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SERIES M: TELECOMMUNICATION MANAGEMENT, INCLUDING TMN AND NETWORK MAINTENANCE

Telecommunications management network

Requirements and analysis for NGN trouble administration across B2B and C2B interfaces

ITU-T Recommendation M.3343

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ITU-T Recommendation M.3343

Requirements and analysis for NGN trouble administration across B2B and C2B interfaces

Summary

ITU-T Recommendation M.3343 contains the requirements and analysis for trouble administration functions for the business-to-business and customer-to-business interfaces in support of NGN. The requirements and analysis are provided using the TMN interface specification methodology described in ITU-T Recommendation M.3020. This Recommendation differs from existing approved Recommendations on trouble management in that NGN requires product and service flexibility and extensions introduced by new technology for NGN. Trouble type is also configurable and extensible by either the service provider or service customer to support new products and services. These extensions are introduced to support peer-wise, local, national and regional requirements introduced and described in ITU-T Recommendation M.3050.2 for supplier/partner relationship management introduced by the NGN value-chain. This is needed to support regulatory and international trade needs.

Source

ITU-T Recommendation M.3343 was approved on 13 January 2007 by ITU-T Study Group 4 (2005-2008) under the ITU-T Recommendation A.8 procedure.

Keywords

Analysis, B2B/C2B interface, NGN, requirements, service customer, service provider, trouble report.

FOREWORD

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In some areas of information technology which fall within ITU-T's purview, the necessary standards are prepared on a collaborative basis with ISO and IEC.

NOTE

In this Recommendation, the expression "Administration" is used for conciseness to indicate both a telecommunication administration and a recognized operating agency.

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CONTENTS

Introduction

This Recommendation contains the requirements and analysis for the trouble administration function for the business-to-business (B2B) and customer-to-business (C2B) interfaces.

From time to time all systems, including communications networks, develop problems or malfunctions, referred to in this Recommendation as "troubles". A "trouble" in a communications network is a problem that has an adverse effect on the quality of service perceived by network users. When a trouble is detected, possibly as a result of an alarm report, a trouble report may be entered by a user or the system may raise a report automatically. Management of that trouble report is necessary to ensure that it receives attention and that the trouble is cleared to restore the service to its previous level of capability.

At the time of a trouble, a network may have been interworking with another network to provide a service and the problem or malfunction may be due to the other network. Therefore, it may be necessary to exchange trouble management information between management systems across interfaces which may be client-to-service provider or service provider-to-service provider interfaces and may represent inter-jurisdictional, as well as intra-jurisdictional, boundaries. In addition to exchanging information on trouble that has already been detected, advance information on service inaccessibility may also need to be exchanged. Thus, a service provider may need to inform a customer of future service inaccessibility (because of planned maintenance, for example). The scope of this Recommendation includes all of the above processes for exchange of management information for NGN to support the B2B and C2B interfaces.

The NGN introduces the requirements for the extensibility and configurability of the trouble types to address new and evolving IMS services, the definition of these extensions is for further study.

ITU-T Recommendation M.3343

Requirements and analysis for NGN trouble administration across B2B and C2B interfaces

1 Scope

This Recommendation contains the requirements and analysis for the business-to-business (B2B) and customer-to-business (C2B) interfaces of trouble administration for NGN. It assumes a multi-service provider environment and is aimed at trouble administration functions to support the deployment of NGN and includes both the B2B and C2B interfaces. B2B/C2B interface is a synonymous term to X Interface.

Figure 1-1 shows the relationship of this Recommendation to existing and as yet undefined documents for service assurance management. It shows the architecture for NGN service assurance management.

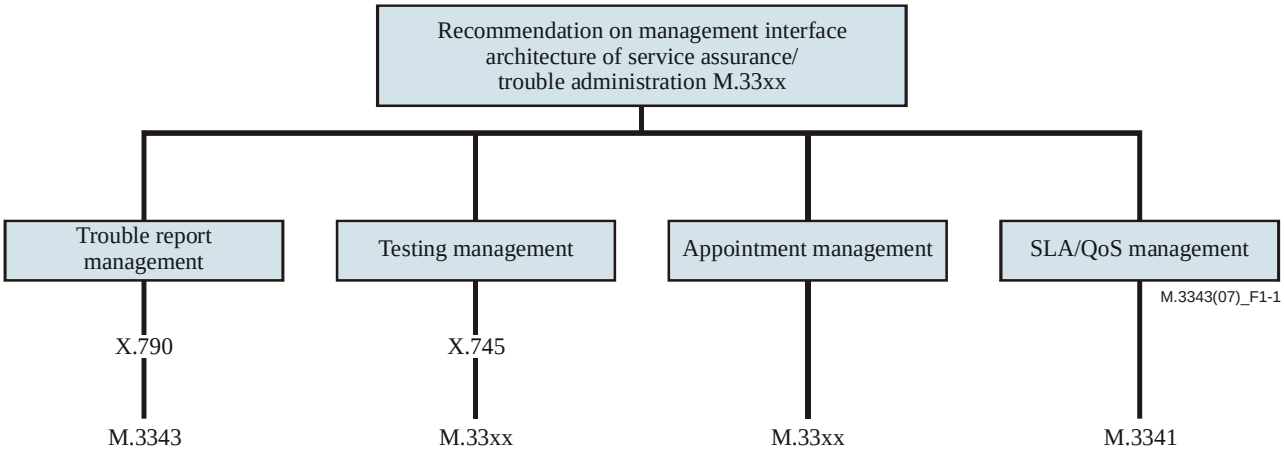

Figure 1-1 – Illustration of document architecture for NGN service assurance/trouble management

Trouble administration consists of processes utilizing trouble report management, testing management, appointment management and SLA management. This Recommendation and the current [ITU-T X.790] are specific to trouble report. Functions for testing of the service or transport stratum, appointment management and SLA management are outside the scope of this Recommendation. Trouble administration will require all the functions defined in this Recommendation and the other three Recommendations to provide a complete set of functions.

Third-party request/response operations are dependent upon the privacy business rules defined in the SC/SP's contract and consequently are considered out of scope for this Recommendation.

2 References

The following ITU-T Recommendations and other references contain provisions which, through reference in this text, constitute provisions of this Recommendation. At the time of publication, the editions indicated were valid. All Recommendations and other references are subject to revision; users of this Recommendation are therefore encouraged to investigate the possibility of applying the most recent edition of the Recommendations and other references listed below. A list of the currently valid ITU-T Recommendations is regularly published. The reference to a document within this Recommendation does not give it, as a stand-alone document, the status of a Recommendation.

[ITU-T G.805] ITU-T Recommendation G.805 (2000), *Generic functional architecture of transport networks*.

[ITU-T M.3010] ITU-T Recommendation M.3010 (2000), *Principles for a telecommunications management network*.

[ITU-T M.3016.x] ITU-T Recommendation M.3016.x (2005), *Security for the management plane*.

[ITU-T M.3020] ITU-T Recommendation M.3020 (2007), *Management interface specification methodology*.

[ITU-T M.3050.x] ITU-T Recommendation M.3050.x (2004), *Enhanced telecommunications operations map (eTOM)*.

[ITU-T M.3060] ITU-T Recommendation M.3060/Y.2401 (2006), *Principles for the management of next generation networks*.

[ITU-T M.3200] ITU-T Recommendation M.3200 (1997), *TMN management services and telecommunications managed areas: Overview*.

[ITU-T M.3208.1] ITU-T Recommendation M.3208.1 (1997), *TMN management services for dedicated and reconfigurable circuits network: Leased circuit services.*

[ITU-T M.3400] ITU-T Recommendation M.3400 (2000), *TMN management functions.*

[ITU-T Q.1290] ITU-T Recommendation Q.1290 (1998), *Glossary of terms used in the definition of intelligent networks*.

[ITU-T X.720] ITU-T Recommendation X.720 (1992), *Information technology – Open Systems Interconnection – Structure of management information: Management information model*.

[ITU-T X.721] ITU-T Recommendation X.721 (1992), *Information technology – Open Systems Interconnection – Structure of management Information: Definition of management information.*

[ITU-T X.790] ITU-T Recommendation X.790 (1995), *Trouble management function for ITU-T applications*.

[ITU-T Y.2001] ITU-T Recommendation Y.2001 (2004), *General overview of NGN*.

[ETSI TS 122 228] ETSI TS 122 228 (2006), *UMTS: Service requirements for the IP multimedia core network subsystem (IMS); Stage 1*.

3 Definitions

3.1 Terms defined elsewhere

This Recommendation uses the following terms defined elsewhere:

3.1.1 administrative domain: [ITU-T G.805].

3.1.2 b2b/c2b reference point: [ITU-T M.3060].

3.1.3 interface: [ITU-T M.3010].

3.1.4 IP multimedia application [ETSI TS 122 228]: An application that handles one or more media simultaneously, such as speech, audio, video and data (e.g., chat text, shared whiteboard) in a synchronized way from the user's point of view. A multimedia application may involve multiple parties, multiple connections and the addition or deletion of resources within a single IP multimedia session. A user may invoke concurrent IP multimedia applications in an IP multimedia session.

3.1.5 IP multimedia subsystem (IMS) [ETSI TS 122 228]: An IP multimedia service is the user experience provided by one or more IP multimedia applications.

3.1.6 managed resource: [ITU-T M.3010].

3.1.7 management domain: [ITU-T M.3010].

3.1.8 management function: [ITU-T M.3010].

3.1.9 market, product and customer management function (MPCMF): [ITU-T M.3060].

3.1.10 next generation network (NGN): [ITU-T Y.2001].

3.1.11 operations system (OS): [ITU-T M.3010].

3.1.12 operations systems function (OSF): [ITU-T M.3010].

3.1.13 Q interface: [ITU-T M.3010].

3.1.14 service customer: [ITU-T M.3208.1].

3.1.15 service provider: [ITU-T M.3208.1].

3.1.16 service resource management function (SRMF): [ITU-T M.3060].

3.1.17 service user: [ITU-T Q.1290].

3.1.18 supplier/partner relationship management function (SPRMF): [ITU-T M.3060].

3.1.19 X interface: [ITU-T M.3010].

3.1.20 x reference point: [ITU-T M.3010].

NOTE 1 – The definitions of SPRMF, MPCMF and SRMF are for further study.

NOTE 2 **–** SP and SC used in this Recommendation means SP role and SC role.

3.2 Terms defined in this Recommendation

This Recommendation defines the following terms:

3.2.1 B2B/C2B interface: The B2B/C2B interface in this Recommendation is used to interconnect two administrative domains or to interconnect a compliant environment with other networks or systems which accommodate a compliant interface, across which trouble administration information can be exchanged.

3.2.2 clearing trouble report: An assertion by an agent that actions which are identified in the trouble report or the repair activity object instances have been satisfactorily performed to resolve the trouble, or that such actions are no longer necessary, such that in either case the trouble report is a candidate for closure.

3.2.3 closing trouble report: An assertion by an agent that the trouble is resolved such that the cleared trouble report may only be processed further to generate a trouble history record and/or be deleted.

3.2.4 network operator: An organization that operates a NGN transport stratum. A network operator may offer both transport stratum and service stratum. A NGN network operator may or may not provide NGN service stratum services.

3.2.5 open trouble report: An assertion by the manager that a trouble exists in the quality of service of one or more network services including one or more network resources being managed, and resulting in the creation of a trouble report in the service provider's TA OSF agent.

3.2.6 status of a trouble report: The stage that has been reached by a trouble report since its instantiation/creation while the trouble is being resolved.

3.2.7 trouble: Any cause that may lead to, or contribute to, a manager perceiving degradation in the quality of service of one or more network services including one or more network resources being managed.

3.2.8 trouble administration: Trouble administration consists of a set of functions that enable troubles to be reported, tracked and maintained.

3.2.9 trouble report: The formal report of trouble exchanged over the B2B or C2B interface.

3.2.10 trouble resolution: Trouble resolution is the process of diagnosis and repair action required to clear a trouble. It includes the process of assigning specific work items or overall responsibility for clearing and closing the trouble report.

3.2.11 trouble type: The description or category of the trouble that was detected.

4 Abbreviations and acronyms

This Recommendation uses the following abbreviations and acronyms:

B2B/b2b Business-to-Business

C2B/c2b customer-to-Business

HMI Human-Machine Interface

IMS IP Multimedia Subsystem

MPCMF Market, product and customer management function

NGN Next Generation Network

OS Operations System

OSF Operations System Function

SC Service customer

SEF Service Element Function

SMF Service Management Function

SP service provider

SPRMF Supplier/Partner Relationship Management Function

SRMF Service Resource Management Function

SU Service User

TA trouble administration

TEF Transport Element Function

TMN Telecommunications Management Network

TR Trouble Report

UML Unified Modelling Language

5 Conventions

In this Recommendation, mandatory requirements are indicated by the use of the word "shall". Desirable requirements are indicated by the use of the word "should". Optional requirements are indicated by the use of the word "may" or "can".

In this Recommendation, when specifying managed entities and their management operations, the following abbreviations are applied to indicate the support qualifier of attributes, notifications or operation parameters:

M: Mandatory;

O: Optional;

C: Conditional;

– Not supported.

The following abbreviations are applied to indicate the read qualifier and write qualifier of the attributes.

R+: must be readable;

R: optional readable;

R-: non-readable;

W+: must be writeable;

W: optional writeable;

W-: non-writeable;

C+: must be write-on-createable;

C: optional write-on-createable;

C-: non-write-on-createable.

6 Functional requirements

6.1 Requirements framework

Figure 6-1 shows the b2b/c2b reference points being addressed by this Recommendation. It is adapted from the illustration of reference points described in [ITU-T M.3060]. The b2b/c2b reference points for trouble administration are located between the OSFs in different administrative domains where trouble administration function is contained. The dashed rectangle shows the location of b2b/c2b reference points.

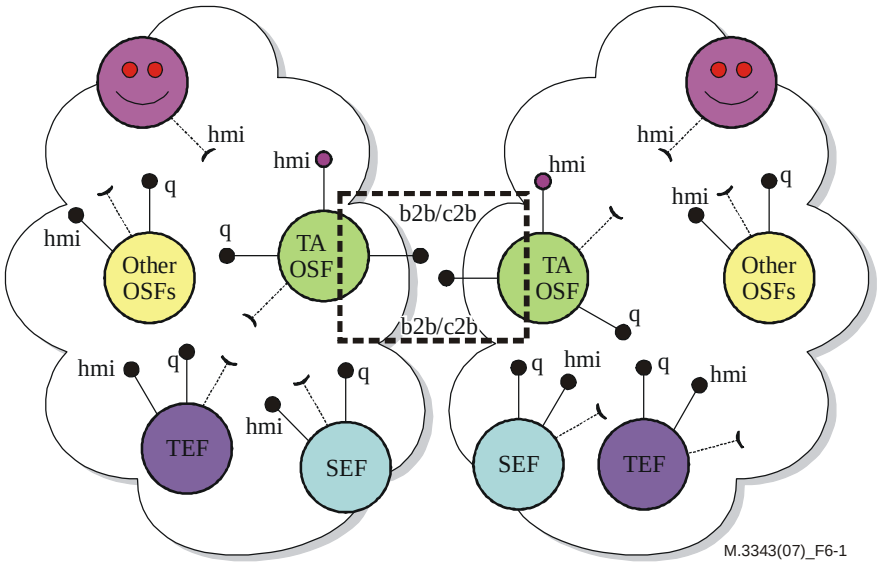

Figure 6-1 – Illustration of b2b/c2b reference points for trouble administration

Figure 6-2 illustrates the SP/SC/SU relationships for the trouble administration. The SP provides trouble administration services to support interactions between SP and SC, and between SP and SP/Network Operator. In NGN supply chain, a SP can provide a telecommunication service to a customer by importing external transport resources from other entities acting as Network Operators or importing external service resources from other service providers.

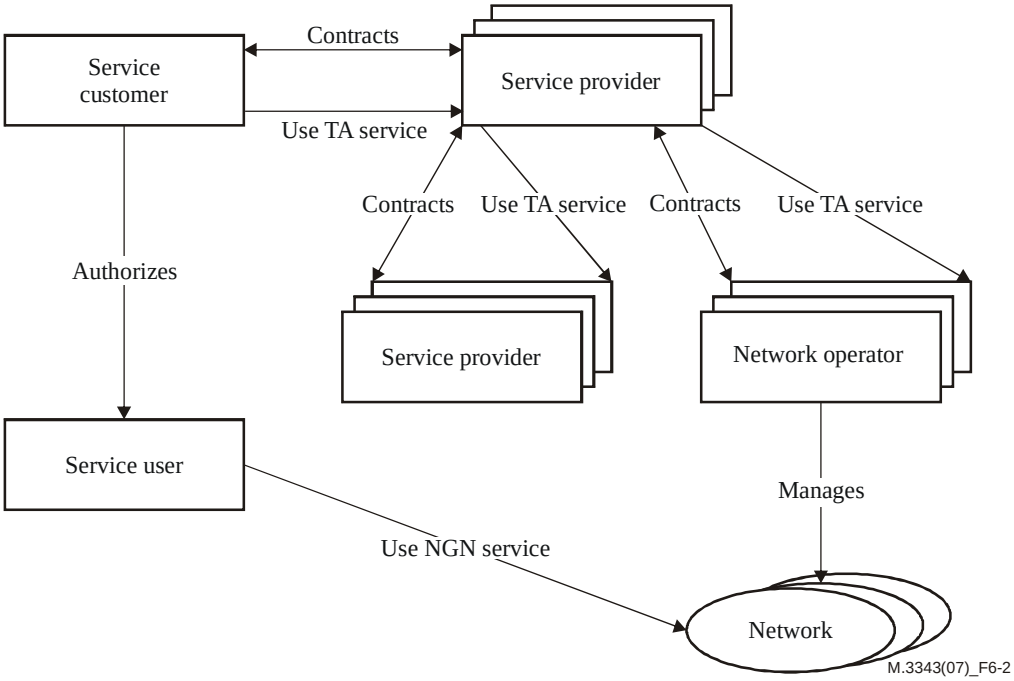

Figure 6-2 – SP/SC/SU roles in trouble administration

The scope of trouble administration function in NGN management is shown in Figure 6-3. Trouble administration OSF may be contained in several logical management layer functions including MPCMF, SMF, SRMF and SPRMF.

The security requirements for the B2B and C2B interface of NGN TA can be found in [ITU-T M.3016.x]. These requirements apply not only to the interfaces between SC and SP, but also between SC-SU and SP-SP.

