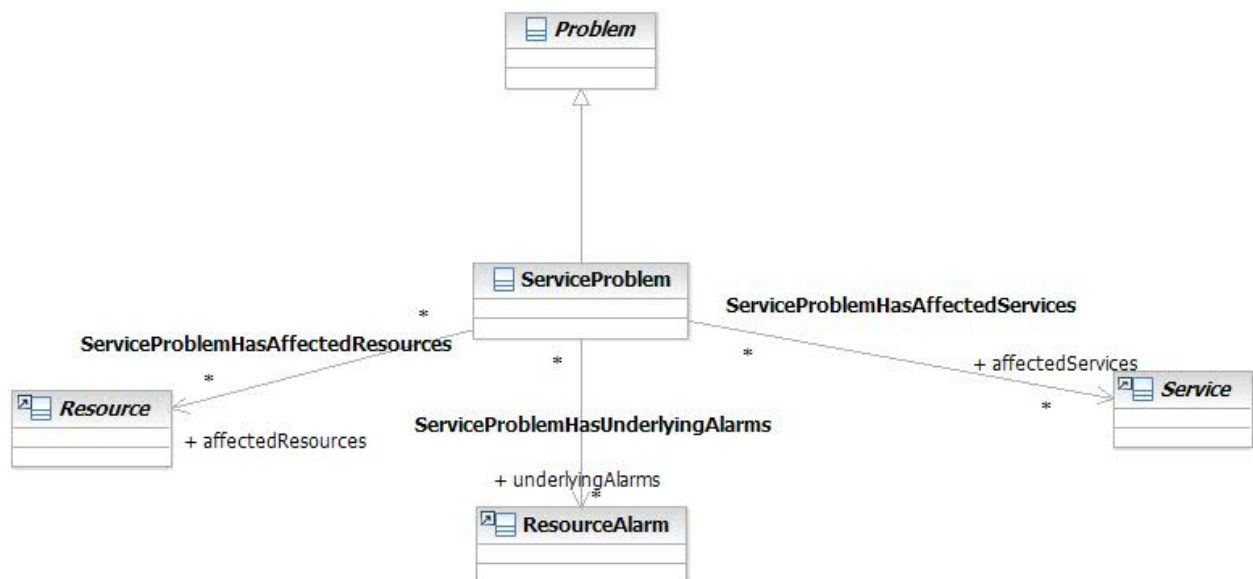
2.3. Service Problem

Service Problem supports the eTOM Service Problem Management process. It represents a specialization of the generalized Problem entity, where the indication relates to a service or a set of service, as shown in the figure below:



The Service Problem has only 1 local attribute: the "affected Service Number", providing the total number of affected services.

The following figure shows a complete view of Service Problem and its relationship with the affected Resource and Service entities and with the existing Resource Alarm entity:



At least one of the attributes: "affected Resources", "affected Services" or "affected Locations" should be filled to indicate what objects this problem is affecting.

Impact can change over the life of the problem, so all impact fields can be modified by the OSS determining the impact and are also settable.

The list and number of affected services can be null or empty. There are the following use cases:

- Creating a problem with only a location as impact. Both list and number of affected services are null or empty
- The list of services is very long. In this case, the list of affected services can be empty, but the number would give the count of affected services

2.4. Interface Summary

The Service Problem Management interface is covering 2 new SID Aggregate Business Entities (ABE):

- Problem or Trouble ABE, part of the Common Business Entities Domain. This ABE contains all shared definitions, like statuses and the definition of the generalized Problem entity.
- Service Problem ABE, part of the Service Domain. This ABE contains the Service Problem.

The Service Problem Management interface is an entity-centric interface, so all the operations are related to either the Problem or the Service Problem entities. Most of the operations defined can be shared and therefore have been defined on the Problem entity and the corresponding service interface (ProblemInterface), defined as an abstract interface, is part of the Trouble or Problem ABE.

The service interface associated to the Service Problem (ServiceProblemInterface) simply inherits from the Problem service interface and defines the common operation, like get, set or delete that cannot be defined on an abstract entity

The create operation has been put in a separate interface ServiceProblemCreateInterface to allow different security settings, like authorization, related to the create operation.

The 2 Service Interfaces will be described first, then the implementation packages that correspond to the 2 ABEs will be described.

The picture below presents an overall view of the Information Model of the Service Problem Management Interface:



3. Information Model

Packages available from Service Problem Management:

- `org.tmforum.tip.cbe.problem`
- `org.tmforum.tip.service.problem`

3.1. Package `org.tmforum.tip.cbe.problem`

3.1.1. Entities

3.1.1.1. Problem

- Type: Entity Artifact
- Package: `org.tmforum.tip.cbe.problem`
- All super types:

`org.tmforum.tip.internal.entity.EntityBase`

- Description:

General description of a problem that can be shared between service and customer. A Problem is an indication that an entity is no longer functioning according to the agreement with its client(s).

- Properties:

This entity is abstract

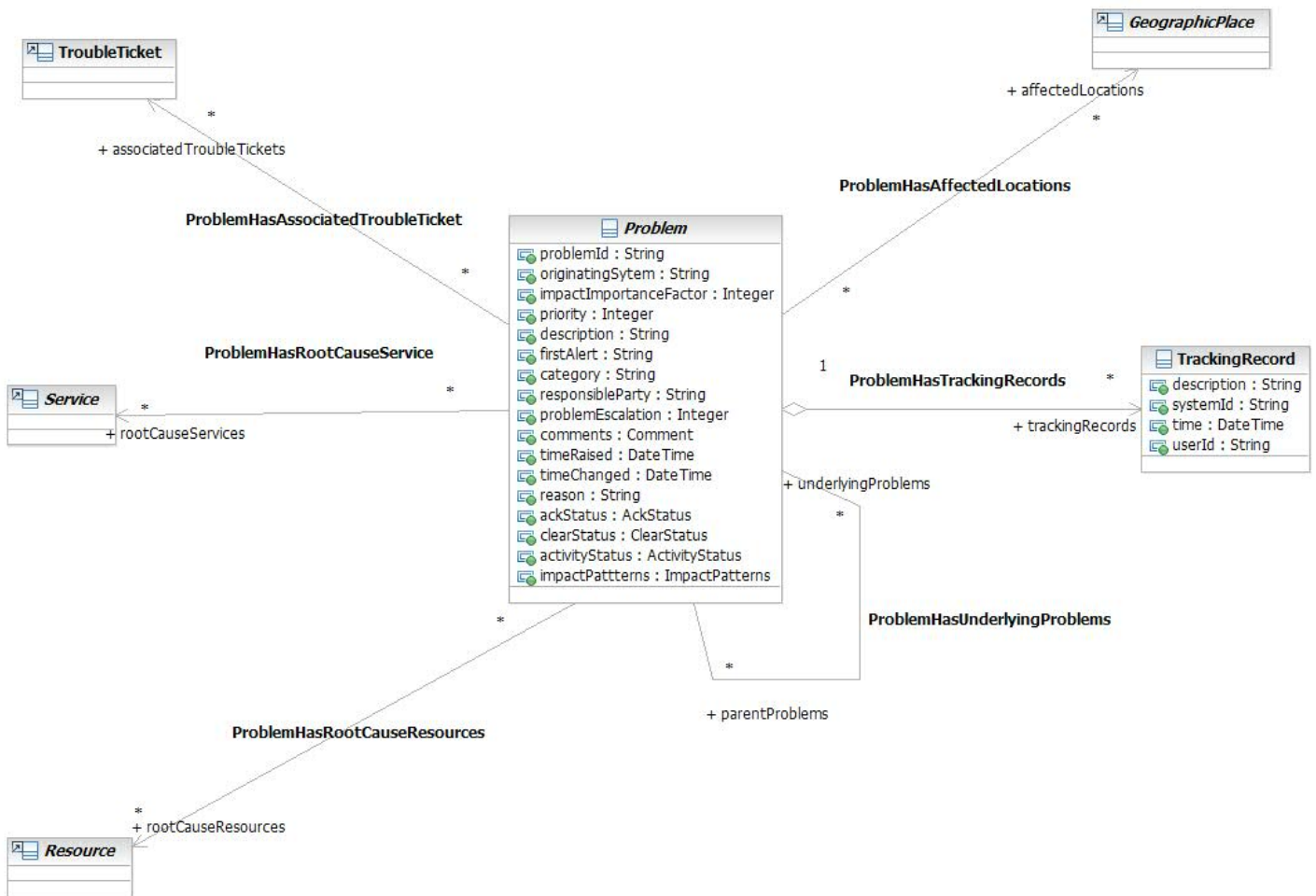
This entity is mandatory

This entity is extendable

This entity does not generate Object Creation notifications (NA)

This entity does not generate Object Deletion notifications (NA)

This entity does not generate Object Discovery notifications (NA)



3.1.1.1.1. Attributes

name	datatype	properties	description
problemId	String	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled (NA)	Identifier of the problem. note that this identifier is local to the server side of the interface. Only EntityIdentifier can be considered as global.
originatingSystem	String	- multiplicity is 0..1 - unique - optional - AVC enabled	Indicates where the problem was generated.
impactImportanceFactor	int	- multiplicity is 1 - unique - default value is '0' - mandatory - AVC enabled	Impact Importance is characterized by an Impact Importance Factor: overall importance of the impact of all the affected services, e.g. 0 (zero impact) to 100 (worst impact). The Impact Importance is a calculated field which is set by the OSS determining the impact.
priority	int	- multiplicity is 1 - unique - default value is '1' - mandatory - AVC enabled	An indication varying from 1 to 10 of how important it is for the service provider to correct the Service Problem. The priority can be changed by the human operator while the impact importance can only be changed by the system which determines the impact.
description	String	- multiplicity is 1 - unique - default value is '' - mandatory - AVC enabled	Free form text describing the Service Problem.
firstAlert	String	- multiplicity is 0..1 - unique - optional - AVC enabled	Text that indicates what first alerted the system to the problem. It is not the root cause of the Service Problem. Examples: Threshold crossing alert: Service component causing the problem Customer report: customer name (or TT id) reporting the problem

category	String	<ul style="list-style-type: none"> - multiplicity is 1 - unique - default value is "" - mandatory - AVC enabled 	classifier for the problem. Settable. Structured text/ enum. In the ATIS Service Outage document, the What Category corresponds to this attribute and the values can be used as possible values.
responsibleParty	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional - AVC enabled 	person or organization responsible for handling this problem. This is text or structured text and not an association to a party object. The Who category from the ATIS Service Outage document can be used for this attribute.
problemEscalation	int	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - default value is '0' - optional - AVC enabled 	Indicates if this service problem 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.
comments	Comment	<ul style="list-style-type: none"> - multiplicity is * - read only - unique - optional - AVC enabled 	Comments on problem, as a list of comments.
timeRaised	dateTime	<ul style="list-style-type: none"> - multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled 	Time the problem was raised
timeChanged	dateTime	<ul style="list-style-type: none"> - multiplicity is 1 - read only - unique - mandatory - AVC disabled 	Time the problem was last changed
reason	String	<ul style="list-style-type: none"> - multiplicity is 1 - unique - default value is "Unknown" - mandatory - AVC enabled 	Free text or optionally structured text. It can be Unknown. The Why category of the ATIS Service Outage document can be used to fill this value.
ackStatus	AckStatus	<ul style="list-style-type: none"> - multiplicity is 1 - read only - unique - default value is 'UNACKNOWLEDGED' - mandatory - AVC enabled 	Acknowledgement status
clearStatus	ClearStatus	<ul style="list-style-type: none"> - multiplicity is 1 - read only - unique - default value is 'UNCLEARED' - mandatory - AVC enabled 	Clear status of the problem. Clearance of the resource RC alarm or of the underlying alarms or problems does not imply clearance of the problem.
activityStatus	ActivityStatus	<ul style="list-style-type: none"> - multiplicity is 1 - read only - unique - default value is 'ACTIVE' - mandatory - AVC enabled 	Activity status, indicates if the problem is historical or active
impactPatterns	ImpactPatterns	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional - AVC enabled 	Define the patterns of impact (optional)- e.g. other service characteristics- Used when defining impact through another pattern than the pre-defined attributes above. This field is extensible.
identifier	EntityIdentifier	<ul style="list-style-type: none"> - multiplicity is 1 - unique - invariant - mandatory - AVC enabled 	The entity instance identifier EID.
extensionInfo	Any	<ul style="list-style-type: none"> - 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.

3.1.1.1.2. Associations

name	datatype	properties	description
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affectedLocations	GeographicPlace	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasAffectedLocations 	List of affected locations. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.
associatedTroubleTickets	TroubleTicket	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasAssociatedTroubleTickets 	List of trouble tickets associated with this problem.
rootCauseResources	Resource	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasRootCauseResources 	Resource(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
rootCauseServices	Service	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasRootCauseServices 	Service(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
trackingRecords	TrackingRecord	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by value - optional - AVC disabled - association is ProblemHasTrackingRecords 	Tracking records allow the tracking of modifications on the problem. The tracking records should not be embedded in the problem to allow retrieving the problem without the tracking records.
underlyingProblems	Problem	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasUnderlyingProblems 	References to the underlying service problems. Only if this problem is derived from other problems.
parentProblems	Problem	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasUnderlyingProblems 	The parent problem to which this problem is attached.