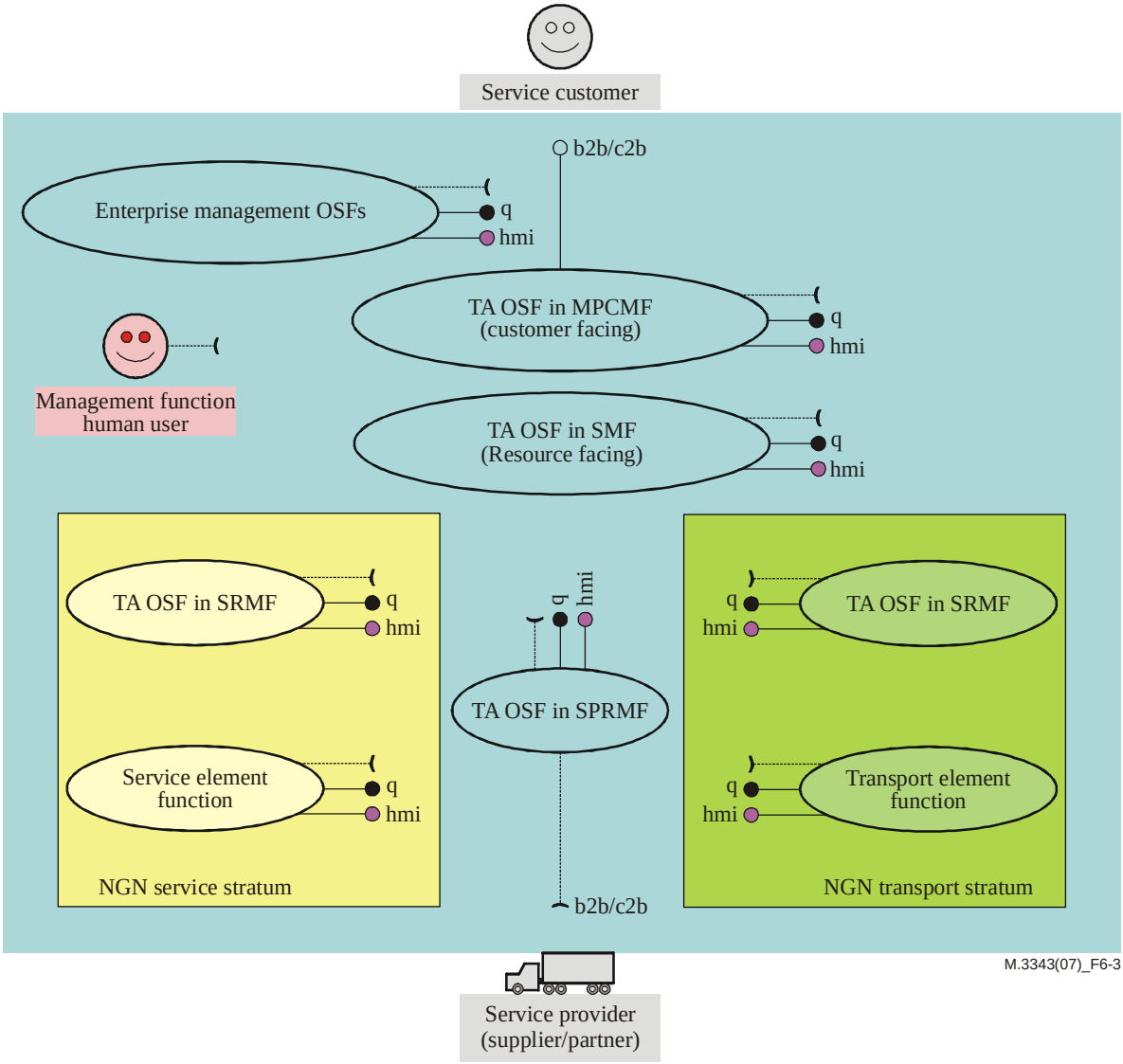

Figure 6-3 – The scope of trouble administration function in NGN management

Figure 6-4 illustrates an example of interconnection of NGN TA management logical architecture. It is consistent with the NGN management logical architecture described in [ITU-T M.3060]. Each of the administration domains shown is considered to be an individual telecommunication management network (TMN). Each domain maintains its own trouble administration management function. The interchange of trouble administration information and interactions between these TA OSFs of different administration domains takes place across the B2B/C2B interface.

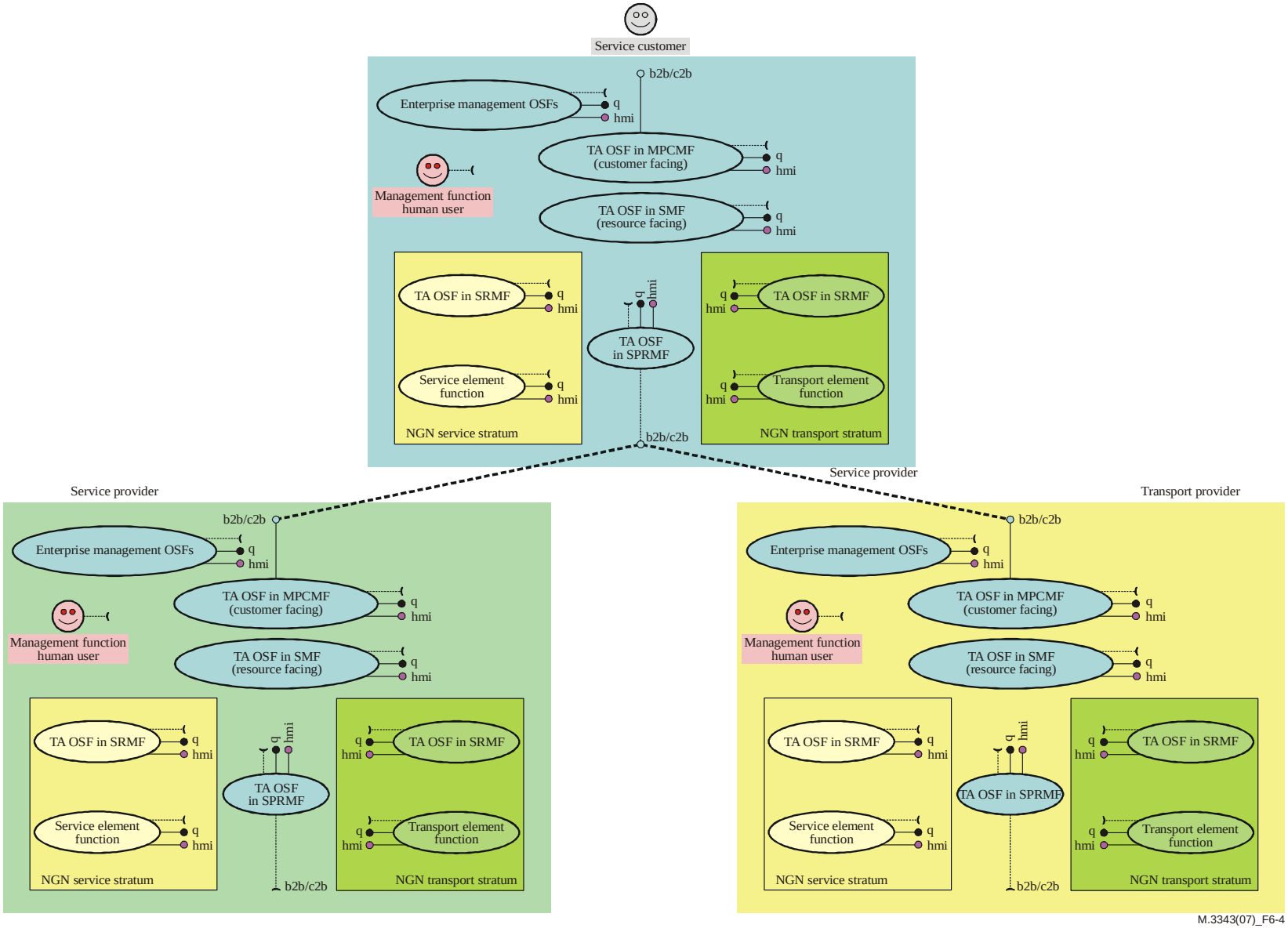

Figure 6-4 – Example of interconnection of NGN TA management logical architecture

There are two types of business context as to B2B/C2B interface. One is that the customer role is taken by an end-user entity. Another is that the customer role is taken by another service provider organization in the overall supply chain.

In the first business context, the service provider detects end-user trouble through a variety of means; either through internal fault-detection procedures or via customer contact. The trouble administration interface is used to allow the customer to report troubles, to enable the service provider to keep the customer informed of trouble resolution and to facilitate the cooperation of service providers. For an end-user organization, in order to communicate with a service provider across a B2B/C2B interface, it must support the trouble administration function in its own management domain. The trouble administration solution may communicate with other equipment's OS within the customer network but the internal interface is out the scope of this Recommendation.

In the second business context, it is possible that a service provider provides a service to an end user with the cooperation of other service providers or transport providers. In this case, trouble administration information needs to be exchanged between the SP and other SPs or transport providers. The SP providing telecommunication services to an end user acts as a customer role, while other SPs or transport providers act as a provider role. The B2B/C2B interface in this Recommendation is used to convey trouble administration information between the TA OSF in SPRMF of other SPs or transport providers (acting as a provider role) and the TA OSF in MPCMF of the SP (acting as a customer role). In the NGN supply chain, the customer and service provider roles may change from situation to situation. However, in any particular situation, one entity will be the customer role while the other will be the provider role.

6.2 Business level requirements

6.2.1 Business level requirements

The trouble administration processes between customers and service providers is part of a business relationship between their organizations in which the service provider has contracted to provide a set of services to a defined level of quality as defined in a customer's contract – service level agreement. The trouble administration processes are concerned with the identification and resolution of total or partial failures of the individual services offered under the customer's contract.

The basic requirements includes:

– trouble report creation (see clause 6.2.1.2);

– trouble report tracking (see clause 6.2.1.3);

– trouble report management (see clause 6.2.1.4);

– trouble report clearing and closure (see clause 6.2.1.5);

– other requirements (see clause 6.2.1.6).

6.2.1.1 Trouble report subject

REQ-TA-CON-101 Each trouble report shall have a single identified subject, which is the resource or service in trouble. Any single resource or service could be the subject of a trouble report. The resource or service which is the subject of a trouble report must be known to the service provider. If the customer uses the interoperable interface to create a trouble report, then the inventory of resources and services which can be the subject of a trouble report must be made known to the customer in advance by the service provider.

6.2.1.2 Trouble report creation

REQ-TA-FUN-201 A customer should be able to initiate, via a local process, a request that a trouble report on a resource or service be created by a service provider using the interoperable interface.

[The process by which the customer initiates the request is a local matter outside the scope of this Recommendation. This is a choice by the customer. Not every customer trouble report needs to be sent to a service provider. The choice is a local customer policy.]

REQ-TA-FUN-202 A service provider should be able to notify a customer about the creation of a trouble report on a resource or service based on one of the following scenarios.

REQ-TA-FUN-202.a A service provider management system detects a trouble and automatically generates a trouble report, for instance due to threshold limits being exceeded or alarm notifications.

REQ-TA-FUN-202.b A person in the customer's organization reports a trouble to the service provider by a procedure other than using the interoperable interface (e.g., a telephone call) and, as a result, the service provider creates a trouble report.

REQ-TA-FUN-203 A service provider should be able to create a trouble report to specifically notify the customer that planned maintenance will be carried out at a given time and that all, or parts of, the service(s), resource(s), network or system will be inaccessible during that time. In this case, the trouble management function is used to notify the customer that planned maintenance action is scheduled.

[This type of trouble report is intended solely to allow the customer to track planned outages, not to support customer approval or suppression of planned outages.]

REQ-TA-FUN-204 The creation time should be recorded in a trouble report by the service provider.

[Creation time is the time that the trouble report is accepted as valid by a service provider. If the service provider implements a 'queued' state, there may be an interval between trouble report creation time and opening time, otherwise they are equivalent.]

REQ-TA-FUN-205 If the service provider rejects the trouble report (i.e., does not create it), the customer should be informed. The reason why the service provider rejects the trouble report should be specified.

REQ-TA-FUN-206 The trouble report originator, either service provider or customer, should be able to specify the time at which the trouble was detected, as it is likely to be different from the time at which the trouble report was created.

REQ-TA-FUN-207 It should be possible to have alias(es) for the trouble report. For example, there may be distinct trouble report IDs on the service provider side and the customer side. This allows for compatibility with existing trouble handling systems, e.g., the trouble report identity derived using existing internal trouble management practices may be used. Each trouble report should be able to support a customer trouble report ID in addition to the service provider trouble report ID.

REQ-TA-FUN-208 Both customer and service provider should be able to group trouble reports together, e.g., to indicate a common problem.

[The criteria for grouping or regrouping trouble reports is outside the scope of this Recommendation. This is a local matter.]

REQ-TA-FUN-209 A trouble report used during the trouble resolution procedures may have associated with it one or more alarms triggered by a single common problem.

[Association with alarms is a local matter. This implies the presence of a separate fault management system that allows for the sharing of alarm information.]

REQ-TA-FUN-210 Multiple distinct trouble reports can be created against the same subject only if the service provider and customer support it, although this does not necessarily imply trouble report correlation.

REQ-TA-FUN-211 It should be possible for either the service provider or customer to include comments in free format text in the trouble report. Comments, once included, cannot be modified or removed. The size of text should be agreed between the service provider and the customer.

REQ-TA-FUN-212 It shall be possible for the trouble report originator, either service provider or customer, to include in the trouble report the trouble type and additional information about the trouble. This represents the customer's viewpoint, not the service provider's viewpoint.

NOTE – As part of the contract, specified by the supplier/partner relationship management process, the SP may require, i.e., make it mandatory that, the SC submit, in additional data, evidence of pre-trouble ticket process execution and pass evidence of prior processes and test diagnosis results.

REQ-TA-FUN-212.a The trouble type shall be configurable and extensible, by either the service provider or the service customer, and also support trouble type definitions agreed and documented at national, regional and international levels to support NGN services.

REQ-TA-FUN-213 The trouble report originator, either service provider or customer, should be able to supply the identity of the person or system who originated the trouble report.

REQ-TA-FUN-214 The trouble report originator, either service provider or customer, should be able to supply the perceived trouble severity in terms of the effect on the trouble report subject.

[This severity is from the customer's viewpoint. Severity is not to be confused with priority or escalation level.]

REQ-TA-FUN-215 In addition to the identity of the service or network resource against which the trouble is being reported, the trouble report should be able to contain additional suspect objects and the location of the trouble. This additional information is not necessarily present in the create request, but should be able to be added by trouble report updates.

REQ-TA-FUN-216 The customer should be able to supply a priority to indicate the urgency for resolution of the trouble relative to his own other outstanding trouble reports.

[Exchange of this information does not guarantee any change in the processing of trouble reports. That is beyond the scope of the interface.]

REQ-TA-FUN-217 Both the service provider and customer should each be able to identify a contact person and alternative contact person(s) from their respective organizations who can provide additional information about the trouble.

REQ-TA-FUN-218 The customer or service provider should be able to indicate that the subject of the trouble report was recently created or that another trouble was reported on this subject in the recent past.

[This might be used to identify chronic problems and newly – deployed equipment. The mechanism used for determining this is outside the scope of this Recommendation.]

REQ-TA-FUN-219 The customer should be able to request a commitment time (e.g., the time at which the service provider either arrives on site or clears the trouble). The service provider should be able to supply a commitment time, not necessarily the same time as requested by the customer.

REQ-TA-FUN-220 The customer should be able to specify when the site is accessible to the service provider.

REQ-TA-FUN-221 The customer should be able to specify when the subject of the trouble report is accessible (i.e., when disruptive repair activity may be carried out).

6.2.1.3 Trouble report tracking

This clause is concerned with the tracking of the problem resolution process by the customer.

REQ-TA-FUN-301 A customer shall be able to track the progress of a trouble report to resolution. The customer should be able to request the trouble report state and/or status from the service provider. The service provider should be able to notify the customer of changes to the trouble report.

[This tracking capability should not have to be explicitly requested by customers. The issue of whether the customer trouble report system polls for status versus having the service provider trouble report system automatically update status will be explicitly determined by what transport protocol is implemented.

Some implementations may provide a periodic refresh by the service provider to the customer, irrespective of whether any changes have taken place, but this mechanism is not itself a functional requirement.]

REQ-TA-FUN-302 The state of the trouble report should be updated as the global condition of the trouble report changes (i.e., whether or not the trouble report may be changed, closed or otherwise moved through the state transition model).

REQ-TA-FUN-303 The status of the trouble repair activity should be updated as the service provider's trouble resolution progresses and the customer should be notified of all changes. The service provider should maintain the time of the last change in the trouble report status.

REQ-TA-FUN-304 The time at which the trouble report was last updated should be recorded.

REQ-TA-FUN-305 The trouble report should maintain a running account of information on the activities taken to diagnose, test and repair the trouble, the repair type, the length of time spent on each activity, whether or not the activity is billable and the equipment involved in each activity. This information is provided by the service provider. In addition to the running account, it should be possible to summarize key information, such as how long was spent on an activity, whether or not the work is billable, etc.

[Any processing that is carried out on this information is a local matter.]

REQ-TA-FUN-306 The service provider should allow the customer to retrieve a complete description of a specific trouble report based on the specification of the unique service provider trouble report ID.

[This would be for the re-synchronization of "views" of trouble reports if there is a suspicion that they are not equivalent, or the creation of a new customer trouble report instance if a trouble report has been missed.]

REQ-TA-FUN-307 The service provider should allow the customer to retrieve complete descriptions of a specific set of trouble reports based on an ad hoc filter definition (e.g., active (not closed) trouble reports, updated trouble reports, etc.).

REQ-TA-FUN-308 It is possible that the service provider system may not be able to update the trouble report information. In this case, the customer should be informed that the trouble report is disabled and its information cannot be updated.

6.2.1.4 Trouble report management

REQ-TA-FUN-401 It should be possible for a customer to escalate a trouble report if this is supported by the service provider, or for a trouble report to be escalated by the service provider. The customer should be informed of all changes to the escalation level. Escalation levels can only increase, not decrease.

[Some service providers may not wish to allow customers to escalate trouble reports, as it could cause confusion, but prefer to carry out escalation according to prior arrangement in a business level agreement. In any case, the conditions under which a trouble report is escalated (for example, if the trouble has not been resolved in a given period of time) should be contained in a business level agreement.]

REQ-TA-FUN-402 It should be possible for the service provider to defer work on a trouble report. For example, it may be necessary to suspend repair work because access to the faulty resource has been prevented by the customer. Deferral of a trouble report suspends the 'outage duration timer'. The service provider should notify the customer when a trouble report has been deferred and when the deferral is released.

REQ-TA-FUN-403 The customer should be able to provide the required repair completion time (which may be derived from an SLA, for example) and obtain from the service provider the expected repair time and, subsequently, the actual repair time.

REQ-TA-FUN-404 The customer should be able to update an open and active trouble report with new information, e.g., additional trouble-related information, contact change, etc.

REQ-TA-FUN-405 The customer should be able to authorize repairs to be made at the customer's location outside of normal business hours and also be able to identify the permitted access times for a given single location. This is out of scope for this Recommendation.

REQ-TA-FUN-406 Upon receiving a request for authorization related to specific repair activities from the service provider, a customer should be able to provide authorization over the interoperable interface. This is out of scope for this Recommendation.

REQ-TA-FUN-407 The service provider should be able to indicate to the customer whether the repair activity covered by the present trouble report is billable. This is out of scope for this Recommendation.

[It is not intended that the trouble report be used for invoicing.]

6.2.1.5 Trouble report clearing and closure

REQ-TA-FUN-501 A customer should be able to request the cancellation of a trouble report and indicate in the trouble report the person making the request.

REQ-TA-FUN-502 When the service provider requests clearance verification for the trouble report, the activity timer should be suspended. It should be restarted if the customer denies clearance.

REQ-TA-FUN-503 The customer should be allowed to verify that the trouble is cleared prior to closure of the trouble report by the service provider. When the clearing of the problem related to the trouble report is verified by the customer, the identity of the trouble clearance person doing the verification should be captured in the trouble report. In the event that the customer denies or delays closure verification, then the service provider should have the option of closing the trouble report.

REQ-TA-FUN-504 Once a service provider has deemed a trouble report to be cleared and has notified the customer, regardless of whether the customer denies clearance or fails to respond, the service provider should be able to deny the customer the ability to modify some of the information in the trouble report.

[This is intended to prevent redefinition of the original problem. The details of how the service provider ensures that the appropriate notification has been received by the customer and the time period within which he has to respond to the request are beyond the scope of this Recommendation.]

REQ-TA-FUN-505 The actual cause of the trouble found, together with the solution provided and other relevant factors should be recorded in the trouble report.

REQ-TA-FUN-506 It should be possible to compute/determine the outage duration of the equipment/service from the repair activity information held in the trouble report or the repair activity object instance, if present. This outage duration should then be added to the trouble report at the time of closure.

[The algorithm for computing/determining the outage duration is outside the scope of this Recommendation.]

REQ-TA-FUN-507 The customer should be able to receive an indication when an instance of a trouble report is deleted locally by the service provider.

[The customer may not require these notifications, which are of limited use.]

6.2.1.6 Other requirements

REQ-TA-FUN-601 It should be possible for either the service provider or the customer to maintain trouble report history.

6.2.2 Actor roles

The capabilities described in this Recommendation are available to relevant service providers and service customers.

6.2.3 Telecommunications resources

The object management functionality is applicable to all types of telecommunications resources.

6.2.4 High-level use case diagrams

This clause contains high-level use case diagrams that summarize the functionality and interfaces of the trouble administration as shown on Figures 6-5 and 6-6. The use case diagrams are organized along the lines shown in Table 6-1, i.e., use cases initiated by the SC are depicted first, followed by use cases initiated by the SP. Use case descriptions are provided in clause 6.3 for every use case pictured in these high level diagrams.

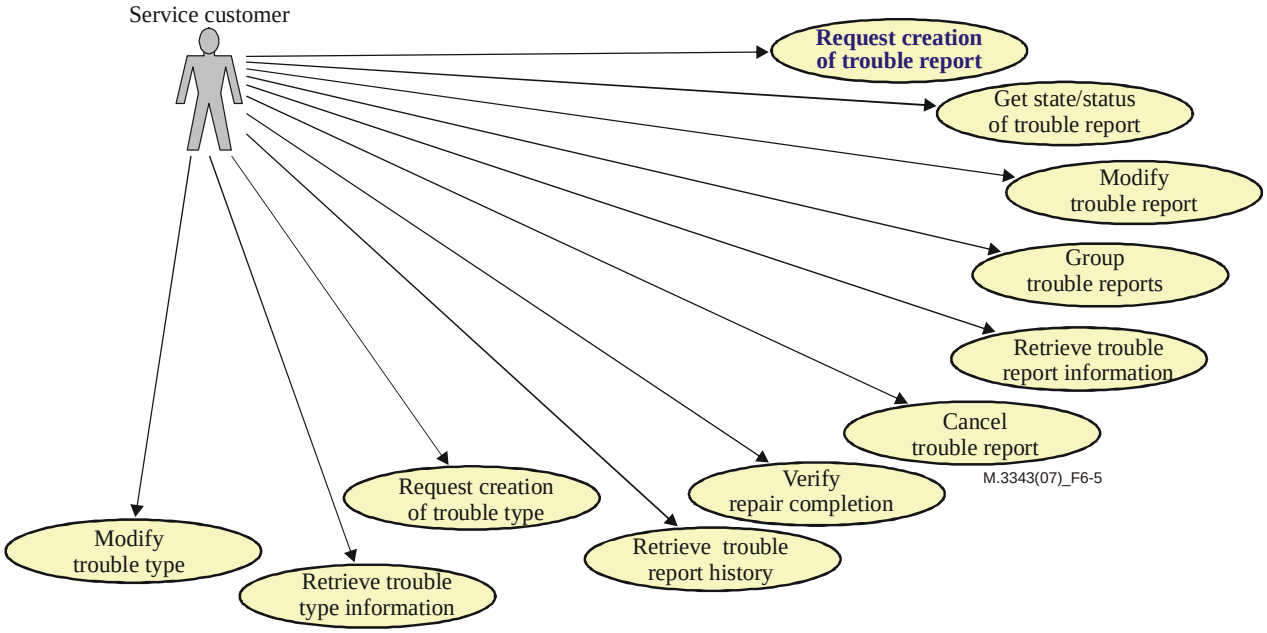

Figure 6-5 – SC-Initiated use cases

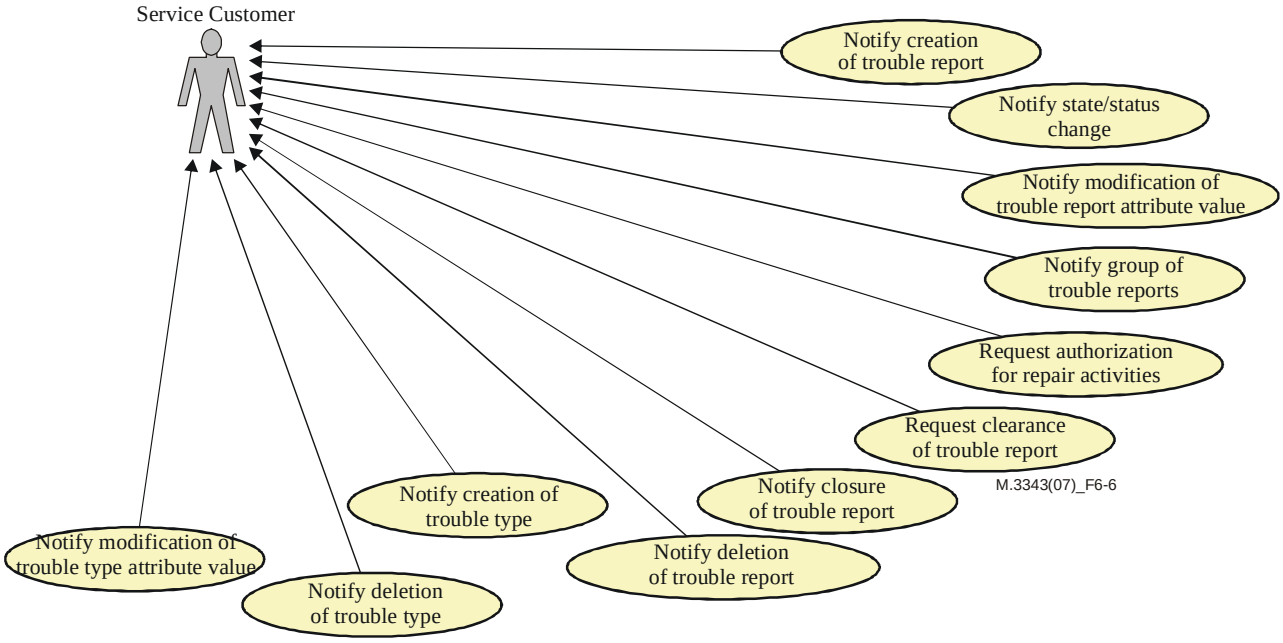

Figure 6-6 – SP-Initiated use cases

NOTE – All third-party use cases will be considered out of scope for this Recommendation.

6.2.5 Interaction

Table 6-1 – Trouble administration interactions across B2B/C2B interface

Originator	Receiver	Interaction
Service customer	Service provider	Request creation of trouble report; Get state/status of trouble report; Modify trouble report; Group trouble reports; Retrieve trouble report information; Cancel trouble report; Verify repair completion; Retrieve trouble report history; Request creation of trouble type; Retrieve trouble type information; Modify trouble type.
Service provider	Service customer	Notify creation of trouble report; Notify state/status change; Notify modification of trouble report attribute value; Notify group of trouble reports; Request authorization for repair activities; Request clearance of trouble report; Notify closure of trouble report; Notify deletion of trouble reports; Notify creation of trouble type; Notify deletion of trouble type; Notify modification of trouble type attribute value.

i) Tracing of requirements

Requirement No.	M/O	Brief description of requirement	Interaction
REQ-TA-CON-001	M	Each trouble report shall have a single identified subject, which is the resource or service in trouble.	All.
REQ-TA-FUN-201	M	A customer should be able to initiate a request for creation of a trouble report.	Request creation of trouble report.
REQ-TA-FUN-202	M	A service provider should be able to notify a customer about the creation of a trouble report.	Notify creation of trouble report.
REQ-TA-FUN-203	M	A service provider should be able to create a trouble report to specifically notify the customer that planned maintenance will be carried out.	Notify creation of trouble report.
REQ-TA-FUN-204	M	The creation time should be recorded in a trouble report by the service provider.	Notify creation of trouble report.

Requirement No.	M/O	Brief description of requirement	Interaction
REQ-TA-FUN-205	M	If the service provider rejects the trouble report (i.e., does not create it), the customer should be informed.	Notify creation of trouble report.
REQ-TA-FUN-206	M	The trouble report originator should be able to specify the time at which the trouble was detected.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-207	M	It should be possible to have alias(es) for the trouble report.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-208	M	Both customer and service provider should be able to group trouble reports together.	Group trouble reports; Notify group of trouble reports.
REQ-TA-FUN-209	O	A trouble report may have associated with it one or more alarms triggered by a single common problem.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-210	O	Multiple distinct trouble reports can be created against the same subject.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-211	M	It should be possible for either the service provider or the customer to include comments in free format text in the trouble report.	Request creation of trouble report; Notify creation of trouble report; Modify trouble report; Notify modification of trouble report attribute value.
REQ-TA-FUN-212	M	It shall be possible for the trouble report originator to include in the trouble report the trouble type and additional information about the trouble.	Request creation of trouble report; Notify creation of trouble report; Modify trouble report; Notify modification of trouble report attribute value.

Requirement No.	M/O	Brief description of requirement	Interaction
REQ-TA-FUN-212.a	M	It shall be configurable and extensible, by either the service provider or the service customer, and also support trouble type definitions agreed and documented at national, regional and international levels to support NGN services.	Request creation of trouble type; Retrieve trouble type information; Modify trouble type; Notify creation of trouble type; Notify deletion of trouble type; Notify modification of trouble type attribute value.
REQ-TA-FUN-213	M	The trouble report originator should be able to supply the identity of the person or system who originated the trouble report.	Request creation of trouble report; Notify creation of trouble report
REQ-TA-FUN-214	M	The trouble report originator should be able to supply the perceived trouble severity.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-215	M	In addition to the identity of the service or network resource against which the trouble is being reported, the trouble report should be able to contain additional suspect objects and the location of the trouble.	
REQ-TA-FUN-216	M	The customer should be able to supply a priority.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-217	M	Both the service provider and customer should each be able to identify a contact person and alternative contact person(s).	Request creation of trouble report; Notify creation of trouble report; Modify trouble report.
REQ-TA-FUN-218	M	The customer or service provider should be able to indicate that the subject of the trouble report was recently created or that another trouble was reported on this subject in the recent past.	Request creation of trouble report; Notify creation of trouble report.
REQ-TA-FUN-219	M	The customer should be able to request a commitment time.	Request creation of trouble report; Notify creation of trouble report; Modify trouble report.

Requirement No.	M/O	Brief description of requirement	Interaction
REQ-TA-FUN-220	M	The customer should be able to specify when the site is accessible to the service provider.	Request creation of trouble report; Notify creation of trouble report; Modify trouble report.
REQ-TA-FUN-221	M	The customer should be able to specify when the subject of the trouble report is accessible.	Request creation of trouble report; Notify creation of trouble report; Modify trouble report.
REQ-TA-FUN-301	M	A customer shall be able to track the progress of a trouble report to resolution.	Get state/status of trouble report; Notify state/status change.
REQ-TA-FUN-302	M	The state of the trouble report should be updated as the global condition of the trouble report changes.	
REQ-TA-FUN-303	M	The status of the trouble repair activity should be updated as the service provider's trouble resolution progresses and the customer should be notified of all changes.	Notify state/status change.
REQ-TA-FUN-304	M	The time at which the trouble report was last updated should be recorded.	
REQ-TA-FUN-305	M	The trouble report should maintain a running account of information on the activities taken to diagnose, test and repair the trouble, the repair type, the length of time spent on each activity, whether or not the activity is billable and the equipment involved in each activity.	
REQ-TA-FUN-306	M	The service provider should allow the customer to retrieve a complete description of a specific trouble report based on the trouble report ID.	Retrieve trouble report information.
REQ-TA-FUN-307	M	The service provider should allow the customer to retrieve complete descriptions of a specific set of trouble reports based on ad hoc filter definitions.	Retrieve trouble report information.
REQ-TA-FUN-308	O	It is possible that the service provider system may not be able to update the trouble report information. In this case the customer should be informed that the trouble report is disabled and that its information cannot be updated.	Notify state/status change.
REQ-TA-FUN-401	M	It should be possible for a customer to escalate a trouble report.	Modify trouble report; Notify state/status change.
REQ-TA-FUN-402	M	It should be possible for the service provider to defer work on a trouble report.	Notify state/status change.

Requirement No.	M/O	Brief description of requirement	Interaction
REQ-TA-FUN-403	M	The customer should be able to provide the required repair completion time (which may be derived from an SLA, for example) and obtain from the service provider the expected repair time and, subsequently, the actual repair time.	Request creation of trouble report; Notify creation of trouble report; Modify trouble report; Retrieve trouble report information.
REQ-TA-FUN-404	M	The customer should be able to update an open and active trouble report with new information	Modify trouble report.
REQ-TA-FUN-405	M	The customer should be able to authorize repairs to be made at the customer's location outside of normal business hours, and also be able to identify the permitted access times for a given single location.	Request authorization for repair activities.
REQ-TA-FUN-406	M	Upon receiving a request for authorization related to specific repair activities from the service provider, a customer should be able to provide authorization over the interoperable interface.	Request authorization for repair activities.
REQ-TA-FUN-407	M	The service provider should be able to indicate to the customer whether the repair activity covered by the present trouble report is billable.	Notify state/status change.
REQ-TA-FUN-501	M	A customer should be able to request the cancellation of a trouble report and indicate in the trouble report the person making the request.	Cancel trouble report.
REQ-TA-FUN-502	M	When the service provider requests clearance verification for the trouble report, the activity timer should be suspended. It should be restarted if the customer denies clearance.	Request clearance of trouble report.
REQ-TA-FUN-503	M	The customer should be allowed to verify the trouble is cleared prior to the closure of the trouble report by the service provider.	Verify repair completion.
REQ-TA-FUN-504	M	Once a service provider has deemed a trouble report to be cleared and has notified the customer, the service provider should be able to deny the customer the ability to modify some of the information in the trouble report.	Notify closure of trouble report.
REQ-TA-FUN-505	M	The actual cause of the trouble found, together with the solution provided and other relevant factors should be recorded in the trouble report.	Notify closure of trouble report.

Requirement No.	M/O	Brief description of requirement	Interaction
REQ-TA-FUN-506	M	It should be possible to compute/determine the outage duration of the equipment/service from the repair activity information held in the trouble report or the repair activity object instance, if present. This outage duration should then be added to the trouble report at the time of closure.	Notify closure of trouble report.
REQ-TA-FUN-507	M	The customer should be able to receive an indication when an instance of a trouble report is deleted locally by the service provider.	Notify deletion of trouble report.
REQ-TA-FUN-601	M	It should be possible for either the service provider or customer to maintain trouble report history.	Retrieve trouble report history.

ii) Interactions initiated by service customer

The following provides a narrative description of requests initiated by the SC and sent across the B2B/C2B interface to the SP for action:

1) Request creation of trouble report – B2B/C2B interface should support the request of creation of a trouble report from a customer. When a customer needs to initiate a request that a trouble report be created on the service provider side, the customer can send a request across the B2B/C2B interface.

2) Get state/status of trouble report – A customer shall be able to track the progress of a trouble report to resolution by initiating a request for the trouble report state and/or status at any time from the SP.

3) Modify trouble report – When a trouble report is in open and active state, the customer should be able to update the trouble report with new information (e.g., additional trouble-related information, contact change, etc.) across the B2B/C2B interface.

4) Group trouble reports – A customer can group trouble reports together, e.g., to indicate a common problem.

5) Retrieve trouble report information – A customer should be able to retrieve complete descriptions of a specific set of trouble reports based on an ad hoc filter definition or a distinct trouble report based on a trouble report ID.

6) Cancel trouble report – A customer should be able to request the cancellation of a trouble report and indicate in the trouble report the person making the request.

7) Verify repair completion – The customer should be allowed to verify the trouble is cleared prior to closure of the trouble report by the SP.

8) Retrieve trouble report history – It should be possible for a customer to retrieve trouble report history across a B2B/C2B interface.

9) Request creation of trouble type – A B2B/C2B interface should support the request for creation of a trouble type from a customer. When a customer needs to initiate a request that a trouble type be created on the service provider side, the customer can send a request across the B2B/C2B interface.

10) Retrieve trouble type information – A customer should be able to retrieve complete descriptions of a specific set of trouble types based on an ad hoc filter definition or a distinct trouble type based on a trouble type ID.

11) Modify trouble type – When a trouble type-related trouble report is "closed", a customer should be able to update the trouble type with new information (e.g., additional trouble type-related information, etc.) across the B2B/C2B interface.

iii) Interactions initiated by service provider

The following provides a narrative description of requests initiated by the SP and sent across the B2B/C2B interface to the SC for action:

1) Notify creation of trouble report – After a trouble report is created, either initiated by the customer or by the SP, the service provider should inform the customer about the creation.

2) Notify state/status change – The state/status of the trouble repair activity should be updated as the service provider's trouble resolution progresses and the customer should be notified of all changes.

3) Notify modification of trouble report attribute value – When any attribute value is modified, the SP should inform the customer about the modification.

4) Request clearance of trouble report – When a service provider has deemed a trouble report to be cleared, the service provider initiates a request for the verification of the clearance of the trouble report to the customer.

5) Notify closure of trouble report – The service provider should notify the customer about the closure of the trouble report.

6) Notify deletion of trouble report – The service provider should notify the customer about the deletion of some trouble reports.

7) Request authorization for repair activities – When the service provider needs access to the site or equipment owned by the customer, the SP should send a request to the customer across the B2B/C2B interface.

8) Notify group of trouble reports – After some trouble reports are grouped together, the SP should inform the customer about the group.

9) Notify creation of trouble type – After a trouble type is created, either initiated by the SC or by the SP, the service provider should inform the customer about the creation.

10) Notify deletion of trouble type – The service provider should notify the customer about the deletion of some trouble types.

11) Notify modification of trouble type attribute value – When any attribute value is modified, the SP should inform the customer about the modification.

6.3 Specification level requirements

This clause contains textual details for each of the use cases shown in the high-level use case diagrams of clause 6.2. The details are provided to clarify the roles of external actors and telecommunications resources and to refine the previous high level use case diagrams to a specification level. Use case details include the following components:

Use case stage	Evolution/specification	<<Uses>> Related use
Goal (*)	This is the objective/end result that the use case strives to achieve and should be a concise statement of what the use case should achieve in a successful scenario. There may be a statement about priority relative to other use cases and required performance of the use case, e.g.: 1) Real time. 2) Near real time. 3) Not real time.	
Actor and roles (*)	The names of actors/roles involved in the use case, including the role characteristics for each actor.	
Assumptions	A description of the environment providing a context for the use case. Assumptions are mutually exclusive to preconditions.	
Preconditions	A list of all system and environment conditions that must be true before the use case can be triggered. Preconditions are mutually exclusive to assumptions.	
Begins when (*)	The name of the single event that triggers the start of the use case.	
Step 1 (*)	A use case describes a list of steps (manual and automated) that are necessary to accomplish the goal of the use case. Steps may invoke other use cases. Steps are numbered for traceability.	Reference to a used use case.
Step n	Steps added as necessary and in a logical sequence.	
Ends when (*)	The event(s) that signals that the use case has terminated.	
Exceptions	A summary list of all exception conditions and faults detected by the use case during its operation.	
Post-conditions	A list of all system and environmental conditions that must be true if the use case has terminated without internal error.	
Traceability (*)	Requirements exposed by the use case.	

The following clauses provide the details for the use cases shown on Figures 6-4 and 6-5.