3.1.1.2. TrackingRecord

- Type: Entity Artifact
- Package: [org.tmforum.tip.cbe.problem](#)
- All super types:
 - [org.tmforum.tip.internal.entity.EntityBase](#)
- Description:

Tracking records allow the tracking of modifications on the Service Problem. The tracking records should not be embedded in the problem to allow retrieving the problem without the tracking records.

- Properties:

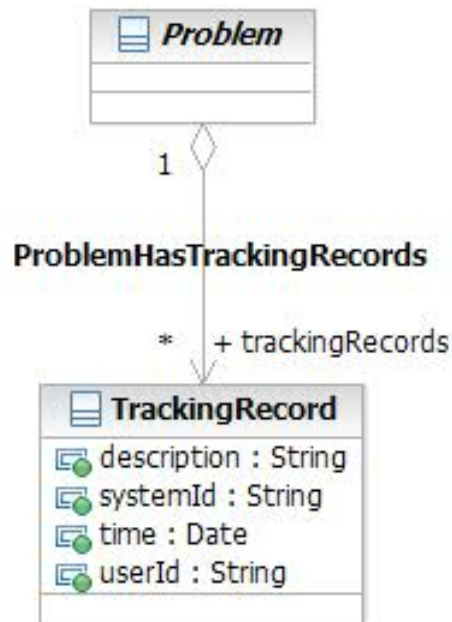
This entity is optional

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



3.1.1.2.1. Attributes

name	datatype	properties	description
description	String	- multiplicity is 1 - unique - mandatory - AVC disabled	Describes the action being done (ack,clear...)
systemId	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Describes the system Id from which the action was done.
time	dateTime	- multiplicity is 1 - unique - mandatory - AVC disabled	Describes the time at which the action was done
userId	String	- multiplicity is 0..1 - unique - optional - AVC disabled	Describes the user id of the user doing the action.
identifier	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.

3.1.1.2.2. Associations

There are no associations (local or inherited) available.

3.1.2. Data Types

3.1.2.1. Comment

- Type: Datatype Artifact
- Package: [org.tmforum.tip.cbe.problem](#)
- Description:
Describe a comment on a problem or an alarm.
- Properties:
This datatype is not extendable

3.1.2.1.1. Attributes

name	datatype	properties	description
userId	String	- multiplicity is 0..1 - unique - optional	Describes the user id of the user doing the action.
time	dateTime	- multiplicity is 1 - unique - mandatory	Describes the time at which the action was done
systemId	String	- multiplicity is 0..1 - unique - optional	Describes the system Id from which the action was done.
comment	String	- multiplicity is 1 - unique - mandatory	text of the comment

3.1.2.2. ImpactPatterns

- Type: Datatype Artifact
- Package: [org.tmforum.tip.cbe.problem](#)
- Description:
Define the patterns of impact (optional). It can be other service characteristics. It is used when defining impact through another pattern than the pre-defined attributes above.
This is an empty class that will be augmented/extended by specific projects
- Properties:
This datatype is extendable

3.1.2.2.1. Attributes

name	datatype	properties	description
description	String	- multiplicity is 0..1 - unique - optional	Basic description of the impact pattern.
extensionInfo	Any	- multiplicity is 0..1 - unique - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

3.1.3. Enumerations

3.1.3.1. AckStatus

- Type: Enumeration Artifact

- Package: [org.tmforum.tip.cbe.problem](#)

- Description:

Defines the possible values for acknowledgement. It is used to indicate whether the associated object is handled or not.

- Properties:

This enumeration is not extendable

3.1.3.1.1. Literals

name	datatype	properties	description
ACKNOWLEDGED	String	value is "ACKNOWLEDGED"	
UNACKNOWLEDGED	String	value is "UNACKNOWLEDGED"	

3.1.3.2. ActivityStatus

- Type: Enumeration Artifact

- Package: [org.tmforum.tip.cbe.problem](#)

- Description:

Activity status of a problem. Indicates if the problem is historical or active

- Properties:

This enumeration is not extendable

3.1.3.2.1. Literals

name	datatype	properties	description
ACTIVE	String	value is "ACTIVE"	
HISTORICAL	String	value is "HISTORICAL"	

3.1.3.3. ClearStatus

- Type: Enumeration Artifact

- Package: [org.tmforum.tip.cbe.problem](#)

- Description:

Defines the possible values for clearance. It is used to indicate whether the fault that originated the associated object (problem/alarms) has disappeared or whether the operator has manually cleared the problem.

- Properties:

This enumeration is not extendable

3.1.3.3.1. Literals

name	datatype	properties	description
CLEARED	String	value is "CLEARED"	
UNCLEARED	String	value is "UNCLEARED"	

3.2. Package org.tmforum.tip.service.problem

3.2.1. Entities

3.2.1.1. ServiceProblem

- Type: Entity Artifact

- Package: `org.tmforum.tip.service.problem`

- All super types:

`org.tmforum.tip.cbe.problem.Problem`

`org.tmforum.tip.internal.entity.EntityBase`

- Description:

A Service Problem is an indication that a service is no longer functioning according to the agreement with its client(s).

- Properties:

This entity is mandatory

This entity is extendable

This entity generates Object Creation notifications

This entity generates Object Deletion notifications

This entity does not generate Object Discovery notifications

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firstAlert	String	- multiplicity is 0..1 - unique - optional - AVC enabled	Text that indicates what first alerted the system to the problem. It is not the root cause of the Service Problem. Examples: Threshold crossing alert: Service component causing the problem Customer report: customer name (or TT id) reporting the problem
category	String	- multiplicity is 1 - unique - default value is "" - mandatory - AVC enabled	classifier for the problem. Settable. Structured text/ enum. In the ATIS Service Outage document, the What Category corresponds to this attribute and the values can be used as possible values.
responsibleParty	String	- multiplicity is 0..1 - unique - optional - AVC enabled	person or organization responsible for handling this problem. This is text or structured text and not an association to a party object. The Who category from the ATIS Service Outage document can be used for this attribute.
problemEscalation	int	- multiplicity is 0..1 - unique - default value is '0' - optional - AVC enabled	Indicates if this service problem 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.
comments	Comment	- multiplicity is * - read only - unique - optional - AVC enabled	Comments on problem, as a list of comments.
timeRaised	dateTime	- multiplicity is 1 - read only - unique - invariant - mandatory - AVC disabled	Time the problem was raised
timeChanged	dateTime	- multiplicity is 1 - read only - unique - mandatory - AVC disabled	Time the problem was last changed
reason	String	- multiplicity is 1 - unique - default value is "Unknown" - mandatory - AVC enabled	Free text or optionally structured text. It can be Unknown. The Why category of the ATIS Service Outage document can be used to fill this value.
ackStatus	AckStatus	- multiplicity is 1 - read only - unique - default value is 'UNACKNOWLEDGED' - mandatory - AVC enabled	Acknowledgement status
clearStatus	ClearStatus	- multiplicity is 1 - read only - unique - default value is 'UNCLEARED' - mandatory - AVC enabled	Clear status of the problem. Clearance of the resource RC alarm or of the underlying alarms or problems does not imply clearance of the problem.
activityStatus	ActivityStatus	- multiplicity is 1 - read only - unique - default value is 'ACTIVE' - mandatory - AVC enabled	Activity status, indicates if the problem is historical or active
impactPatterns	ImpactPatterns	- multiplicity is 0..1 - unique - optional - AVC enabled	Define the patterns of impact (optional)- e.g. other service characteristics- Used when defining impact through another pattern than the pre-defined attributes above. This field is extensible.
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.