6.3.1 Use case: Request creation of trouble report

Name	Request creation of trouble report	<<Uses>> Related use
Goal	The SC initiates a request for the creation of a trouble report to the SP. The SP returns the result to the SC when the creation has completed.	
Actor and roles	Service customer (SC).	
Assumptions	When some trouble occurs and causes an adverse effect on the customer's service quality, the SC can initiate a request for the creation of a trouble report across the B2B/C2B interface. Only an authorized SC can request creation of a trouble report.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function. NOTE – Predefined contracts may include obligations to carry out pre-trouble reporting processes and to provide evidence and results of those processes when requesting creation of trouble reports.	
Begins when	The SC requests creation of a trouble report.	
Step 1	When the SC issues a request for a trouble report creation, the SC will specify certain parameters as part of the request (e.g., ID, subject, trouble type, severity, priority, contact person, etc.). NOTE – The SP may require the SC to provide evidence and results of contractually agreed pre-trouble reporting processes and results such as diagnostic tests, etc. The SC may modify the trouble report parameter values at a later time using the "modify trouble report" use case (see clause 6.3.3). When the trouble report has been created, the SP should return the result to the SC.	
Ends when	The SP returns the result to the SC that the requested trouble report has been created.	
Exceptions	– The trouble report was previously created; – Missing or incorrect parameter values; – Missing contractually agreed pre-trouble reporting evidence; – The request originates from an unauthorized source; – A network problem exists.	
Post-conditions	The trouble report is created. The state is "queued".	
Traceability	REQ-TA-FUN-201, REQ-TA-FUN-206, REQ-TA-FUN-207, REQ-TA-FUN-209, REQ-TA-FUN-210, REQ-TA-FUN-211, REQ-TA-FUN-212, REQ-TA-FUN-213, REQ-TA-FUN-214, REQ-TA-FUN-216, REQ-TA-FUN-217, REQ-TA-FUN-218, REQ-TA-FUN-219, REQ-TA-FUN-220, REQ-TA-FUN-221, REQ-TA-FUN-403	

6.3.2 Use case: Get state/status of trouble report

Name	Get state/status of trouble report	<<Uses>> Related use
Goal	The SC queries the state/status of a specific trouble report.	
Actor and roles	Service customer (SC).	
Assumptions	At any time, the SC can request the state/status of a specific trouble report to track the resolution progress of the trouble.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC sends a query request for a trouble report state/status to the SP.	
Step 1	When the SC sends a request for a trouble report state/status to the SP, the SC will specify certain parameters as part of the request (e.g., ID of the trouble report for which the state/status is requested). The SP returns the query result to the SC. The response will include certain parameters (e.g., value of the state of the trouble report requested, value of the status of the trouble report requested, etc.)	
Ends when	SP responds with state/status information of the trouble report.	
Exceptions	– Invalid trouble report ID. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The SC has received the state/status information of the requested trouble report.	
Traceability	REQ-TA-FUN-301	

6.3.3 Use case: Modify trouble report

Name	Modify trouble report	<<Uses>> Related use
Goal	The SC modifies one or more parameters associated with a trouble report.	
Actor and roles	Service customer (SC).	
Assumptions	It may be necessary for the SC to change some parameters of the trouble report that has been created by the SP. For example, the possible trouble cause, the additional information, the information of contact person, etc., may need to be modified to help resolve the problem. Modify trouble report may also be used to change the priority or escalation level of the current trouble report in response to business needs, in accordance with the SPRMF. It is assumed that the state of the trouble report for which TR parameters are being modified is "open/active". Only an authorized SC can request modification of TR parameters.	
Preconditions	The state of the trouble report for which parameters are being modified is "open/active". The trouble administration service of the SP is in place and in good condition. A predefined trouble administration service contract has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC requests modification of one or more parameters associated with a specific trouble report.	
Step 1	When the SC issues a request for modification of trouble report parameters, the SC will specify certain parameters as part of the request (e.g., ID of the trouble report for which parameters are to be modified, new values for the parameters to be modified, etc.) When the requested TR parameter(s) modification has completed, the SP returns the result.	
Ends when	The SP returns the result to the SC that the new trouble report parameter value(s) are in effect.	
Exceptions	– Invalid trouble report ID. – Missing or incorrect parameter values. – Requested trouble report is not "open/active". – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The parameter value(s) of the trouble report for which modification was requested are updated.	
Traceability	REQ-TA-FUN-211, REQ-TA-FUN-212, REQ-TA-FUN-217, REQ-TA-FUN-219, REQ-TA-FUN-220, REQ-TA-FUN-221, REQ-TA-FUN-401, REQ-TA-FUN-403, REQ-TA-FUN-404	

6.3.4 Use case: Group trouble reports

Name	Group trouble reports	<<Uses>> Related use
Goal	The SC groups several trouble reports together, e.g., to indicate a common problem.	
Actor and roles	Service customer (SC).	
Assumptions	In some cases, several created trouble reports may be caused by a common problem. So, once the problem has been resolved, all the related trouble reports can be closed. The SC can initiate a grouping. Only an authorized SC can request grouping of trouble reports.	
Preconditions	The SP supports the grouping mechanism. The trouble administration service of the SP is in place and in good condition. A predefined trouble administration service contract has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC initiates a request for grouping several trouble reports.	
Step 1	When the SC issues a request for grouping several trouble reports, the SC will specify certain parameters as part of the request (e.g., ID of the trouble reports that will be grouped or a request for all trouble reports on a specific resource/service for a specified time interval). When the requested trouble reports have been grouped, the SP returns the result.	
Ends when	The SP returns the result to the SC that grouping of the requested trouble reports is completed.	
Exceptions	– Invalid trouble report IDs. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The trouble reports on which grouping was requested are grouped together.	
Traceability	REQ-TA-FUN-208	

6.3.5 Use case: Retrieve trouble report information

Name	Retrieve trouble report information	<<Uses>> Related use
Goal	The SC queries the complete description of one or more trouble reports.	
Actor and roles	Service customer (SC).	
Assumptions	The SC can retrieve the complete information of one or more trouble reports at any time. Only an authorized SC can request retrieval of trouble report information.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC sends a query request to get the complete information of the specific trouble reports.	
Step 1	When the SC issues a request to get complete information of specific trouble reports, the SC will specify certain parameters as part of the request (e.g., a distinct ID of a trouble report or a filter definition for the specific TR set, etc.). When the requested retrieve has completed, the SP returns the complete list of TR information.	
Ends when	The SP returns the complete information list of the requested TRs.	
Exceptions	– Invalid trouble report ID. – Incorrect filter definition. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The SC has received the complete information list of the requested trouble reports.	
Traceability	REQ-TA-FUN-306, REQ-TA-FUN-307, REQ-TA-FUN-403	

6.3.6 Use case: Cancel trouble report

Name	Cancel trouble report	<<Uses>> Related use
Goal	The SC attempts to remove a trouble report that has been created from the SP.	
Actor and roles	Service customer (SC).	
Assumptions	It is necessary for the SC to cancel a created trouble report. For example, the SC made an error in reporting the trouble or has resolved the trouble and wants to abort the trouble report. Only an authorized SC can request cancellation of a trouble report.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function. The requested trouble report has been created.	
Begins when	The SC sends a request to cancel a specific trouble report.	
Step 1	When the SC issues a request to cancel a specific trouble report, the SC will specify certain parameters as part of the request (e.g., a distinct ID of a trouble). When the cancellation has completed, the SP returns the result to the SC.	
Ends when	The SP returns the result to the SC that the requested trouble report has been cancelled.	
Exceptions	– Invalid trouble report ID. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The requested trouble report has been cancelled.	
Traceability	REQ-TA-FUN-501	

6.3.7 Use case: Verify repair completion

Name	Verify repair completion	<<Uses>> Related use
Goal	The SC verifies the repair activities before the closure of a trouble report.	
Actor and roles	Service customer (SC).	
Assumptions	Prior to closure of the trouble report by the service provider, it may be necessary for the customer to verify that the trouble has been resolved. But in the event that the customer denies or delays closure verification, then the service provider should have the option of closing the trouble report. Only an authorized SC can verify repair completion of the trouble report.	
Preconditions	The trouble was resolved from the SP's point of view and the notification about the clearance of a trouble report was sent to the SC. The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC sends verification of repair completion.	
Step 1	When the repair verification has finished, the SC informs the SP by using the use case. The SC may give some information as part of the verification, such as the information of the person doing the verification. The SP then can close the trouble report.	
Ends when	The SP has received the verification.	
Exceptions	– Invalid trouble report ID. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The trouble report requested has been verified by the SC. The trouble report requested has been accepted by the SC. The trouble report requested has been rejected by the SC.	
Traceability	REQ-TA-FUN-503	

6.3.8 Use case: Retrieve trouble report history

Name	Retrieve trouble report history	<<Uses>> Related use
Goal	When a trouble report has been closed, it is transferred to the history TR database. The SC can query the complete description of one or more trouble reports from the history database.	
Actor and roles	Service customer (SC).	
Assumptions	Upon closure, the trouble report attributes are captured in a historical event generated at trouble report closure which may then be stored in a log of trouble history records for future reference. It is necessary for the SP to retain the "closed" trouble reports for a period of time. The SC can retrieve trouble report history for the purposes of statistics and/or analysis. Only an authorized SC can request retrieval of trouble report history.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function. The trouble report records are stored by the SP.	
Begins when	The SC sends a query request to get information of the specific history trouble reports.	
Step 1	When the SC issues a request to get complete information of specific history trouble reports, the SC will specify certain parameters as part of the request (e.g., filter definition for the specific TR set, etc.). When the requested retrieve has completed, the SP returns the list of complete TR history information.	
Ends when	The SP returns the information list of the requested trouble reports.	
Exceptions	– Incorrect filter definition. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The SC has received the complete information list of the requested history trouble reports.	
Traceability	REQ-TA-FUN-601	

6.3.9 Use case: Request creation of trouble type

Name	Request creation of trouble type	<<Uses>> Related use
Goal	The SC initiates a request for creation of trouble type to the SP. The SP returns the result to the SC when the creation has completed.	
Actor and roles	Service customer (SC)	
Assumptions	When a trouble report needs a trouble type, the SC can initiate a request for creation of a trouble type across the B2B/C2B interface. Only an authorized SC can request creation of a trouble type.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC requests creation of a trouble type.	
Step 1	When the SC issues a request for a trouble type creation, the SC will specify certain parameters as part of the request (e.g., type info, type code, attach type code, etc.). When the trouble type has been created, the SP should return the result to the SC.	
Ends when	The SP returns the result to the SC that the requested trouble type has been created.	
Exceptions	– The trouble type was previously created. – Missing or incorrect parameter values. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The trouble type is created.	
Traceability	REQ-TA-FUN-212a	

6.3.10 Use case: Retrieve trouble type information

Name	Retrieve trouble type information	<<Uses>> Related use
Goal	The SC queries the trouble type description.	
Actor and roles	Service customer (SC).	
Assumptions	The SC can retrieve the trouble type information at any time. Only an authorized SC can request retrieval of trouble type information.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined contract about the trouble administration service has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC sends a query request to get the information of the specific trouble type.	
Step 1	When the SC issues a request to get information of a specific trouble type, the SC will specify a distinct ID of a trouble type as part of the request. When the requested retrieve has completed, the SP returns the trouble type information.	
Ends when	The SP returns the information of the requested trouble type.	
Exceptions	– Invalid trouble type ID. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The SC has received the information of the requested trouble type.	
Traceability	REQ-TA-FUN-212a	

6.3.11 Use case: Modify trouble type

Name	Modify trouble type	<<Uses>> Related use
Goal	The SC modifies one or more parameters associated with a trouble type.	
Actor and roles	Service customer (SC).	
Assumptions	It may be necessary for the SC to change some parameters of a trouble type that has been created by the SP. It is assumed that the requested trouble type related trouble reports are "closed". Only an authorized SC can request modification of trouble type parameters.	
Preconditions	The trouble administration service of the SP is in place and in good condition. A predefined trouble administration service contract has been established and the SC has been preauthorized to perform this function.	
Begins when	The SC requests modification of one or more parameters associated with a specific trouble type.	
Step 1	When the SC issues a request for modification of trouble type parameters, the SC will specify certain parameters as part of the request (e.g., ID of the trouble type for which parameters are to modified, new values for the parameters to be modified, etc.). When the requested trouble type parameter modification has completed, the SP returns the result.	
Ends when	The SP returns the result to the SC that the new trouble type parameter value(s) are in effect.	
Exceptions	– Invalid trouble type ID. – Missing or incorrect parameter values. – Requested trouble type related trouble reports are not "closed". – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The parameter value(s) of the trouble type for which modification was requested are updated.	
Traceability	REQ-TA-FUN-212a	

6.3.12 Use case: Notify creation of trouble report

Name	Notify creation of trouble report	<<Uses>> Related use
Goal	When the SP is the originator of a trouble report and the trouble report has been created, the SP notifies the creation of the trouble report.	
Actor and roles	Service customer (SC).	
Assumptions	When the originator of a trouble report is the SP, that is, the creation is based on one of the following scenarios: – The service provider management system detects a trouble and automatically generates a trouble report; – A person in the customer's organization reports a trouble to the service provider by a procedure other than using the B2B/C2B interface; – A service provider notifies the customer that planned maintenance will be carried out at a given time.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification about the creation of a trouble report.	
Step 1	When the SP sends notification about the creation of a trouble report, the SP will contain certain parameters as part of the notification (e.g., ID, subject, trouble type, severity, priority, contact person, etc.). The SP or SC may modify the trouble report parameter values at a later time.	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC is informed that the trouble report was created.	
Traceability	REQ-TA-FUN-202, REQ-TA-FUN-203, REQ-TA-FUN-204, REQ-TA-FUN-205, REQ-TA-FUN-206, REQ-TA-FUN-207, REQ-TA-FUN-209, REQ-TA-FUN-210, REQ-TA-FUN-211, REQ-TA-FUN-212, REQ-TA-FUN-213, REQ-TA-FUN-214, REQ-TA-FUN-216, REQ-TA-FUN-217, REQ-TA-FUN-218, REQ-TA-FUN-219, REQ-TA-FUN-220, REQ-TA-FUN-221, REQ-TA-FUN-403	

6.3.13 Use case: Notify state/status change

Name	Notify state/status change	<<Uses>> Related use
Goal	The SP notifies the SC about the changed state/status of a trouble report.	
Actor and roles	Service customer (SC).	
Assumptions	The service provider maintains the state of the trouble report and the status of the trouble repair activity. If any change of the state/status occurs, the SC will be informed about the change.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification about the change of state/status of a trouble report.	
Step 1	When the SP notifies the SC about the change of state/status of a trouble report, the SP will give some parameters as part of the request (e.g., ID of the trouble report, the new state/status value, etc.).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC receives the changed state/status information of the trouble report.	
Traceability	REQ-TA-FUN-301, REQ-TA-FUN-303, REQ-TA-FUN-308, REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-407	

6.3.14 Use case: Notify modification of trouble report attribute value

Name	Notify modification of trouble report attribute value	<<Uses>> Related use
Goal	The SP modifies one or more parameters associated with a trouble report and notifies the SC.	
Actor and roles	Service customer (SC).	
Assumptions	During the problem resolution progress, the SP may change some parameters of the trouble report. For example, the expected repair time, the information of contact person, etc., may need to be modified to help resolve the problem.	
Preconditions	The state of the trouble report for which parameters are being modified is "open/active". A predefined trouble administration service contract has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification of the modification of trouble report attribute value(s).	
Step 1	When the SP notifies the SC about the modification of trouble report parameters, the SP will give some parameters as part of the notification (e.g., ID of the trouble report, new parameters values, etc.).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC receives the modified parameters values of a trouble report.	
Traceability	REQ-TA-FUN-211, REQ-TA-FUN-212	

6.3.15 Use case: Notify group of trouble reports

Name	Notify group of trouble reports	<<Uses>> Related use
Goal	The SP groups several trouble reports together, e.g., to indicate a common problem, and informs the SC.	
Actor and roles	Service customer (SC).	
Assumptions	In some cases, several created trouble reports may be caused by a common problem. So, once the problem has been resolved, all the related trouble reports can be closed. The SP can initiate a grouping.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined trouble administration service contract has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification of the grouping of several trouble reports.	
Step 1	When the SP sends notification of grouping several trouble reports, the SP will give some information as part of the notification (e.g., ID of the trouble reports that will be grouped).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC receives the group information of trouble reports.	
Traceability	REQ-TA-FUN-208	

6.3.16 Use case: Request authorization for repair activities

Name	Request authorization for repair activities	<<Uses>> Related use
Goal	The SP requests authorization for repair activities which need access to a SC location and to SC equipment.	
Actor and roles	Service customer (SC).	
Assumptions	During the trouble resolution progress, the SP may need access to the customer's location and or access to the customer's equipment, the authorization should be given by the SC.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends a request for authorization for repair activities.	
Step 1	When the SP issues a request for authorization for repair activities, the SP will specify certain parameters as part of the request (e.g., a distinct ID of a trouble report, the access time, the access location, etc.). After receiving the request, the SC returns the authorization result to the SP.	
Ends when	The SC returns the result containing the authorization information to the SP.	
Exceptions	– Invalid trouble report ID. – Missing or incorrect parameter values. – The request originates from an unauthorized source. – A network problem exists.	
Post-conditions	The SP's repair activities are authorized by the SC.	
Traceability	REQ-TA-FUN-405, REQ-TA-FUN-406	

6.3.17 Use case: Request clearance of trouble report

Name	Request clearance of trouble report	<<Uses>> Related use
Goal	The SP requests clearance of a trouble report so that the SC can verify the repair activities.	
Actor and roles	Service customer (SC).	
Assumptions	After the problem has been resolved from the SP's viewpoint, the SP can request clearance of trouble report. The SC may verify the repair activities.	
Preconditions	The trouble has been resolved from the SP's viewpoint. The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends a request for the clearance of a trouble report.	
Step 1	When the SP sends a request for the clearance of a trouble report, the SP will contain certain parameters as part of the notification (e.g., ID).	
Ends when	The SC has received the request.	
Exceptions	None.	
Post-conditions	The SC is informed that a trouble report was cleared by the SP and is awaiting verification.	
Traceability	REQ-TA-FUN-502	

6.3.18 Use case: Notify closure of trouble report

Name	Notify closure of trouble report	<<Uses>> Related use
Goal	The SP closes a trouble report and informs the SC of the closure.	
Actor and roles	Service customer (SC).	
Assumptions	Once a service provider has deemed a trouble report to be cleared and has notified the customer, regardless of whether the customer denies clearance or delays closure verification, then the service provider has the option of closing the trouble report.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification of the closure of a trouble report.	
Step 1	When the SP sends notification of the closure of a trouble report, the SP will contain certain parameters as part of the notification (e.g., ID).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC is informed that a trouble report was closed.	
Traceability	REQ-TA-FUN-504, REQ-TA-FUN-505, REQ-TA-FUN-506	

6.3.19 Use case: Notify deletion of trouble report

Name	Notify deletion of trouble report	<<Uses>> Related use
Goal	The SP notifies the SC of the deletion of some trouble reports.	
Actor and roles	Service customer (SC).	
Assumptions	The SP can maintain the trouble report history for a period of time, and then the SP may need to delete some trouble reports from the history database due to storage limits or other causes.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification of the deletion of some trouble reports.	
Step 1	When the SP sends notification of the deletion of some trouble reports, the SP will contain certain parameters as part of the notification (e.g., ID, ad hoc filter, etc.).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC is informed that some trouble reports have been deleted.	
Traceability	REQ-TA-FUN-507	

6.3.20 Use case: Notify creation of trouble type

Name	Notify creation of trouble type	<<Uses>> Related use
Goal	When the SP is the originator of a trouble type and the trouble type has been created, the SP notifies the creation of the trouble type.	
Actor and roles	Service customer (SC).	
Assumptions	The SP may need a new trouble type due to some causes.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification about the creation of a trouble type.	
Step 1	When the SP sends notification about the creation of a trouble type, the SP will contain certain parameters as part of the notification (e.g., ID, info, code, etc.). The SP or SC may modify the trouble type parameter values at a later time.	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC is informed that the trouble type has been created.	
Traceability	REQ-TA-FUN-212.a	

6.3.21 Use case: Notify deletion of trouble type

Name	Notify deletion of trouble type	<<Uses>> Related use
Goal	The SP notifies the SC of the deletion of a trouble type.	
Actor and roles	Service customer (SC).	
Assumptions	The SP may need to delete some trouble types from the database due to some causes.	
Preconditions	The trouble administration service of the SC is in place and in good condition. A predefined contract about the trouble administration service has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification of the deletion of the trouble type.	
Step 1	When the SP sends notification of the deletion of the trouble type, the SP will contain certain parameters as part of the notification (e.g., ID, ad hoc filter, etc.).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC is informed that the trouble type has been deleted.	
Traceability	REQ-TA-FUN-212.a	

6.3.22 Use case: Notify modification of trouble type attribute value

Name	Notify modification of trouble type attribute value	<<Uses>> Related use
Goal	The SP modifies one or more parameters associated with a trouble type and notifies the SC.	
Actor and roles	Service customer (SC).	
Assumptions	It is assumed that the requested trouble type related trouble report is "closed".	
Preconditions	A predefined trouble administration Service contract has been established and the SP has been preauthorized to perform this function.	
Begins when	The SP sends notification of the modification of trouble type attribute value(s).	
Step 1	When the SP notifies the SC about the modification of trouble type parameters, the SP will give some parameters as part of the notification (e.g., ID of the trouble type, new parameters values, etc.).	
Ends when	The SC receives the notification.	
Exceptions	None.	
Post-conditions	The SC has received the modified parameter values of a trouble type.	
Traceability	REQ-TA-FUN-212.a	

7 Analysis

7.1 Scope

This clause contains the analysis for trouble administration functions for the business-to-business and customer-to-business interfaces in support of NGN. The analysis is provided using the TMN interface specification methodology described in [ITU-T M.3020].

7.2 Use cases

The analysis clause includes the following use cases:

– Request creation of trouble report;
– Get state/status of trouble report;
– Modify trouble report;
– Group trouble reports;
– Retrieve trouble reports information;
– Cancel trouble report;
– Verify repair completion;
– Retrieve trouble report history;
– Request creation of trouble type;
– Retrieve trouble type information;
– Modify trouble type;
– Notify creation of trouble report;
– Notify state/status change;
– Notify modification of trouble report attribute value;
– Request authorization for repair activities;
– Notify group of trouble reports;
– Request clearance of trouble report;
– Notify closure of trouble report;
– Notify deletion of trouble report;
– Notify creation of trouble type;
– Notify deletion of trouble type;
– Notify modification of trouble type attribute value.

7.3 Interface definition

7.3.1 Class diagram representing interfaces

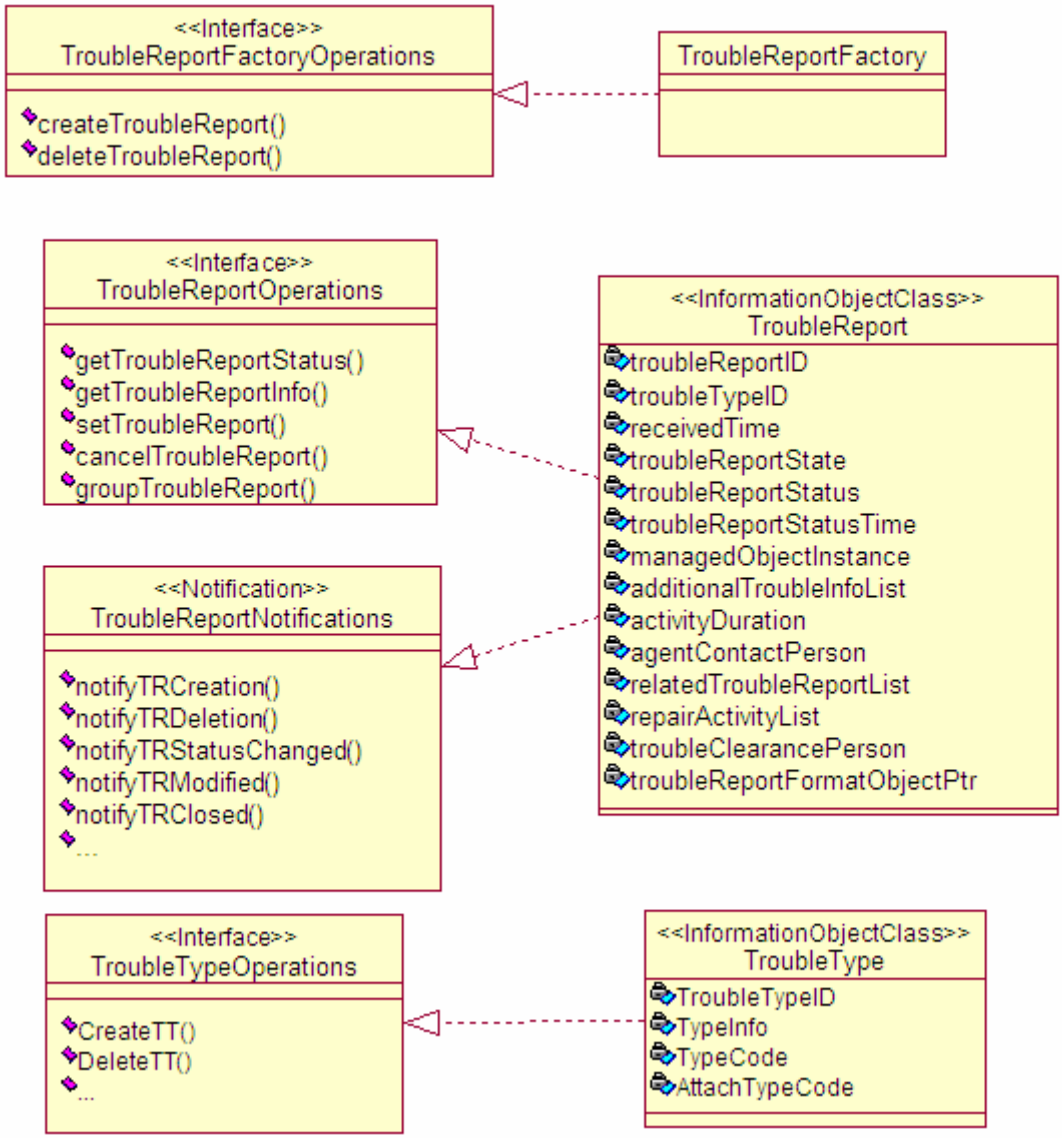

Figure 7-1 – Class diagram representing interfaces

7.3.2 Generic rules

Rule 1	Each operation with at least one input parameter supports a precondition valid_input_parameter which indicates that all input parameters shall be valid with regard to their information type. Additionally, each such operation supports an exception operation_failed_invalid_input_parameter which is raised when precondition valid_input_parameter is false. The exception has the same entry and exit state.
Rule 2	Each operation with at least one optional input parameter supports a set of preconditions supported_optional_input_parameter_xxx where "xxx" is the name of the optional input parameter and the precondition indicates that the operation supports the named optional input parameter. Additionally, each such operation supports an exception operation_failed_unsupported_optional_input_parameter_xxx which is raised when: 1) the precondition supported_optional_input_parameter_xxx is false; and 2) the named optional input parameter is carrying information. The exception has the same entry and exit state.
Rule 3	Each operation shall support a generic exception operation_failed_internal_problem which is raised when an internal problem occurs and the operation cannot be completed. The exception has the same entry and exit state.

7.3.3 TroubleReportFactoryOperations interface

Operation name	Qualifier	Requirement IDs
createTroubleReport	M	REQ-TA-CON-101, REQ-TA-FUN-201, REQ-TA-FUN-202, REQ-TA-FUN-203, REQ-TA-FUN-204, REQ-TA-FUN-205, REQ-TA-FUN-206, REQ-TA-FUN-207, REQ-TA-FUN-209, REQ-TA-FUN-210, REQ-TA-FUN-211, REQ-TA-FUN-212, REQ-TA-FUN-213, REQ-TA-FUN-214, REQ-TA-FUN-215, REQ-TA-FUN-216, REQ-TA-FUN-217, REQ-TA-FUN-218, REQ-TA-FUN-219, REQ-TA-FUN-220, REQ-TA-FUN-221, REQ-TA-FUN-403
deleteTroubleReport	M	REQ-TA-FUN-507

7.3.3.1 createTroubleReport (M)

7.3.3.1.1 Definition

According to the request to create a trouble report, and responding with the result of the operation.

7.3.3.1.2 Sequence diagram

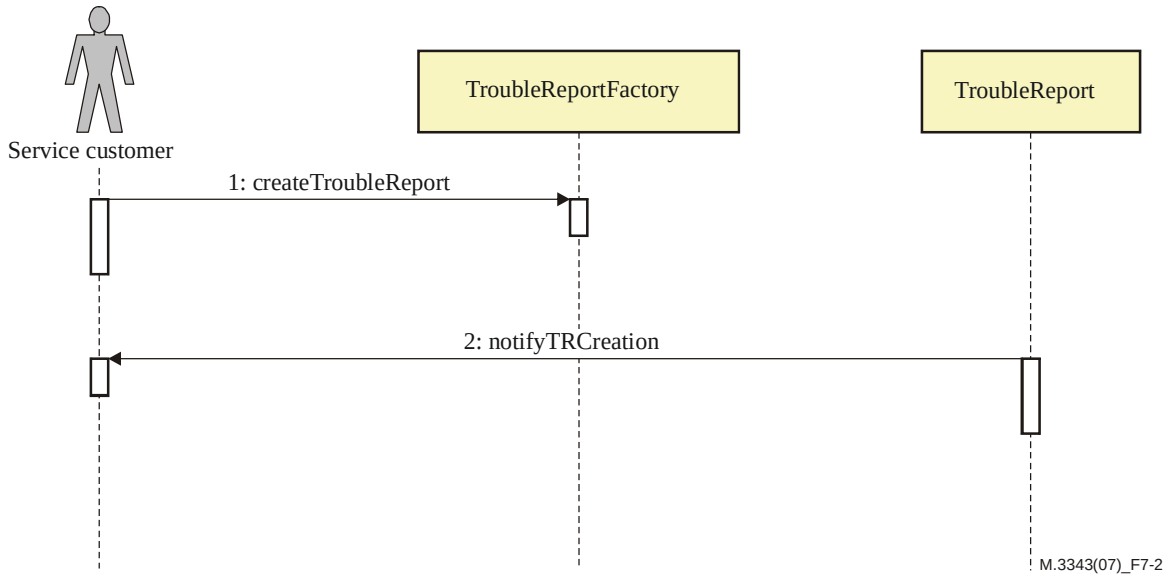

Figure 7-2 – createTroubleReport Sequence diagram

7.3.3.1.3 Input parameters

Parameter name	Qualifier	Information type	Comment
managedObjectInstance	M	ObjectInstance	
troubleType	M	INTEGER	
additionalTroubleInfoList	O	SET OF GraphicString	A minimum of 256 octets should be supported. If Japanese Kanji or Chinese characters are used for this attribute, 256 characters cannot be accommodated
custTroubleTickNum	O	GraphicString (SIZE(0..64))	
troubleReportFormatObjectPtr	O	ObjectInstance	
tspPriority	O	GraphicString (SIZE(2))	
aLocationAccessAddress	O	GraphicString (SIZE(0..256))	
zLocationAccessAddress	O	GraphicString (SIZE(0..256))	
aLocationAccessHours	O	SET OF WeekMask	
zLocationAccessHours	O	SET OF WeekMask	
aLocationAccessPerson	O	PersonReach	
zLocationAccessPerson	O	PersonReach	
alternateManagerContactPerson	O	PersonReach	
alternateManagerContactObjectPtr	O	ObjectInstance	
commitmentTimeRequest	O	GeneralizedTime	
managedObjectAccessHours	O	SET OF WeekMask	

Parameter name	Qualifier	Information type	Comment
managedObjectAccessFromTime	O	GeneralizedTime	
managedObjectAccessToTime	O	GeneralizedTime	
managerContactPerson	O	PersonReach	
managerContactObjectPtr	O	ObjectInstance	
perceivedTroubleSeverity	O	INTEGER	outOfService (0); backInService (1); serviceImpairment (2); nonServiceAffectingTrouble (3)
preferredPriority	O	INTEGER	Undefined (0); minor (1); major (2); serious (3)
troubleDetectionTime	O	GeneralizedTime	

7.3.3.1.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
troubleReportID	M	TroubleReport.troubleReportID	

7.3.3.1.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Request creation of trouble report	6.3.1

7.3.3.1.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Request creation of trouble report	6.3.1

7.3.3.1.7 Exceptions

Exception Name	Definition
operation_failed_already_exist	The trouble report was previously created
operation_failed_mismatched_parameters	Missing or incorrect parameter values
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.3.2 deleteTroubleReport (M)

7.3.3.2.1 Definition

According to the request to delete a closed trouble report.

7.3.3.2.2 Sequence diagram

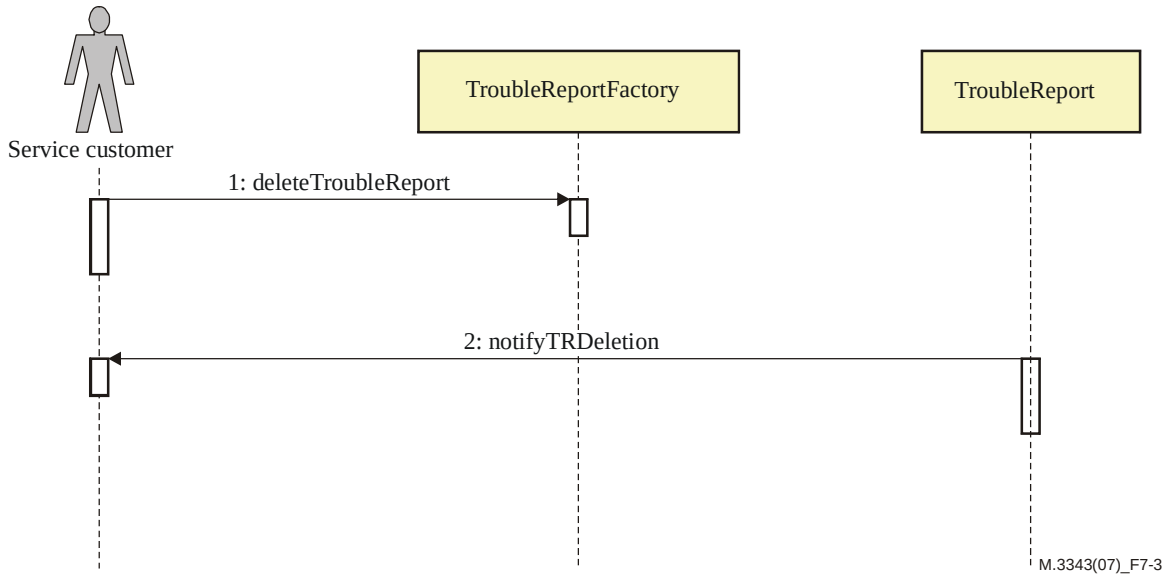

Figure 7-3 – deleteTroubleReport sequence diagram

7.3.3.2.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleReportID	M	GraphicString	The identifier of the trouble report

7.3.3.2.4 Output parameters

Parameter Name	Qualifier	Matching Information	Comment
operationResult	M		Success (0); Fail (1)

7.3.3.2.5 Preconditions

Assertion name	Definition
The state of the trouble report	The state of the trouble report is "closed".

7.3.3.2.6 Post-conditions

Assertion name	Definition
The trouble report record whose identifier is the input troubleReportID	The record has been deleted

7.3.3.2.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleReportID	The troubleReportID is invalid
operation_failed_mismatched_states	Requested trouble report is not "closed"
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.4 TroubleReportOperations interface

Operation name	Qualifier	Requirement IDs
getTroubleReportStatus	M	REQ-TA-FUN-301
getTroubleReportInfo	M	REQ-TA-FUN-306, REQ-TA-FUN-307
setTroubleReport	M	REQ-TA-FUN-302, REQ-TA-FUN-304, REQ-TA-FUN-305, REQ-TA-FUN-308, REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-404, REQ-TA-FUN-405, REQ-TA-FUN-406, REQ-TA-FUN-407
cancelTroubleReport	M	REQ-TA-FUN-501
groupTroubleReport	M	REQ-TA-FUN-208

7.3.4.1 getTroubleReportStatus (M)

7.3.4.1.1 Definition

Query the state/status of a trouble report.

7.3.4.1.2 Sequence diagram

N/A.

7.3.4.1.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleReportID	M	GraphicString	

7.3.4.1.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
troubleReportState	M	TroubleReport.troubleReportState	
troubleReportStatus	M	TroubleReport.troubleReportStatus	

7.3.4.1.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Get state/status of trouble report	6.3.2

7.3.4.1.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Get state/status of trouble report	6.3.2

7.3.4.1.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleReportID	The troubleReportID is invalid
operation_failed_mismatched_parameters	Missing or incorrect parameter values
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.4.2 getTroubleReportInfo (M)

7.3.4.2.1 Definition

Query the complete information of one or several trouble reports.

7.3.4.2.2 Sequence diagram

N/A.

7.3.4.2.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleReportIDList	M	SET OF TroubleReportID	

7.3.4.2.4 Output parameters

Parameter Name	Qualifier	Matching Information	Comment
troubleReportPtrList	M	SET OF TroubleReport ObjectInstance	

7.3.4.2.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Retrieve trouble report information and retrieve trouble report history	6.3.5, 6.3.8

7.3.4.2.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Retrieve trouble report information and retrieve trouble report history	6.3.5, 6.3.8

7.3.4.2.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleReportID	The troubleReportID is invalid
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.4.3 setTroubleReport (M)

7.3.4.3.1 Definition

Modify one or several trouble report attributes.

7.3.4.3.2 Sequence diagram

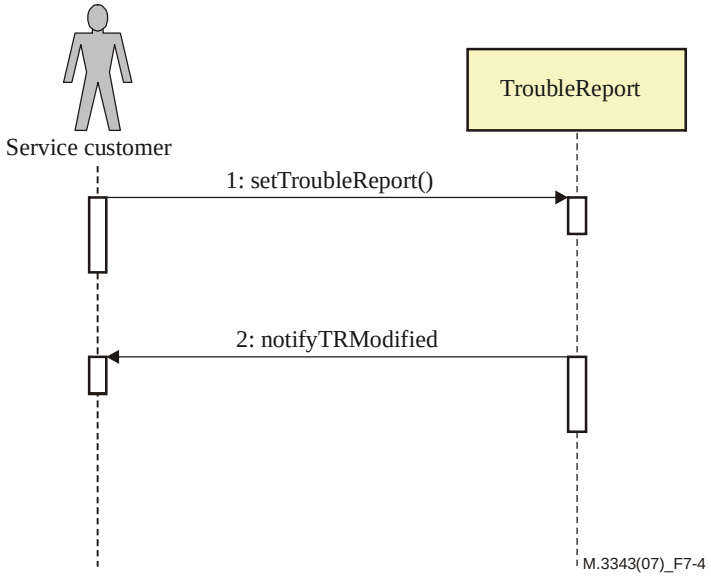

Figure 7-4 – setTroubleReport sequence diagram

7.3.4.3.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleReportID	M	GraphicString	
aLocationAccessAddress	O	GraphicString (SIZE (0..256))	
zLocationAccessAddress	O	GraphicString (SIZE (0..256))	
aLocationAccessHours	O	SET OF WeekMask	
zLocationAccessHours	O	SET OF WeekMask	
aLocationAccessPerson	O	PersonReach	
zLocationAccessPerson	O	PersonReach	
alternateManagerContactPerson	O	PersonReach	
alternateManagerContactObjectPtr	O	ObjectInstance	
commitmentTimeRequest	O	GeneralizedTime	
managedObjectAccessHours	O	SET OF WeekMask	
managedObjectAccessFromTime	O	GeneralizedTime	
managedObjectAccessToTime	O	StopTime	
managerContactPerson	O	PersonReach	
managerContactObjectPtr	O	ObjectInstance	

Parameter name	Qualifier	Information type	Comment
perceivedTroubleSeverity	O	INTEGER	outOfService (0); backInService (1); serviceImpairment (2); nonServiceAffectingTrouble (3)
preferredPriority	O	INTEGER	Undefined (0); minor (1); major (2); serious (3)
troubleDetectionTime	O	GeneralizedTime	

7.3.4.3.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
operationResult	M		Success (0), Fail (1)

7.3.4.3.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Modify trouble report	6.3.3

7.3.4.3.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Modify trouble report	6.3.3

7.3.4.3.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleReportID	Invalid trouble report ID
operation_failed_mismatched_parameters	Missing or incorrect parameter values
operation_failed_mismatched_states	Requested trouble report is not "open/active"
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.4.4 cancelTroubleReport (M)

7.3.4.4.1 Definition

Cancel a created trouble report.