3.2.1.1.2. Associations

name	datatype	properties	description
affectedResources	Resource	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ServiceProblemHasAffectedResources 	List of affected resources. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.
affectedServices	Service	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ServiceProblemHasAffectedServices 	List of affected services. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.
underlyingAlarms	ResourceAlarm	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ServiceProblemHasUnderlyingAlarms 	A set of alarm ids identifying the alarms that are underlying to this problem. Note: a resource RC alarm would be an underlying alarm (also sometimes refer as a symptom) for a service problem.
affectedLocations	GeographicPlace	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasAffectedLocations 	List of affected locations. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.
associatedTroubleTickets	TroubleTicket	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasAssociatedTroubleTickets 	List of trouble tickets associated with this problem.
rootCauseResources	Resource	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasRootCauseResources 	Resource(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
rootCauseServices	Service	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasRootCauseServices 	Service(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
trackingRecords	TrackingRecord	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by value - optional - AVC disabled - association is ProblemHasTrackingRecords 	Tracking records allow the tracking of modifications on the problem. The tracking records should not be embedded in the problem to allow retrieving the problem without the tracking records.
underlyingProblems	Problem	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasUnderlyingProblems 	References to the underlying service problems. Only if this problem is derived from other problems.

parentProblems	Problem	<ul style="list-style-type: none"> - multiplicity is * - aggregation is none - navigable - unique - passed by id - optional - AVC enabled - association is ProblemHasUnderlyingProblems 	The parent problem to which this problem is attached.
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3.2.2. Data Types

3.2.2.1. CreateDataForServiceProblem

- Type: Datatype Artifact
- Package: [org.tmforum.tip.service.problem](#)
- Description:

Contains the create data for the Service Problem, i.e. all the attributes of the Service Problem that can be set at creation. A Service Problem object cannot be used for this purpose as it would require to provide all the mandatory attributes of the Service Problem.

- Properties:

This datatype is extendable

3.2.2.1.1. Attributes

name	datatype	properties	description
problemId	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Identifier of the problem, as known by the application
originatingSytem	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Indicates where the problem was generated.
impactImportanceFactor	int	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Impact Importance is characterized by an Impact Importance Factor: overall importance of the impact of all the affected services, e.g. 0 (zero impact) to 100 (worst impact). The Impact Importance is a calculated field which is set by the OSS determining the impact.
priority	int	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	An indication varying from 1 to 10 of how important it is for the service provider to correct the Service Problem. The priority can be changed by the human operator while the impact importance can only be changed by the system which determines the impact.
description	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Free form text describing the Service Problem.
firstAlert	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Text that indicates what first alerted the system to the problem. It is not the root cause of the Service Problem. Examples: Threshold crossing alert: Service component causing the problem Customer report: customer name (or TT id) reporting the problem
category	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	classifier for the problem. Settable. Structured text/ enum. In the ATIS Service Outage document, the What Category corresponds to this attribute and the values can be used as possible values.
responsibleParty	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	person or organization responsible for handling this problem. This is text or structured text and not an association to a party object. The Who category from the ATIS Service Outage document can be used for this attribute.
problemEscalation	int	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Indicates if this service problem 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.
reason	String	<ul style="list-style-type: none"> - multiplicity is 0..1 - unique - optional 	Free text or optionally structured text. It can be Unknown. The Why category of the ATIS Service Outage document can be used to fill this value.

ackStatus	AckStatus	- multiplicity is 0..1 - unique - optional	Acknowledgement status
clearStatus	ClearStatus	- multiplicity is 0..1 - unique - optional	Clear status of the problem. Clearance of the resource RC alarm or of the underlying alarms or problems does not imply clearance of the problem.
impactPatterns	ImpactPatterns	- multiplicity is 0..1 - unique - optional	Define the patterns of impact (optional)- e.g. other service characteristics- Used when defining impact through another pattern than the pre-defined attributes above. This field is extensible.
affectedServiceNumber	int	- multiplicity is 0..1 - unique - optional	Number of affected services (mandatory, but value can be zero).
affectedLocations	GeographicPlace	- multiplicity is * - unique - passed by id - optional	List of affected locations.
affectedResources	Resource	- multiplicity is * - unique - passed by id - optional	List of affected resources.
affectedServices	Service	- multiplicity is * - unique - passed by id - optional	List of affected services.
rootCauseResources	Resource	- multiplicity is * - unique - passed by id - optional	Resource(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
rootCauseServices	Service	- multiplicity is * - unique - passed by id - optional	Service(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
associatedTroubleTickets	TroubleTicket	- multiplicity is * - unique - passed by id - optional	List of trouble tickets associated with this problem.
underlyingProblems	ServiceProblem	- multiplicity is * - unique - passed by id - optional	underlyingProblems
parentProblems	ServiceProblem	- multiplicity is * - unique - passed by id - optional	The parent problem to which this problem is attached.
underlyingAlarms	ResourceAlarm	- multiplicity is * - unique - passed by id - optional	A set of alarm ids identifying the alarms that are underlying to this problem. Note: a resource RC alarm would be an underlying alarm (also sometimes refer as a symptom) for a service problem.
extensionInfo	Any	- multiplicity is 0..1 - unique - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

3.2.2.2. SetDataForServiceProblem

- Type: Datatype Artifact
- Package: [org.tmforum.tip.service.problem](#)
- Description:

Contains the set data for the Service Problem, i.e. all the attributes of the Service Problem that can be set. A Service Problem object cannot be used for this purpose as it would require to provide all the mandatory attributes of the Service Problem.

- Properties:

This datatype is extendable

3.2.2.2.1. Attributes

name	datatype	properties	description
originatingSystem	String	- multiplicity is 0..1 - unique - optional	Indicates where the problem was generated.
impactImportanceFactor	int	- multiplicity is 0..1 - unique - optional	Impact Importance is characterized by an Impact Importance Factor: overall importance of the impact of all the affected services, e.g. 0 (zero impact) to 100 (worst impact). The Impact Importance is a calculated field which is set by the OSS determining the impact.
priority	int	- multiplicity is 0..1 - unique - optional	An indication varying from 1 to 10 of how important it is for the service provider to correct the Service Problem. The priority can be changed by the human operator while the impact importance can only be changed by the system which determines the impact.
description	String	- multiplicity is 0..1 - unique - optional	Free form text describing the Service Problem.
firstAlert	String	- multiplicity is 0..1 - unique - optional	Text that indicates what first alerted the system to the problem. It is not the root cause of the Service Problem. Examples: Threshold crossing alert: Service component causing the problem Customer report: customer name (or TT id) reporting the problem
category	String	- multiplicity is 0..1 - unique - optional	classifier for the problem. Settable. Structured text/ enum. In the ATIS Service Outage document, the What Category corresponds to this attribute and the values can be used as possible values.
responsibleParty	String	- multiplicity is 0..1 - unique - optional	person or organization responsible for handling this problem. This is text or structured text and not an association to a party object. The Who category from the ATIS Service Outage document can be used for this attribute.
problemEscalation	int	- multiplicity is 0..1 - unique - optional	Indicates if this service problem 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.
reason	String	- multiplicity is 0..1 - unique - optional	Free text or optionally structured text. It can be Unknown. The Why category of the ATIS Service Outage document can be used to fill this value.
impactPatterns	ImpactPatterns	- multiplicity is 0..1 - unique - optional	Define the patterns of impact (optional)- e.g. other service characteristics- Used when defining impact through another pattern than the pre-defined attributes above. This field is extensible.
affectedServiceNumber	int	- multiplicity is 0..1 - unique - optional	Number of affected services (mandatory, but value can be zero).
affectedLocations	GeographicPlace	- multiplicity is * - unique - passed by id - optional	List of affected locations.
affectedResources	Resource	- multiplicity is * - unique - passed by id - optional	List of affected resources.
affectedServices	Service	- multiplicity is * - unique - passed by id - optional	List of affected services.
rootCauseResources	Resource	- multiplicity is * - unique - passed by id - optional	Resource(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
rootCauseServices	Service	- multiplicity is * - unique - passed by id - optional	Service(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
extensionInfo	Any	- multiplicity is 0..1 - unique - optional	a generic list of any type of elements. Used for vendor extensions or loose element encapsulation from other namespaces.

3.2.3. Notifications

3.2.3.1. ServiceProblemAVCN

- Type: Event Artifact

- Package: [org.tmforum.tip.service.problem](#)

- Description:

This is a notification generated from the entity [org.tmforum.tip.service.problem.ServiceProblem](#)

- All super types:

[org.tmforum.tip.common.notifications.AVCNotification](#)

[org.tmforum.tip.common.notifications.CommonNotification](#)

[org.tmforum.tip.internal.notifications.NotificationBase](#)

3.2.3.1.1. Attributes

name	datatype	properties	description
affectedServiceNumber	int	- multiplicity is 0..1 - optional	Number of affected services (mandatory, but value can be zero).
originatingSystem	String	- multiplicity is 0..1 - optional	Indicates where the problem was generated.
impactImportanceFactor	int	- multiplicity is 0..1 - optional	Impact Importance is characterized by an Impact Importance Factor: overall importance of the impact of all the affected services, e.g. 0 (zero impact) to 100 (worst impact). The Impact Importance is a calculated field which is set by the OSS determining the impact.
priority	int	- multiplicity is 0..1 - optional	An indication varying from 1 to 10 of how important it is for the service provider to correct the Service Problem. The priority can be changed by the human operator while the impact importance can only be changed by the system which determines the impact.
description	String	- multiplicity is 0..1 - optional	Free form text describing the Service Problem.
firstAlert	String	- multiplicity is 0..1 - optional	Text that indicates what first alerted the system to the problem. It is not the root cause of the Service Problem. Examples: Threshold crossing alert: Service component causing the problem Customer report: customer name (or TT id) reporting the problem
category	String	- multiplicity is 0..1 - optional	classifier for the problem. Settable. Structured text/ enum. In the ATIS Service Outage document, the What Category corresponds to this attribute and the values can be used as possible values.
responsibleParty	String	- multiplicity is 0..1 - optional	person or organization responsible for handling this problem. This is text or structured text and not an association to a party object. The Who category from the ATIS Service Outage document can be used for this attribute.
problemEscalation	int	- multiplicity is 0..1 - optional	Indicates if this service problem 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.
comments	Comment	- multiplicity is * - optional	Comments on problem, as a list of comments.
reason	String	- multiplicity is 0..1 - optional	Free text or optionally structured text. It can be Unknown. The Why category of the ATIS Service Outage document can be used to fill this value.
ackStatus	AckStatus	- multiplicity is 0..1 - optional	Acknowledgement status
clearStatus	ClearStatus	- multiplicity is 0..1 - optional	Clear status of the problem. Clearance of the resource RC alarm or of the underlying alarms or problems does not imply clearance of the problem.
activityStatus	ActivityStatus	- multiplicity is 0..1 - optional	Activity status, indicates if the problem is historical or active
impactPatterns	ImpactPatterns	- multiplicity is 0..1 - optional	Define the patterns of impact (optional)- e.g. other service characteristics- Used when defining impact through another pattern than the pre-defined attributes above. This field is extensible.
affectedResources	Resource	- multiplicity is * - passed by id - optional	List of affected resources. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.

affectedServices	Service	- multiplicity is * - passed by id - optional	List of affected services. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.
underlyingAlarms	ResourceAlarm	- multiplicity is * - passed by id - optional	A set of alarm ids identifying the alarms that are underlying to this problem. Note: a resource RC alarm would be an underlying alarm (also sometimes refer as a symptom) for a service problem.
affectedLocations	GeographicPlace	- multiplicity is * - passed by id - optional	List of affected locations. Either the list of affected services or the list of affected resources or the list of affected locations should at least be present. Both cannot be absent.
associatedTroubleTickets	TroubleTicket	- multiplicity is * - passed by id - optional	List of trouble tickets associated with this problem.
rootCauseResources	Resource	- multiplicity is * - passed by id - optional	Resource(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
rootCauseServices	Service	- multiplicity is * - passed by id - optional	Service(s) that are associated to the underlying service problems that are the Root Cause of this one if any (used only if applicable).
underlyingProblems	Problem	- multiplicity is * - passed by id - optional	References to the underlying service problems. Only if this problem is derived from other problems.
parentProblems	Problem	- multiplicity is * - passed by id - optional	The parent problem to which this problem is attached.
sourceTime	time	- multiplicity is 0..1 - unique - optional	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - optional	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - optional	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.
extensionInfo	Any	- multiplicity is 0..1 - unique - optional	A generic list of any type of elements. Used for vendor Extensions or loose element encapsulation from other namespaces.