7.3.4.4.2 Sequence diagram

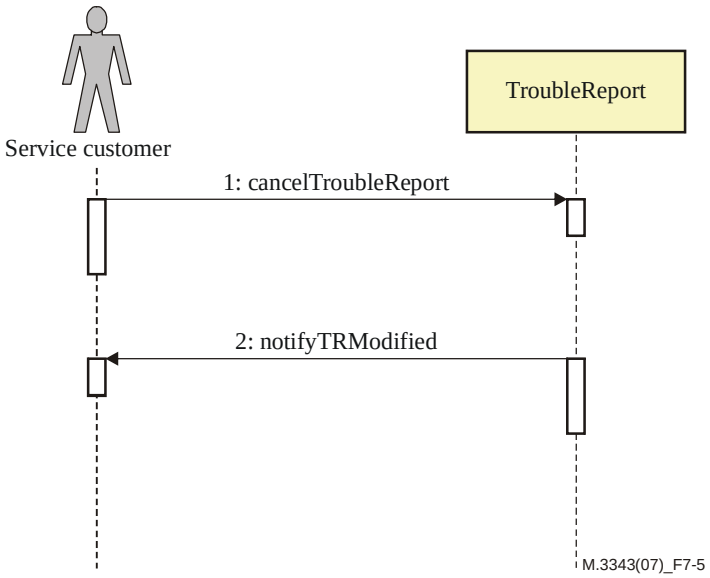

Figure 7-5 – cancelTroubleReport sequence diagram

7.3.4.4.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleReportID	M	GraphicString	

7.3.4.4.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
operationResult	M		Success (0), Fail (1)

7.3.4.4.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Cancel trouble report	6.3.6

7.3.4.4.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Cancel trouble report	6.3.6

7.3.4.4.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleReportID	Invalid trouble report ID
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.4.5 groupTroubleReport (M)

7.3.4.5.1 Definition

To group several trouble reports together, to indicate a common problem.

7.3.4.5.2 Sequence diagram

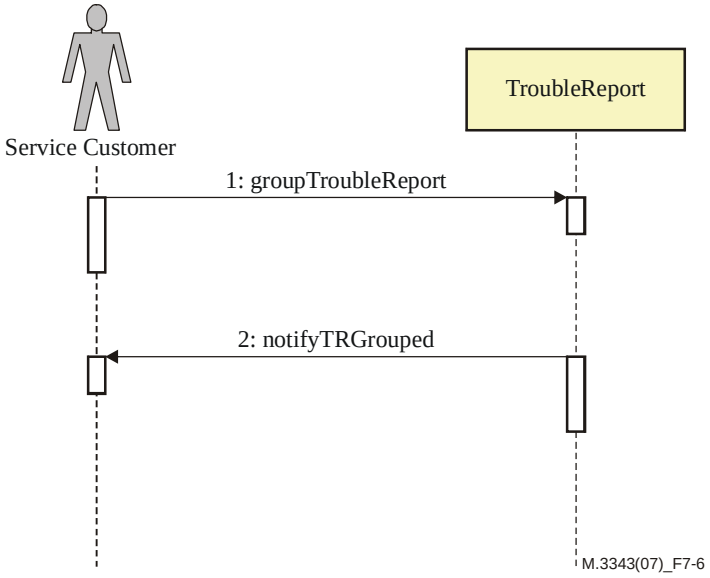

Figure 7-6 – GroupTroubleReport sequence diagram

7.3.4.5.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleReportIDList	M	SET OF troubleReportID	

7.3.4.5.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
operationResult	M		Success (0), Fail (1)

7.3.4.5.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Group trouble reports	6.3.4

7.3.4.5.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Group trouble reports	6.3.4

7.3.4.5.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleReportID	Invalid trouble report ID
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.5 TroubleReportNotifications interface

Notification name	Qualifier	Requirement IDs
notifyTRCreation	M	REQ-TA-FUN-202, REQ-TA-FUN-203
notifyTRDeletion	M	REQ-TA-FUN-507
notifyTRStatusChanged	M	REQ-TA-FUN-303
notifyTRModified	M	REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-403
notifyTRClosed	M	REQ-TA-FUN-503
notifyTRCleared	M	REQ-TA-FUN-504
notifyTRGrouped	M	REQ-TA-FUN-208

7.3.5.1 notifyTRCreation (M)

7.3.5.1.1 Definition

When the trouble report has been created, notifies the creation of the trouble report to the service customer.

7.3.5.1.2 Sequence diagram

N/A.

7.3.5.1.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportID	M	TroubleReport.trouble ReportID	
initiatingMode	M	INTEGER	managerDirect (0); managerIndirect (1); agentOriginated (2); managerIndirectEMail (4); managerIndirectFax (5); managerIndirectPersonal (6); managerIndirectPhone (7).
receivedTime	M	TroubleReport.receivedTime	
additionalTroubleInfoList	O	TroubleReport.additional TroubleInfoList	
agentContactPerson	O	TroubleReport.agentContact Person	
alarmRecordPtrList	O	TelecommunicationsTrouble Report.alarmRecordPtrList	
commitmentTime	O	TelecommunicationsTrouble Report.commitmentTime	
relatedTroubleReportList	O	TroubleReport.relatedTrouble ReportList	

7.3.5.1.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify creation of trouble report	6.3.12

7.3.5.1.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify creation of trouble report	6.3.12

7.3.5.2 notifyTRDeletion (M)

7.3.5.2.1 Definition

When the trouble report has been deleted, notifies the deletion of the trouble report to the service customer.

7.3.5.2.2 Sequence diagram

N/A.

7.3.5.2.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportIDList	M	SET OF TroubleReport.troubleReportID	

7.3.5.2.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify deletion of trouble report	6.3.19

7.3.5.2.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify deletion of trouble report	6.3.19

7.3.5.3 notifyTRStatusChanged (M)

7.3.5.3.1 Definition

The SP notifies the SC about the changed state/status of a trouble report.

7.3.5.3.2 Sequence diagram

N/A.

7.3.5.3.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportID	M	TroubleReport.troubleReportID	
troubleReportState	M	TroubleReport.troubleReportState	
troubleReportStatus	M	TroubleReport.troubleReportStatus	

7.3.5.3.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify state/status change	6.3.13

7.3.5.3.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify state/status change	6.3.13

7.3.5.4 notifyTRModified (M)

7.3.5.4.1 Definition

When the trouble report's attributes have been modified, notifies the modification of the trouble report to the service customer.

7.3.5.4.2 Sequence diagram

N/A.

7.3.5.4.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportID	M	TroubleReport.troubleReportID	
changedTroubleReport	M	TroubleReport ObjectInstance	

7.3.5.4.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify modification of trouble report attribute value	6.3.14

7.3.5.4.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify modification of trouble report attribute value	6.3.14

7.3.5.5 notifyTRClosed (M)

7.3.5.5.1 Definition

When the trouble report has been closed, notifies the closure of the trouble report to the service customer.

7.3.5.5.2 Sequence diagram

N/A.

7.3.5.5.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportID	M	TroubleReport.troubleReportID	

7.3.5.5.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify closure of trouble report	6.3.18

7.3.5.5.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify closure of trouble report	6.3.18

7.3.5.6 requestTRCleared (M)

7.3.5.6.1 Definition

When the trouble report has been cleared, the SP requests the verification of the clearance of the trouble report from the service customer.

7.3.5.6.2 Sequence diagram

N/A.

7.3.5.6.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportID	M	TroubleReport.troubleReportID	

7.3.5.6.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Request clearance of trouble report	6.3.17

7.3.5.6.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Request clearance of trouble report	6.3.17

7.3.5.7 notifyTRGrouped (M)

7.3.5.7.1 Definition

When the trouble reports have been grouped, notifies the grouping of the trouble reports to the service customer.

7.3.5.7.2 Sequence diagram

N/A.

7.3.5.7.3 Input parameters

Parameter name	Qualifiers	Matching information	Comment
troubleReportID	M	TroubleReport.troubleReportID	

7.3.5.7.4 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify group of trouble reports	6.3.15

7.3.5.7.5 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Notify group of trouble reports	6.3.15

7.3.6 TroubleTypeOperations interface

Operation name	Qualifier	Requirement IDs
createTT	M	REQ-TA-FUN-212.a
deleteTT	M	REQ-TA-FUN-212.a
getTTInfo	M	REQ-TA-FUN-212.a
setTTInfo	M	REQ-TA-FUN-212.a

7.3.6.1 createTT (M)

7.3.6.1.1 Definition

According to the request to create a trouble type, and responding with the result of the operation.

7.3.6.1.2 Sequence diagram

N/A.

7.3.6.1.3 Input parameters

Parameter name	Qualifier	Information type	Comment
TypeInfo	M	GraphicString	
TypeCode	M	INTEGER	
AttachTypeCode	O	INTEGER	

7.3.6.1.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
troubleTypeID	M	TroubleType.troubleTypeID	

7.3.6.1.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Request creation of trouble type	6.3.9

7.3.6.1.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Request creation of trouble type	6.3.9

7.3.6.1.7 Exceptions

Exception name	Definition
operation_failed_already_exist	The trouble type was previously created
operation_failed_mismatched_parameters	Missing or incorrect parameter values
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.6.2 deleteTT (M)

7.3.6.2.1 Definition

According to the request to delete a trouble type, and responding with the result of the operation.

7.3.6.2.2 Sequence diagram

N/A.

7.3.6.2.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleTypeID	M	INTEGER	

7.3.6.2.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
operationResult	M		Success (0), Fail (1)

7.3.6.2.5 Preconditions

Assertion name	Definition
Referenced by trouble report	This trouble type is not referenced by any trouble report

7.3.6.2.6 Post-conditions

Assertion name	Definition
The trouble type record whose identifier is the input troubleTypeID	The record has been deleted

7.3.6.2.7 Exceptions

Exception Name	Definition
operation_failed_invalid_troubleTypeID	The troubleTypeID is invalid
operation_failed_mismatched_states	Requested trouble type related trouble report is not "closed"
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.6.3 setTTInfo (M)

7.3.6.3.1 Definition

According to the request to set information of a trouble type, and responding with the result of the operation.

7.3.6.3.2 Sequence diagram

N/A.

7.3.6.3.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleTypeID	M	INTEGER	
TypeInfo	M	GraphicString	
TypeCode	M	INTEGER	
AttachTypeCode	O	INTEGER	

7.3.6.3.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
operationResult	M		Success (0), Fail (1)

7.3.6.3.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Modify trouble type	6.3.11

7.3.6.3.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Modify trouble type	6.3.11

7.3.6.3.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleTypeID	The troubleTypeID is invalid
operation_failed_mismatched_states	Requested trouble type related trouble report is not "closed"
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.3.6.4 getTTInfo (M)

7.3.6.4.1 Definition

According to the request to get information of a trouble type, and responding with the result of the operation.

7.3.6.4.2 Sequence diagram

N/A.

7.3.6.4.3 Input parameters

Parameter name	Qualifier	Information type	Comment
troubleTypeID	M	INTEGER	

7.3.6.4.4 Output parameters

Parameter name	Qualifier	Matching information	Comment
TypeInfo	M	TroubleType.TypeInfo	
TypeCode	M	TroubleType.TypeCode	
AttachTypeCode	O	TroubleType.AttachTypeCode	

7.3.6.4.5 Preconditions

The preconditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Retrieve trouble type information	6.3.10

7.3.6.4.6 Post-conditions

The post-conditions of this operation have been defined in a use case in the requirements specification:

Use case	Reference ID
Retrieve trouble type information	6.3.10

7.3.6.4.7 Exceptions

Exception name	Definition
operation_failed_invalid_troubleTypeID	The troubleTypeID is invalid
operation_failed_unauthorized_user	The request originates from an unauthorized source
operation_failed_network_fault	A network problem exists

7.4 Information object classes

7.4.1 Imported information entities and local labels

Label reference (Note)	Local label
X.721: Information Object Class, LogRecord	LogRecord
X.721: Information Object Class, EventLogRecord	EventLogRecord
X.721: Information Attribute, EventTime	EventTime
CMIP-1: Information Attribute, ObjectInstance	ObjectInstance
CMIP-1: Information Attribute, ObjectClass	ObjectClass
CMIP-1: Information Attribute, AttributeId	AttributeId
CMIP-1: Information Attribute, GraphicString	GraphicString
M.3100: Information Attribute, ObjectList	ObjectList
NOTE – The imported information from [ITU-T X.721] and [ITU-T X.720] will be updated to ITU-T common services Recommendation series when approved.	

7.4.2 Class diagram

7.4.2.1 Classes and relationships

NOTE – The common services reference will be updated when the Recommendations are available.

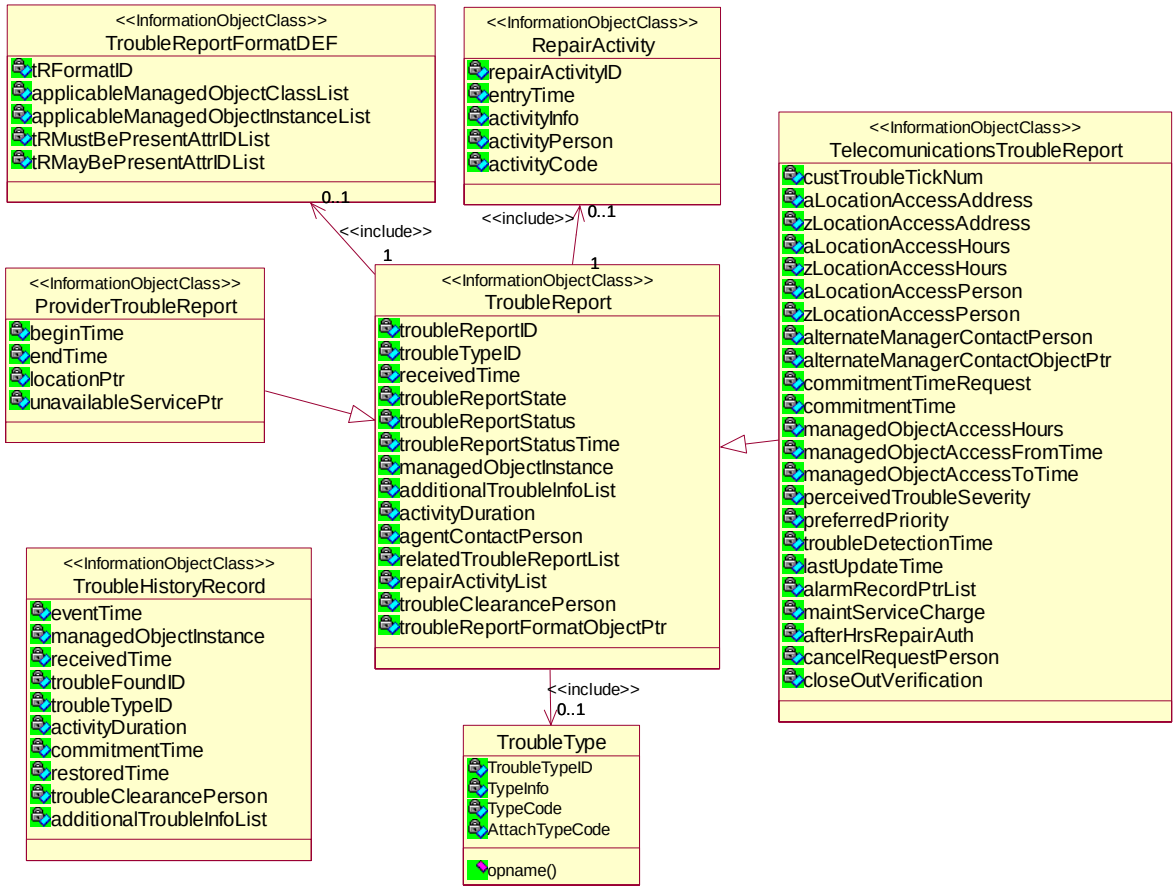

Figure 7-7 – Classes and relationships diagram

7.4.2.2 Inheritance

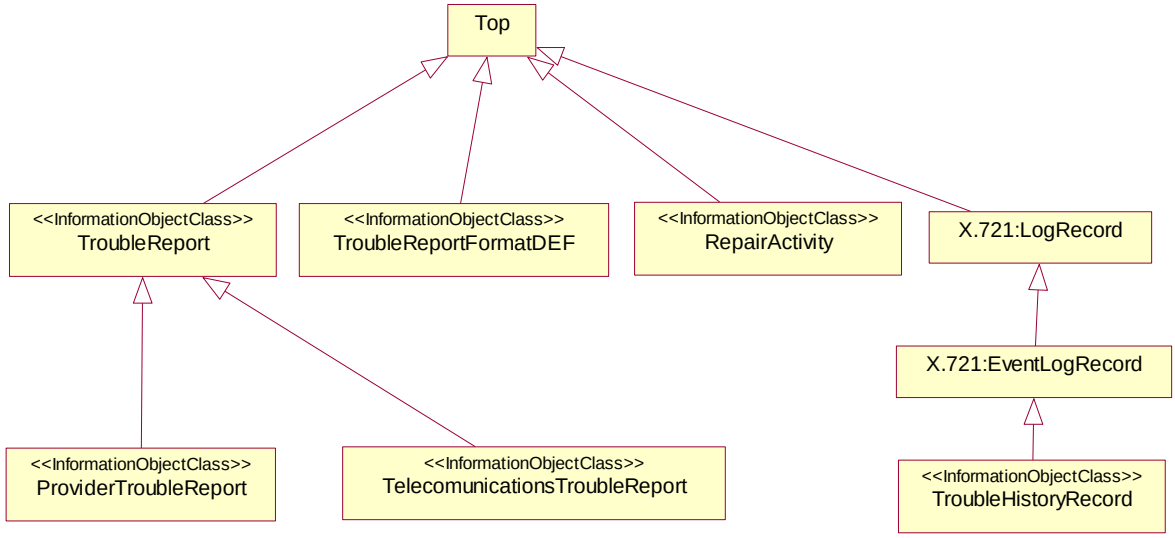

Figure 7-8 – Inheritance diagram

NOTE – The imported information from [ITU-T X.721] will be updated to ITU-T common services Recommendation series when approved.