3.2.3.2. ServiceProblemOCN

- Type: Event Artifact

- Package: [org.tmforum.tip.service.problem](#)

- Description:

This is a notification generated from the entity [org.tmforum.tip.service.problem.ServiceProblem](#)

- All super types:

[org.tmforum.tip.common.notifications.OCNotification](#)

[org.tmforum.tip.common.notifications.CommonNotification](#)

[org.tmforum.tip.internal.notifications.NotificationBase](#)

3.2.3.2.1. Attributes

name	datatype	properties	description
object	ServiceProblem	- multiplicity is 0..1 - optional - passed by value	A Service Problem is an indication that a service is no longer functioning according to the agreement with its client(s).
sourceTime	time	- multiplicity is 0..1 - unique - optional	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - optional	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - optional	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.

extensionInfo	Any	- multiplicity is 0..1 - unique - optional	A generic list of any type of elements. Used for vendor Extensions or loose element encapsulation from other namespaces.
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3.2.3.3. ServiceProblemODeIN

- Type: Event Artifact
- Package: [org.tmforum.tip.service.problem](#)
- Description:

This is a notification generated from the entity [org.tmforum.tip.service.problem.ServiceProblem](#)

- All super types:
 - [org.tmforum.tip.common.notifications.ODelNotification](#)
 - [org.tmforum.tip.common.notifications.CommonNotification](#)
 - [org.tmforum.tip.internal.notifications.NotificationBase](#)

3.2.3.3.1. Attributes

name	datatype	properties	description
object	ServiceProblem	- multiplicity is 0..1 - optional - passed by value	A Service Problem is an indication that a service is no longer functioning according to the agreement with its client(s).
sourceTime	time	- multiplicity is 0..1 - unique - optional	The time at which the event was reported by the source system (NE, EMS or OS).
objectId	EntityIdentifier	- multiplicity is 0..1 - unique - optional	The identifier of the object associated with the event, as internal opaque identifier.
objectType	String	- multiplicity is 0..1 - unique - optional	The type (class) of the object associated with the event. This attribute is needed to allow simple notification filtering based on the object type.
extensionInfo	Any	- multiplicity is 0..1 - unique - optional	A generic list of any type of elements. Used for vendor Extensions or loose element encapsulation from other namespaces.

4. Service Interfaces

Service interfaces available from Service Problem Management model:

- ProblemInterface
- ServiceProblemInterface

4.1. ProblemInterface

- Type: Session Artifact (Service Interface)
- Package: `org.tmforum.tip.cbe.problem`
- Description:

Service Interface containing all the services offered on Problems.

- Operations exposed:

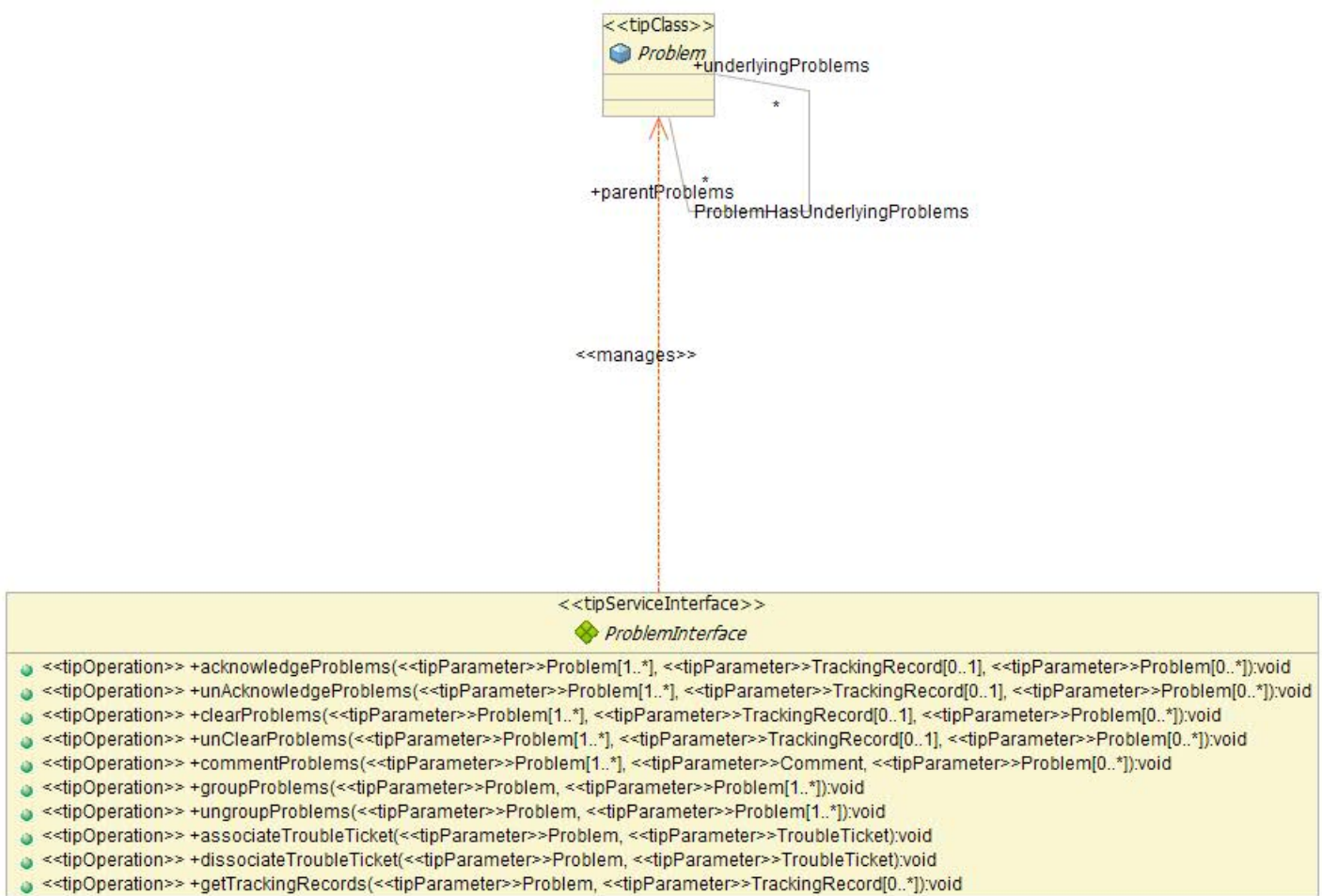
- `acknowledgeProblems`
- `unAcknowledgeProblems`
- `clearProblems`
- `unClearProblems`
- `commentProblems`
- `groupProblems`
- `ungroupProblems`
- `associateTroubleTicket`
- `dissociateTroubleTicket`
- `getTrackingRecords`

- Managed entities:

- `org.tmforum.tip.cbe.problem.Problem`

- Properties:

- This service interface is abstract
- This service interface is mandatory



4.1.1. acknowledgeProblems

- Type: Operation

- Description:

Acknowledge problems

- Properties:

This operation is idempotent

This operation is not extendable

This operation is mandatory

- Return:

void

- Exceptions:

NotInValidState

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.1.1. Arguments

name	datatype	properties	description
problems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	
trackingRecord	TrackingRecord	- input parameter - multiplicity is 0..1 - unique - passed by value - optional	
ackProblems	Problem	- output parameter - multiplicity is 0..* - unique - passed by id - mandatory	acknowledged Problems, i.e. the ones really acknowledged

4.1.2. unAcknowledgeProblems

- Type: Operation

- Description:

UnAcknowledge Problems

- Properties:

This operation is idempotent

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

NotInValidState

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.2.1. Arguments

name	datatype	properties	description
problems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	input list of ids to unack
trackingRecord	TrackingRecord	- input parameter - multiplicity is 0..1 - unique - passed by value - optional	

unackProblems	Problem	- output parameter - multiplicity is 0..* - unique - passed by id - mandatory	problems really unacked
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4.1.3. clearProblems

- Type: Operation

- Description:

Clear Problems

- Properties:

This operation is idempotent

This operation is not extendable

This operation is mandatory

- Return:

void

- Exceptions:

NotInValidState

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.3.1. Arguments

name	datatype	properties	description
problems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	
trackingRecord	TrackingRecord	- input parameter - multiplicity is 0..1 - unique - passed by value - optional	
clearedProblems	Problem	- output parameter - multiplicity is 0..* - unique - passed by id - mandatory	cleared problem ids

4.1.4. unClearProblems

- Type: Operation

- Description:

- Properties:

This operation is idempotent

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
problems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	
trackingRecord	TrackingRecord	- input parameter - multiplicity is 0..1 - unique - passed by value - optional	
unclearProblems	Problem	- output parameter - multiplicity is 0..* - unique - passed by id - mandatory	problems ids really uncledared

4.1.5. commentProblems

- Type: Operation

- Description:

Comment Problems

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.5.1. Arguments

name	datatype	properties	description
problems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	
comment	Comment	- input parameter - multiplicity is 1 - unique - mandatory	
commentedProblems	Problem	- output parameter - multiplicity is 0..* - unique - passed by id - mandatory	commented Problems

4.1.6. groupProblems

- Type: Operation

- Description:

group one or more child problems to a parent problem.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.6.1. Arguments

name	datatype	properties	description
parentProblem	Problem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	parent problem
childProblems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	child problems to be associated with the parent

4.1.7. ungroupProblems

- Type: Operation

- Description:

ungroup one or more child problems from a parent problem.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.7.1. Arguments

name	datatype	properties	description
parentProblem	Problem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	parent problem
childProblems	Problem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	child problems to ungroup

4.1.8. associateTroubleTicket

- Type: Operation

- Description:

Associate a trouble ticket with a problem

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.8.1. Arguments

name	datatype	properties	description
problem	Problem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	problem
troubleTicket	TroubleTicket	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	TT to associate with the problem

4.1.9. dissociateTroubleTicket

- Type: Operation

- Description:

Dissociate a trouble ticket from a problem

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.1.9.1. Arguments

name	datatype	properties	description
problem	Problem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	problem to dissociate
troubleTicket	TroubleTicket	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	trouble ticket to dissociate

4.1.10. getTrackingRecords

- Type: Operation

- Description:

Get tracking records for a given problem. Tracking records allow the tracking of modifications on the Service Problem. The

tracking records should not be embedded in the problem to allow retrieving the problem without the tracking records. So a specific operation is needed to retrieve them on demand.

- 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](#)

4.1.10.1. Arguments

name	datatype	properties	description
problemId	Problem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	input problem id
trackingRecords	TrackingRecord	- output parameter - multiplicity is 0..* - unique - passed by value - bulk potential - mandatory	output list of tracking records

4.2. ServiceProblemInterface

- Type: Session Artifact (Service Interface)

- Package: [org.tmforum.tip.service.problem](#)

- All Super interfaces:

[org.tmforum.tip.cbe.problem.ProblemInterface](#)

- Description:

Service Interface containing all the services offered on Service Problems.

- Operations exposed:

[createServiceProblem](#)

[deleteServiceProblems](#)

[getServiceProblem](#)

[getServiceProblemsByTemplate](#)

[setServiceProblem](#)

[setServiceProblemsByTemplate](#)

[associateAlarms](#)

[dissociateAlarms](#)

- Operations inherited from the service interface [org.tmforum.tip.cbe.problem.ProblemInterface](#)

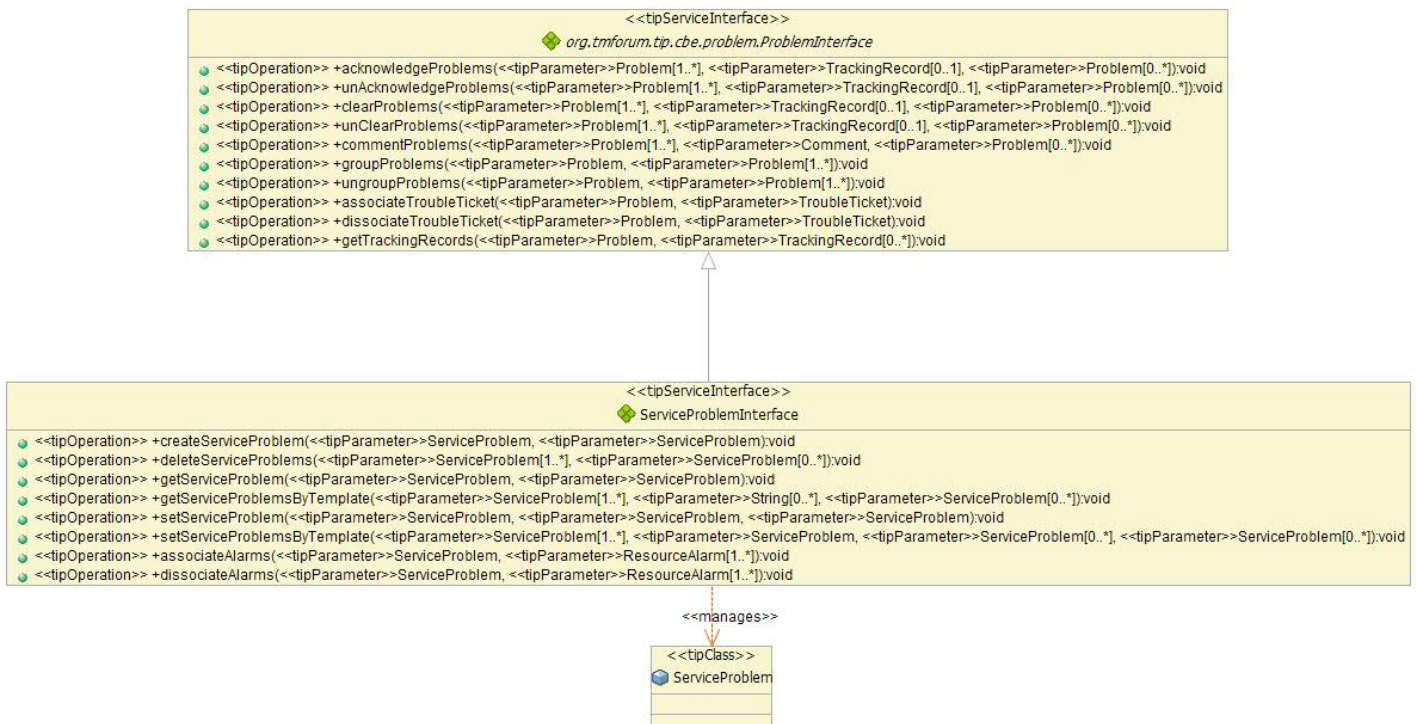
acknowledgeProblems
 unAcknowledgeProblems
 clearProblems
 unClearProblems
 commentProblems
 groupProblems
 ungroupProblems
 associateTroubleTicket
 dissociateTroubleTicket
 getTrackingRecords

- Managed entities:

org.tmforum.tip.service.problem.ServiceProblem

- Properties:

This service interface is mandatory



4.2.1. createServiceProblem

- Type: Operation

- Description:

Create a Service Problem

- Properties:

This operation is extendable

This operation is optional

- Return:

void

- Exceptions:

Duplicate
 AccessDenied
 CommunicationLoss
 InternalError
 InvalidInput
 NotImplemented
 UnableToComply

4.2.1.1. Arguments

name	datatype	properties	description
createData	CreateDataForServiceProblem	- input parameter - multiplicity is 1 - unique - mandatory	contains all the values of the Service Problem to be created.
createdObject	ServiceProblem	- output parameter - multiplicity is 1 - unique - passed by value - mandatory	contains the created service problem
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. deleteServiceProblems

- Type: Operation

- Description:

Delete one or more service problems

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

AccessDenied
 CommunicationLoss
 InternalError
 InvalidInput
 NotImplemented
 UnableToComply

4.2.2.1. Arguments

name	datatype	properties	description
objectsToDelete	ServiceProblem	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	input problem ids to delete

failedIds	ServiceProblem	- output parameter - multiplicity is 0..* - unique - passed by id - optional	failed service problems that could be deleted (returned by ids)
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4.2.3. getServiceProblem

- Type: Operation

- Description:

get a service problem. The id of the problems to be collected is provided in input.

- Properties:

This operation is extendable

This operation is mandatory

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.2.3.1. Arguments

name	datatype	properties	description
objectToGet	ServiceProblem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	service problem to return. Passed by id
object	ServiceProblem	- output parameter - multiplicity is 1 - unique - passed by value - mandatory	service problem being returned
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.

4.2.4. getServiceProblemsByTemplate

- Type: Operation

- Description:

get one or more service problems matching the template.

The template is a filter based on the attribute of the problem. For a given template problem passed in input, there is an AND between the attributes provided. In case multiple template problems are provided in input, there is an OR between each template instance.

This directive can return a large number of values, so the problems are returned by iterator.

- Properties:

This operation uses iterator bulk transfer pattern

This operation is extendable

This operation is optional

- Return:

void

- Exceptions:

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.2.4.1. Arguments

name	datatype	properties	description
template	ServiceProblem	- input parameter - multiplicity is 1..* - unique - passed by value - mandatory	template to use as 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 full object is returned.
objects	ServiceProblem	- output parameter - multiplicity is 0..* - unique - passed by value - bulk potential - mandatory	objects being returned. By iterator.
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.

4.2.5. setServiceProblem

- Type: Operation

- Description:

set operation on a given service problem.

- Properties:

This operation is extendable

This operation is mandatory

- Return:

void

- Exceptions:

NotInValidState

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput
NotImplemented
UnableToComply

4.2.5.1. Arguments

name	datatype	properties	description
objectToSet	ServiceProblem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	service problem id to set
valuesToBeSet	SetDataForServiceProblem	- input parameter - multiplicity is 1 - unique - mandatory	values to be set.
modifiedObject	ServiceProblem	- output parameter - multiplicity is 1 - unique - passed by value - mandatory	modified problem (passed 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.

4.2.6. setServiceProblemsByTemplate

- Type: Operation

- Description:

set one or more service problems matching the template.

The template is a filter based on the attribute of the problem. For a given template problem passed in input, there is an AND between the attributes provided. In case multiple template problems are provided in input, there is an OR between each template instance.

This directive can return a large number of values, so the problems are returned by iterator.

- Properties:

This operation uses iterator bulk transfer pattern

This operation is extendable

This operation is optional

- Return:

void

- Exceptions:

AccessDenied
CommunicationLoss
InternalError
InvalidInput
NotImplemented
UnableToComply

4.2.6.1. Arguments

name	datatype	properties	description
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template	ServiceProblem	- input parameter - multiplicity is 1..* - unique - passed by value - mandatory	template as a set of service problems
valuesToBeSet	SetDataForServiceProblem	- input parameter - multiplicity is 1 - unique - mandatory	values to be set.
modifiedObjects	ServiceProblem	- output parameter - multiplicity is 0..* - unique - passed by value - bulk potential - mandatory	modified objects by value, using an iterator.
failedIds	ServiceProblem	- output parameter - multiplicity is 0..* - unique - passed by id - optional	failed problems that could be set (by ids)
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.

4.2.7. associateAlarms

- Type: Operation

- Description:

Associate one or more alarms to a problem. Alarms already associated to the problem are not changed. This operation is idempotent.

- Properties:

This operation is idempotent

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.2.7.1. Arguments

name	datatype	properties	description
problem	ServiceProblem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	parent problem
alarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	alarms to be associated to the problem

4.2.8. dissociateAlarms

- Type: Operation

- Description:

Dissociate one or more alarms from a problem. alarms already associated to the problem are not changed.

- Properties:

This operation is not extendable

This operation is optional

- Return:

void

- Exceptions:

EntityNotFound

AccessDenied

CommunicationLoss

InternalError

InvalidInput

NotImplemented

UnableToComply

4.2.8.1. Arguments

name	datatype	properties	description
problem	ServiceProblem	- input parameter - multiplicity is 1 - unique - passed by id - mandatory	parent problem
alarms	ResourceAlarm	- input parameter - multiplicity is 1..* - unique - passed by id - mandatory	alarms to remove from the problem