7.4.3 Information object class definitions

Class name	Qualifier	Requirement IDs
TroubleReport	M	REQ-TA-CON-101, REQ-TA-FUN-201, REQ-TA-FUN-204, REQ-TA-FUN-207, REQ-TA-FUN-208, REQ-TA-FUN-211, REQ-TA-FUN-212, REQ-TA-FUN-215, REQ-TA-FUN-217, REQ-TA-FUN-218, REQ-TA-FUN-301, REQ-TA-FUN-302, REQ-TA-FUN-303, REQ-TA-FUN-304, REQ-TA-FUN-305, REQ-TA-FUN-403, REQ-TA-FUN-503, REQ-TA-FUN-506
ProviderTroubleReport	M	REQ-TA-FUN-203, REQ-TA-FUN-215
TelecommunicationsTroubleReport	M	REQ-TA-FUN-206, REQ-TA-FUN-207, REQ-TA-FUN-208, REQ-TA-FUN-209, REQ-TA-FUN-214, REQ-TA-FUN-216, REQ-TA-FUN-217, REQ-TA-FUN-218 REQ-TA-FUN-219, REQ-TA-FUN-220, REQ-TA-FUN-221, REQ-TA-FUN-304, REQ-TA-FUN-305, REQ-TA-FUN-403, REQ-TA-FUN-405, REQ-TA-FUN-407, REQ-TA-FUN-501, REQ-TA-FUN-503, REQ-TA-FUN-506
TroubleReportFormatDEF	O	
RepairActivity	M	REQ-TA-FUN-305
TroubleHistoryRecord	M	REQ-TA-FUN-601
TroubleType	M	REQ-TA-FUN-212.a

7.4.3.1 TroubleReport

7.4.3.1.1 Definition

The TroubleReport class is the super-class of the ProviderTroubleReport and TelecommunicationsTroubleReport class. The TroubleReport class is not instantiated. It describes the nature of the problem as well as ongoing status.

7.4.3.1.2 Attributes

Attribute name	Visibility	Support qualifier	Access Qualifier	Requirement IDs
troubleReportID	private	M	R-, W-, C+	REQ-TA-FUN-207
troubleTypeID	private	M	R-, W-, C+	REQ-TA-FUN-212
receivedTime	private	M	R-, W-, C+	REQ-TA-FUN-204
troubleReportState	private	M	R-, W-, C+	REQ-TA-FUN-301, REQ-TA-FUN-302, REQ-TA-FUN-303
troubleReportStatus	private	M	R-, W-, C+	REQ-TA-FUN-301, REQ-TA-FUN-302, REQ-TA-FUN-303

Attribute name	Visibility	Support qualifier	Access Qualifier	Requirement IDs
troubleReportStatusTime	private	M	R-, W-, C+	REQ-TA-FUN-304
managedObjectInstance	private	M	R-, W-, C+	REQ-TA-CON-101
additionalTroubleInfoList	private	O	R-, W-, C+	REQ-TA-FUN-211, REQ-TA-FUN-215
activityDuration	private	O	R-, W-, C-	REQ-TA-FUN-305, REQ-TA-FUN-403, REQ-TA-FUN-506
agentContactPerson	private	O	R-, W-, C	REQ-TA-FUN-217
relatedTroubleReportList	private	O	R-, W-, C-	REQ-TA-FUN-208, REQ-TA-FUN-218
repairActivityList	private	O	R-, W-, C-	REQ-TA-FUN-305
troubleClearancePerson	private	O	R-, W-, C-	REQ-TA-FUN-503
troubleReportFormatObjectPtr	private	O	R-, W-, C	
troubleRelaventSLAEventList	private	C	R-, W-, C	

Attribute name		Type	Description
troubleReportID		GraphicString	The identifier of the trouble report
troubleTypeID		INTEGER	Indicates the type of the trouble report
receivedTime		GeneralizedTime	Indicates when the trouble report was received
troubleReportState		INTEGER	Indicates the state of the trouble report
troubleReportStatus		INTEGER	Indicates the status of the trouble report
troubleReportStatusTime		GeneralizedTime	Indicates the status time of the trouble report
managedObjectInstance		ObjectInstance	Indicates the resource or service in trouble
additionalTroubleInfoList		SET OF GraphicString	Indicates additional trouble information
activityDuration		TimeInterval	Indicates the duration of the repair activities
agentContactPerson		PersonReach	Indicates the contact person of agent
relatedTroubleReportList		SET OF ObjectInstance	Indicates the related trouble reports
repairActivityList		SET OF ObjectInstance	The list of the repair activities
troubleClearancePerson		PersonReach	Indicates the person who cleared the trouble
troubleReportFormatObjectPtr		ObjectInstance	Indicates the format of the trouble report
troubleRelaventSLAEventList [a)]		SET OF ObjectInstance	Indicates the related SLA violation events
[a)] SLA event is the event related to the service level agreed by service providers and customers.			

7.4.3.1.3 Attribute constraints

N/A.

7.4.3.1.4 Relationships

Relationship	Requirement IDs
TRToFormatDEF	
TRToRA	REQ-TA-FUN-305
TRToPTR	REQ-TA-FUN-203
TRToTTR	REQ-TA-FUN-202
TRToTT	REQ-TA-FUN-212.a

7.4.3.1.5 State diagram

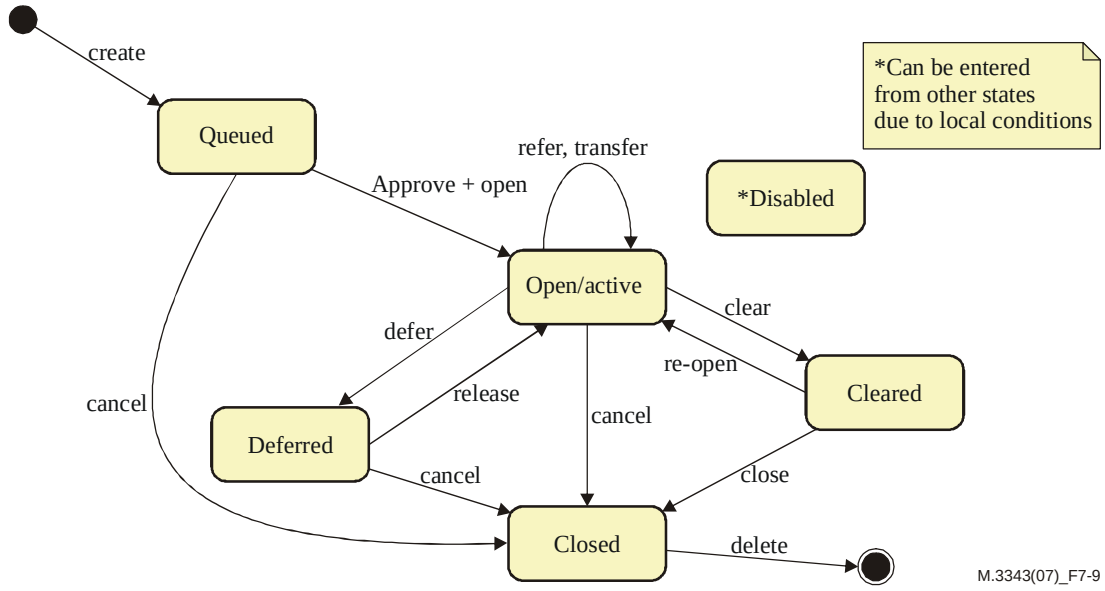

Figure 7-9 – TroubleReport class state diagram

NOTE – The actions/events listed on the transitions in Figure 7-9 are meant to be informative at a high level. Use cases should be consulted for detailed actions/events and should be considered to be normative text for detail operations.

The following table lists the high level states, qualifiers, and detail description. All of the states may be sub-stated dependent upon the business process adopted by either the service customer or the service provider.

State	Mandatory (M)/ Optional (O)/ Conditional (C)	Description
Queued	O	A trouble report is in a queued state when it has been instantiated but the trouble resolution process has not yet been initiated. A trouble report which is in the queued state may be cancelled by the customer. The service provider, on receiving such a request, will attempt to close the trouble report.

State	Mandatory (M)/ Optional (O)/ Conditional (C)	Description
Open/active	M	The trouble report becomes "open/active" when the trouble report resolution process is initiated. An "open/active" trouble report may be "referred" to another hand-off person, or "transferred" to another responsible person for further processing. The state however remains unchanged as "open/active". A trouble report in the open/active state may be cancelled by the customer. The service provider, on receiving such a request, will close the trouble report.
Deferred	O	This state indicates that action to resolve the trouble has been postponed. This can occur when the faulty resource is inaccessible for a period and activity to repair cannot proceed. A deferred telecommunications trouble report may become "open/active" again, or may move directly to the "closed" state if it is cancelled for some reason. A trouble report in the deferred state may be cancelled by the customer. The service provider, on receiving such a request, will close the trouble report.
Cleared	M	A trouble report is moved by the SP to the "cleared" state when it determines that the trouble has been resolved. If the customer needs to verify that the trouble has been resolved, verification may optionally be awaited by the service provider prior to closure of the trouble report.
Closed	M	This state indicates that the trouble resolution process is complete. Upon closure, the trouble report information is captured as a historical event generated at trouble report closure, which may then be stored in a log of trouble history records for future reference. The trouble report may then be eliminated or maintained for a period of time according to business agreements.
Disabled	O	A "disabled" value is exhibited when a trouble report's information cannot be updated due to local conditions on the service provider side. In the "disabled" condition, only read operations may be performed.
NOTE – All of the states may be sub-stated dependent upon the business process adopted by either the service customer or the service provider.		

7.4.3.1.6 Notifications

Name	Qualifier	Requirement IDs	Notes
notifyTRCreation	M	REQ-TA-FUN-202, REQ-TA-FUN-203	
notifyTRDeletion	M	REQ-TA-FUN-507	
notifyTRStatusChanged	M	REQ-TA-FUN-303	
notifyTRModified	M	REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-403	
notifyTRClosed	M	REQ-TA-FUN-503	

Name	Qualifier	Requirement IDs	Notes
notifyTRCleared	M	REQ-TA-FUN-504	
notifyTRGrouped	M	REQ-TA-FUN-208	

7.4.3.1.7 Operations

Name	Qualifier	Requirement IDs	Notes
getTroubleReportStatus	M	REQ-TA-FUN-301	
getTroubleReportInfo	M	REQ-TA-FUN-306, REQ-TA-FUN-307	
setTroubleReport	M	REQ-TA-FUN-302, REQ-TA-FUN-304, REQ-TA-FUN-305, REQ-TA-FUN-308, REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-404, REQ-TA-FUN-405, REQ-TA-FUN-406, REQ-TA-FUN-407	
cancelTroubleReport	M	REQ-TA-FUN-501	
groupTroubleReport	M	REQ-TA-FUN-208	

7.4.3.2 ProviderTroubleReport

7.4.3.2.1 Definition

The ProviderTroubleReport class is inherited from the TroubleReport class. It is created by the SP's (role) OSF to notify the SC's (role) OSF that planned maintenance will be carried out at a given time and that all or parts of the services, resources, network or system will be inaccessible during that time.

7.4.3.2.2 Attributes

Attribute name	Visibility	Support qualifier	Access qualifier	Requirement IDs
beginTime	private	M	R-, W-, C+	REQ-TA-FUN-203
endTime	private	M	R-, W-, C+	REQ-TA-FUN-203
locationPtr	private	M	R-, W-, C+	REQ-TA-FUN-215
unavailableServicePtr	private	M	R-, W-, C+	REQ-TA-FUN-203

Attribute name		Type	Description
beginTime		GeneralizedTime	Indicates the beginning of the time-frame when the service will be unavailable
endTime		GeneralizedTime	Indicates the end of the time-frame for which the service will be unavailable
locationPtr		ObjectInstance	Indicates the location of the managed object instance against which the trouble report is created
unavailableServicePtr		ObjectInstance	Indicates which service is affected

7.4.3.2.3 Attribute constraints

N/A.

7.4.3.2.4 Relationships

Relationship	Requirement IDs
TRToPTR	REQ-TA-FUN-203

7.4.3.2.5 State diagram

N/A.

7.4.3.2.6 Notifications

Name	Qualifier	Requirement IDs	Notes
notifyTRCreation	M	REQ-TA-FUN-203	
notifyTRDeletion	M	REQ-TA-FUN-507	
notifyTRClosed	M	REQ-TA-FUN-503	
notifyTRCleared	M	REQ-TA-FUN-504	

7.4.3.2.7 Operations

Name	Qualifier	Requirement IDs	Notes
getTroubleReportStatus	M	REQ-TA-FUN-301	
getTroubleReportInfo	M	REQ-TA-FUN-306, REQ-TA-FUN-307	
setTroubleReport	M	REQ-TA-FUN-302, REQ-TA-FUN-304, REQ-TA-FUN-305, REQ-TA-FUN-308, REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-404, REQ-TA-FUN-405, REQ-TA-FUN-406, REQ-TA-FUN-407	

7.4.3.3 TelecommunicationsTroubleReport

7.4.3.3.1 Definition

The TelecommunicationsTroubleReport class is inherited from the TroubleReport class. It represents reported troubles on the NGN service stratum or transport stratum. Instances of this class describe the nature of the problem as well as ongoing status.

7.4.3.3.2 Attributes

Attribute name	Visibility	Support qualifier	Access qualifier	Requirement IDs
custTroubleTickNum	private	O	R-, W-, C	REQ-TA-FUN-207
aLocationAccessAddress	private	O	R-, W-, C	REQ-TA-FUN-215
zLocationAccessAddress	private	O	R-, W-, C	REQ-TA-FUN-215
aLocationAccessHours	private	O	R-, W-, C	REQ-TA-FUN-220, REQ-TA-FUN-405
zLocationAccessHours	private	O	R-, W-, C	REQ-TA-FUN-220, REQ-TA-FUN-405
aLocationAccessPerson	private	O	R-, W-, C	REQ-TA-FUN-217
zLocationAccessPerson	private	O	R-, W-, C	REQ-TA-FUN-217
alternateManagerContactPerson	private	O	R-, W-, C	REQ-TA-FUN-217
alternateManagerContactObjectPtr	private	O	R-, W-, C	REQ-TA-FUN-217
commitmentTimeRequest	private	O	R-, W-, C	REQ-TA-FUN-219
commitmentTime	private	O	R-, W-, C	REQ-TA-FUN-219
managedObjectAccessHours	private	O	R-, W-, C	REQ-TA-FUN-221
managedObjectAccessFromTime	private	O	R-, W-, C	REQ-TA-FUN-221
managedObjectAccessToTime	private	O	R-, W-, C	REQ-TA-FUN-221
perceivedTroubleSeverity	private	O	R-, W-, C	REQ-TA-FUN-214
preferredPriority	private	O	R-, W-, C	REQ-TA-FUN-216
troubleDetectionTime	private	M	R-, W-, C+	REQ-TA-FUN-206
lastUpdateTime	private	M	R-, W-, C-	REQ-TA-FUN-304
alarmRecordPtrList	private	O	R-, W-, C-	REQ-TA-FUN-209
maintServiceCharge	private	O	R-, W-, C	REQ-TA-FUN-305, REQ-TA-FUN-407
afterHrsRepairAuth	private	O	R-, W-, C-	REQ-TA-FUN-405
cancelRequestPerson	private	O	R-, W-, C-	REQ-TA-FUN-501
closeOutVerification	private	O	R-, W-, C-	REQ-TA-FUN-503

Attribute name		Type	Description
custTroubleTickNum		GraphicString (SIZE(0..64))	The trouble ticket ID in the customer's system
aLocationAccessAddress		GraphicString (SIZE(0..256))	The address of the aLocation
zLocationAccessAddress		GraphicString (SIZE(0..256))	The address of the zLocation
aLocationAccessHours		SET OF WeekMask	When the aLocation can be access
zLocationAccessHours		SET OF WeekMask	When the zLocation can be access
aLocationAccessPerson		PersonReach	The person who arranges access to the aLocation
zLocationAccessPerson		PersonReach	The person who arranges access to the zLocation
alternateManagerContactPerson		PersonReach	The alternate contact person of the customer
alternateManagerContactObjectPtr		ObjectInstance	The contact information for the alternate contact person of the customer
commitmentTimeRequest		GeneralizedTime	Indicates the customer's requested repair time commitment
commitmentTime		GeneralizedTime	Indicates the service provider's repair time commitment
managedObjectAccessHours		SET OF WeekMask	When the managed object can be accessed
managedObjectAccessFromTime		GeneralizedTime	From when the managed object can be accessed
managedObjectAccessToTime		GeneralizedTime	To when the managed object can be accessed
perceivedTroubleSeverity		INTEGER	Indicates the severity of the perceived trouble
preferredPriority		INTEGER	Indicates the preferred priority
troubleDetectionTime		GeneralizedTime	Indicates when the trouble was detected
lastUpdateTime		GeneralizedTime	Indicates when the trouble report was last updated
relatedTroubleReportList		SET OF ObjectInstance	Indicates the related trouble reports
alarmRecordPtrList		SET OF ObjectInstance	Indicates the related alarm records
maintServiceCharge		BOOLEAN	Indicates if the maintenance activity requires charges
activityDuration		TimeInterval	Indicates the duration of the repair activities
repairActivityList		SET OF ObjectInstance	The list of the repair activities
afterHrsRepairAuth		BOOLEAN	The authorization of repair after permitted time

Attribute name		Type	Description
cancelRequestPerson		PersonReach	Indicates the person who raised the cancellation request
closeOutVerification		BOOLEAN	The verification state of whether the trouble report has been closed out
troubleClearancePerson		PersonReach	Indicates the person who cleared the trouble

7.4.3.3.3 Attribute constraints

N/A.

7.4.3.3.4 Relationships

Relationship	Requirement IDs
TRToTTR	REQ-TA-FUN-202

7.4.3.3.5 State diagram

N/A.

7.4.3.3.6 Notifications

Name	Qualifier	Requirement IDs	Notes
notifyTRCreation	M	REQ-TA-FUN-202, REQ-TA-FUN-203	
notifyTRDeletion	M	REQ-TA-FUN-507	
notifyTRStatusChanged	M	REQ-TA-FUN-303	
notifyTRModified	M	REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-403	
notifyTRClosed	M	REQ-TA-FUN-503	
notifyTRCleared	M	REQ-TA-FUN-504	
notifyTRGrouped	M	REQ-TA-FUN-208	

7.4.3.3.7 Operations

Name	Qualifier	Requirement IDs	Notes
getTroubleReportStatus	M	REQ-TA-FUN-301	
getTroubleReportInfo	M	REQ-TA-FUN-306, REQ-TA-FUN-307	
setTroubleReport	M	REQ-TA-FUN-302, REQ-TA-FUN-304, REQ-TA-FUN-305, REQ-TA-FUN-308, REQ-TA-FUN-401, REQ-TA-FUN-402, REQ-TA-FUN-404, REQ-TA-FUN-405, REQ-TA-FUN-406, REQ-TA-FUN-407	
cancelTroubleReport	M	REQ-TA-FUN-501	
groupTroubleReport	M	REQ-TA-FUN-208	

7.4.3.4 TroubleReportFormatDEF

7.4.3.4.1 Definition

The TroubleReportFormatDEF class gives the service provider a flexible scheme that allows definition of trouble report formats. It also provides the flexibility to dynamically specify trouble report formats for a service/resource object on an object class basis or on an object instance basis. A trouble report format definition contains a selected list of attribute identifiers from the attributes in conditional packages of the trouble report object class or its sub-classes.

7.4.3.4.2 Attributes

Attribute name	Visibility	Support qualifier	Access qualifier	Requirement IDs
tRFormatID	private	M	R-, W-, C+	
applicableManagedObjectClassList	private	O	R-, W-, C	
applicableManagedObjectInstanceList	private	O	R-, W-, C	
tRMustBePresentAttrIDList	private	M	R-, W-, C+	
tRMayBePresentAttrIDList	private	M	R-, W-, C+	

Attribute name		Type	Description
tRFormatID		INTEGER	The trouble report format identifier
applicableManagedObjectClassList		SET OF ObjectClass	Indicates the managed objects to which this format is applicable
applicableManagedObjectInstanceList		SET OF ObjectInstance	Indicates the managed object instances to which this format is applicable
tRMustBePresentAttrIDList		SET OF AttributeId	Indicates which attributes must be present in this format
tRMayBePresentAttrIDList		SET OF AttributeId	Indicates which attributes may be present in this format

7.4.3.4.3 Attribute constraints

N/A.

7.4.3.4.4 Relationships

Relationship	Requirement IDs
TRToFormatDEF	

7.4.3.4.5 State diagram

N/A.

7.4.3.4.6 Notifications

Name	Qualifier	Requirement IDs	Notes
notifyTRFDCreation	M		
notifyTRFDDeletion	M		
notifyTRFDValueChanged	M		

7.4.3.4.7 Operations

Name	Qualifier	Requirement IDs	Notes
createTRFD	M		
deleteTRFD	M		
getTRFDInfo	M		
setTroubleReport	M		

7.4.3.5 RepairActivity

7.4.3.5.1 Definition

The RepairActivity class contains parameters and text describing the specific repair functions performed, who performed them and when they were performed. For each repair activity performed in conjunction with resolving a problem related to a trouble report, a RepairActivity object is created.

7.4.3.5.2 Attributes

Attribute name	Visibility	Support qualifier	Access qualifier	Requirement IDs
repairActivityID	private	M	R-, W-, C+	REQ-TA-FUN-305
entryTime	private	M	R-, W-, C	REQ-TA-FUN-305
activityInfo	private	O	R-, W-, C	REQ-TA-FUN-305
activityPerson	private	O	R-, W-, C	REQ-TA-FUN-305
activityCode	private	O	R-, W-, C	REQ-TA-FUN-305

Attribute name		Type	Description
repairActivityID		INTEGER	The identifier of the repair activity
entryTime		GeneralizedTime	Indicates when the activity was started
activityInfo		GraphicString	The information of the repair activity
activityPerson		PersonReach	Indicates the person who performed this repair activity
activityCode		INTEGER	The code of the repair activity

7.4.3.5.3 Attribute constraints

N/A.

7.4.3.5.4 Relationships

Relationship	Requirement IDs
TRToRA	REQ-TA-FUN-305

7.4.3.5.5 State diagram

N/A.

7.4.3.5.6 Notifications

Name	Qualifier	Requirement IDs	Notes
notifyRACreation	M	REQ-TA-FUN-305	

7.4.3.5.7 Operations

Name	Qualifier	Requirement IDs	Notes
createRA	M	REQ-TA-FUN-305	
deleteRA	M	REQ-TA-FUN-305	
getRAInfo	M	REQ-TA-FUN-305	
setRA	M	REQ-TA-FUN-305	

7.4.3.6 TroubleHistoryRecord

7.4.3.6.1 Definition

The TroubleHistoryRecord class is inherited from the logRecord class in [ITU-T X.721] and is used to log the trouble history event notifications from the trouble report object and its sub-classes. The

TroubleHistoryRecord object is a repository for selected information from a trouble report object and its sub-classes. Instantiated sub-classes of the trouble report object generate a trouble history event notification with trouble history information whenever the trouble report status attribute value changes to a final closed-out value. The attributes in the trouble history event notification may be a subset of the attributes present in the trouble report object.

7.4.3.6.2 Attributes

Attribute name	Visibility	Support qualifier	Access qualifier	Requirement IDs
eventTime	private	M	R-, W-, C+	REQ-TA-FUN-601
managedObjectInstance	private	M	R-, W-, C+	REQ-TA-FUN-601
receivedTime	private	M	R-, W-, C+	REQ-TA-FUN-601
troubleFoundID	private	M	R-, W-, C+	REQ-TA-FUN-601
troubleTypeID	private	O	R-, W-, C	REQ-TA-FUN-601
activityDuration	private	O	R-, W-, C	REQ-TA-FUN-601
commitmentTime	private	O	R-, W-, C	REQ-TA-FUN-601
restoredTime	private	O	R-, W-, C	REQ-TA-FUN-601
troubleClearancePerson	private	O	R-, W-, C	REQ-TA-FUN-601
additionalTroubleInfoList	private	O	R-, W-, C	REQ-TA-FUN-601

Attribute name		Type	Description
eventTime		GeneralizedTime	Indicates the time of the event
managedObjectInstance		ObjectInstance	Indicates the instance of the managed object
receivedTime		GeneralizedTime	Indicates when the trouble report was received
troubleFoundID		INTEGER	Indicates which trouble was found
troubleTypeID		INTEGER	Indicates the type of the trouble report
activityDuration		TimeInterval	Indicates the duration of the repair activities
commitmentTime		GeneralizedTime	Indicates the service provider commitment repair time
restoredTime		GeneralizedTime	Indicates the actual repair time
troubleClearancePerson		PersonReach	Indicates the person who cleared the trouble
additionalTroubleInfoList		SET OF GraphicString	Indicates additional trouble information

7.4.3.6.3 Attribute constraints

N/A.

7.4.3.6.4 Relationships

N/A.

7.4.3.6.5 State diagram

N/A.

7.4.3.6.6 Notifications

Name	Qualifier	Requirement IDs	Notes
notifyRACreation	M	REQ-TA-FUN-305	

7.4.3.6.7 Operations

Name	Qualifier	Requirement IDs	Notes
createRA	M	REQ-TA-FUN-305	
deleteRA	M	REQ-TA-FUN-305	
getRAInfo	M	REQ-TA-FUN-305	
setRA	M	REQ-TA-FUN-305	

7.4.3.7 TroubleType

7.4.3.7.1 Definition

The TroubleType class contains parameters and text of the description or category of the trouble that was detected. The trouble type can be configurable and extensible, either by the service provider or by the service customer, to support NGN services.

7.4.3.7.2 Attributes

Attribute name	Visibility	Support qualifier	Access qualifier	Requirement IDs
TroubleTypeID	private	M	R-, W-, C+	REQ-TA-FUN-212.a
TypeInfo	private	O	R-, W-, C	REQ-TA-FUN-212.a
TypeCode	private	O	R-, W-, C	REQ-TA-FUN-212.a
AttachTypeCode	private	O	R-, W-, C	REQ-TA-FUN-212.a

Attribute name		Type	Description
TroubleTypeID		INTEGER	The identifier of the trouble type
TypeInfo		GraphicString	The information of the trouble type
TypeCode		INTEGER	The code of the trouble type
AttachTypeCode		INTEGER	Attached type code which may be included to aid compilation of course-grained statistics

7.4.3.7.3 Attribute constraints

N/A.

7.4.3.7.4 Relationships

Relationship	Requirement IDs
TRToTT	REQ-TA-FUN-203

7.4.3.7.5 State diagram

N/A.

7.4.3.7.6 Notifications

N/A.

7.4.3.7.7 Operations

Name	Qualifier	Requirement IDs	Notes
createTT	M	REQ-TA-FUN-212.a	
deleteTT	M	REQ-TA-FUN-212.a	
getTTInfo	M	REQ-TA-FUN-212.a	
setTTInfo	M	REQ-TA-FUN-212.a	

7.4.4 Information relationship definitions

Relationship	Support qualifier	Requirement IDs
TRToFormatDEF	O	
TRToRA	M	REQ-TA-FUN-305
TRToPTR	M	REQ-TA-FUN-203
TRToTTR	M	REQ-TA-FUN-202

7.4.4.1 TRToFormatDEF (O)

7.4.4.1.1 Definition

This represents the relationship between TroubleReport and TroubleReportFormatDEF.

7.4.4.1.2 Roles

Name	Definition
TR	Represents the TroubleReport
FormatDEF	Represents the TroubleReportFormatDEF

7.4.4.1.3 Constraints

Name	Definition
Quantity constraint	One trouble report can only use one trouble report format definition

7.4.4.2 TRToRA (M)

7.4.4.2.1 Definition

This represents the relationship between TroubleReport and RepairActivity.

7.4.4.2.2 Roles

Name	Definition
TR	Represents the TroubleReport
RA	Represents the RepairActivity

7.4.4.2.3 Constraints

Name	Definition
Quantity constraint	One trouble report can include one or several repair activity object(s)

7.4.4.3 TRToPTR (M)

7.4.4.3.1 Definition

This represents the relationship between TroubleReport and ProviderTroubleReport.

7.4.4.3.2 Roles

Name	Definition
TR	Represents the TroubleReport
PTR	Represents the ProviderTroubleReport

7.4.4.3.3 Constraints

N/A.

7.4.4.4 TRToTTR (M)

7.4.4.4.1 Definition

This represents the relationship between TroubleReport and TelecommunicationsTroubleReport.

7.4.4.4.2 Roles

Name	Definition
TR	Represents the TroubleReport
TTR	Represents the TelecommunicationsTroubleReport

7.4.4.4.3 Constraints

N/A.

7.4.5 Information attribute definitions

7.4.5.1 Definition and legal values

Attribute name	Definition	Legal values
ActivityCode	Indicates the code of the activity	approved (0), assign (1), cancel (2), clear (3), close (4), defer (5), dispatch (6), refer (7), release (8), re-open (9), repair (10), test (11), transfer (12)
ActivityType	Indicates the type of the activity	after-hours-repair (0), standby (1), after-hours-standby (2), test (3), manager-initiated-test (4), dispatch (5), no-access (6), delayed-maintenance (7), release (8)
ChangeDeniedReason	Indicates the reason for denying change to the trouble report	waitingVerificationOfClosure (1), troubleReportAlreadyClosed (2), activityAuthorizationPending (3)
CloseOutVerification	The verification state of whether the trouble report has been closed out	noAction (0), verified (1), denied (2), deniedActivityDurationDisputed (3), deniedCloseOutNarrDisputed (4)
InitiatingMode	Indicates the initial mode of the trouble report	managerDirect (0), managerIndirect (1), agentOriginated (2), managerIndirectEMail (4), managerIndirectFax (5), managerIndirectPersonal (6), managerIndirectPhone (7)
PerceivedTroubleSeverity	Indicates the severity of the trouble being perceived	outOfService (0), backInService (1), serviceImpairment (2), nonServiceAffectingTrouble (3)
PreferredPriority	Indicates the preferred priority	undefined (0), minor (1), major (2), serious (3)
TroubleFound	Indicates which trouble was found	pending 0), cameClear (1), centralOffice (2), switchTrouble (3), customerProvidedEquipment (4), facility (5), centralOfficeFacility (6), iCfacility (7), interexchangeCarrier (8), information (9), nonplanClassified (10), nonplanClassifiedIC (11), nonplanClassifiedEA (12), noTroubleFound (13), station (14), stationProductData (15), stationProductTerminal (16), stationProductVideo (17), stationProductVoice (18), stationWiring (19),

Attribute name	Definition	Legal values
TroubleFound (continued)	Indicates which trouble was found	otherStationEquipment (20), foundOKStation (21), servingBureau (22), testOK (23), publicServicesCoinSet (24), customerOperatingInstructions (25), testedOKVerifiedOK (26), coFacilityTestedFoundOK (27), outsideFacilityTestedFoundOK (28), referredOutToOtherDept (29), protectiveConnectingArrang (30), cpeCustomerResponsibility (31), preService (32), preServiceIC (33), preServiceEA (34), serviceNode (35), data (36), customerReferredToVendor (37), exchangeAccess (38), international (39), otherProvidedAccess (40), existingReport (41), cancelExclude (42), paBX (43), outsideWire (44), outsideTerminals (45), outsidePlantEquipment (46), outsidePlantFiberOptic (47), ousidePlantOther (48), coEquipmentOther (49), coEquipmentFrames (50), coConcentrator (51), receiverOffHook (52), cpeAuthorized (53), cpeTelcoMaintained (54), independentCompany (55), cpeCalledNumber (56), assigningProvisioning (57), interServiceCenter (58), referredOut (59), network (60)
TroubleReportState	Indicates the state of the trouble report	queued (0), openActive (1), deferred (2), cleared (3), closed (4), disabled (5)
TroubleReportStatus	Indicates the status of the trouble report	screening (1), testing (2), dispatchedIn (3), dispatchedOut (4), preassignedOut (5), bulkDispatchedOut (6), startRepair (7), pendingTest (8), pendingDispatch (9), requestRepair (10), referMtceCenter (11), referVendor (12), noAccessOther (13), startNoAccess (14), stopNoAccess (15), startDelayedMtce (16), stopDelayedMtce (17), troubleEscalated (18), craftDispatched (19),

Attribute name	Definition	Legal values
TroubleReportStatus (continued)	Indicates the status of the trouble report	temporaryOK (20), cableFailure (21), originatingEquipFailure (22), backOrder (23), clearedCustNotAdvised (24), clearedCustAdvised (25), clearedAwaitingCustVerification (26), closedOut (27), closedOutByCustReq (28), closedOutCustVerified (29), closedOutCustDenied (30), canceledPendingWorkInProgress (31), canceledPendingTestCompletion (32), canceledPendingDispatchCompl (33), techOnSite (34), techLeftSite (35)
TroubleType (Note)	Indicates the type of the trouble report	See Appendix I.
NOTE – The definition of trouble types to support all NGN services is for further study.		

7.4.5.2 Constraints

N/A.

Appendix I

ITU-T example of trouble type

(This appendix does not form an integral part of this Recommendation)

I.1 Trouble type

The following table gives an example set of trouble TypeInfo and TypeCode; service providers can extend and configure the trouble type based on this set through an extensible and configurable mechanism. The providers can negotiate their pair-wise agreement on trouble type and the implementation mechanism during the supplier/partner relationship management process.

NOTE – Classification of trouble type into service stratum and transport stratum is for further study.

Trouble TypeInfo	TypeCode
noDialToneGroup	(100)
noDialTone	(101)
slowDialTone	(102)
circuitDead	(103)
canNotCallOutGroup	(200)
canNotCallOut	(201)
canNotBreakDialTone	(203)
dialToneAfterDialing	(204)
highAndDry	(205)
canNotRaise	(206)
allAccessBusy	(207)
canNotCallOut2	(208)
canNotCallLongDistance	(209)
canNotCallOverseas	(210)
speedCall	(211)
canNotBeCalledGroup	(300)
canNotBeCalled	(301)
canNotBeCalledBusy	(302)
doNotGetCalled	(303)
canNotTripRing	(304)
falseRings	(305)
doNotAnswer	(306)
reachRecording	(307)
canNotRaiseAStation	(308)
canNotRaiseADrop	(309)
canNotRaiseACircuitLocation	(310)
ringNoAnswer	(311)
reorder	(312)
alwaysBusy	(313)

Trouble TypeInfo	TypeCode
bellDoesNotRing	(314)
bellDoesNotRing2	(315)
bellRingsCanNotAnswer	(316)
bellRingsAfterAnswer	(317)
noRingNoAnswer	(318)
otherRingTrouble	(319)
receivesCallsForWrongNumber	(320)
recordingOnLine	(321)
canNotBeHeardGroup	(400)
canNotBeHeard	(401)
canNotHear	(402)
fading	(403)
distant	(404)
reachedWrongNumberGroup	(500)
wrongNumber	(501)
circuitOperationGroup	(600)
open	(601)
falseDisconnect	(602)
grounded	(603)
canNotBeSignalled	(604)
canNotSignal	(605)
permanentSignal	(606)
improperSupervision	(607)
supervision	(608)
canNotMeet	(609)
canNotReleaseCircuit	(610)
hungUp	(611)
noWinkStart	(612)
noSF	(613)

Trouble TypeInfo	TypeCode
lowSF	(614)
noContinuity	(615)
cutCable	(616)
openToDEMARC	(617)
noRingGenerator	(618)
badERL	(619)
echo	(620)
hollow	(621)
circuitDead	(622)
circuitDown	(623)
failingCircuit	(624)
noSignal	(625)
seizureOnCircuit	(626)
lossEPSCSorSwitchedServices	(627)
monitorCircuit	(628)
newServiceNotWorking	(629)
openEPSCSorSwitchedServices	(630)
otherVoiceDescribeAdditInfo	(631)
cutOffsGroup	(700)
cutsOff	(701)
noiseProblemGroup	(800)
intermittentNoise	(801)
noisy	(802)
foreignTone	(803)
clipping	(804)
crossTalk	(805)
staticOnLine	(806)
groundHum	(807)
hearsOtherOnLine	(808)
humOnLine	(809)
clicking	(810)
noiseEPSCSorSwitchedServices	(811)
levelTroublesGroup	(900)
lowLevels	(901)
highLevels	(902)
longLevels	(903)
hotLevels	(904)
highEndRollOff	(905)
lowEndRollOff	(906)
needsEqualized	(907)
lineLoss	(908)

Trouble TypeInfo	TypeCode
doesNotPassFreqResponse	(909)
miscellaneousTroubleGroup	(1000)
hiCapDown	(1001)
carrierDown	(1002)
biPolarViolations	(1003)
frameErrorsHiCap	(1004)
outOfFrame	(1005)
lossOfSync	(1006)
frameSlips	(1007)
noLoopback	(1008)
canNotLoopbackDEMARC	(1009)
recordingOnCircuit	(1010)
linesNeedTagging	(1011)
outwatsRingingin	(1012)
remoteAccess	(1013)
other	(1014)
alarm	(1015)
memoryServiceProblemGroup	(1100)
dataTroubleGroup	(1200)
canNotReceiveData	(1201)
canNotSendData	(1202)
canNotTransmitCanNotReceive	(1203)
noReceive	(1204)
noResponse	(1205)
delay	(1206)
impulseNoise	(1207)
phaseJitter	(1208)
harmonicDistortion	(1209)
highDistortion	(1210)
noDataLoopback	(1211)
noCarrier	(1212)
notPolling	(1213)
dataFramingErrors	(1214)
dropOuts	(1215)
hits	(1216)
noAnswerBack	(1217)
streamer	(1218)
outOfSpecification	(1219)
canNotRunToCSU	(1220)
canNotRunToOSU	(1221)
deadDataCircuit	(1222)

Trouble TypeInfo	TypeCode
circuitInLoopback	(1223)
errors	(1224)
garbledData	(1225)
invalidData	(1226)
crossModulation	(1227)
slowResponse	(1228)
otherDataDescribeAdditInfo	(1229)
gettingAllOnes	(1230)
slip	(1231)
stationTroubleGroup	(1300)
voiceEquipment	(1301)
dataEquipment	(1302)
videoEquipment	(1303)
otherEquipment	(1304)
stationWiring	(1305)
physicalTroubleGroup	(1400)
lightBurnedOut	(1401)
dataset	(1402)
ttySet	(1403)
highSpeedPrinter	(1404)
aNI	(1405)
aLI	(1406)
canNotActivatePC	(1407)
modem	(1408)
cathodeRayTube	(1409)
looseJack	(1410)
offHook	(1411)
physicalProblem	(1412)
processorDead	(1413)
wiringProblem	(1414)
wireBrokeSetBrokePoleDown	(1415)
noRegister	(1416)
stuckSender	(1417)
otherStationTrouble	(1418)
otherCaseGroup	(1500)
callTransferProblem	(1501)
callWaitingProblem	(1502)
customCallFeatureDoNotWork	(1503)
information	(1504)
threeWayCallingProblem	(1505)
orderWork	(1506)

Trouble TypeInfo	TypeCode
releaseCktRequestedByIC	(1507)
releaseCktRequestedByEC	(1508)
releaseFacilityRequestedByIC	(1509)
releaseFacilityRequestedByEC	(1510)
requestForRoutine	(1511)
release	(1512)
requestDispatch	(1513)
requestMonitorOfCircuit	(1514)
routineTestFailure	(1515)
lostTimerReport	(1516)
historicalReports	(1517)
switchOrTrunkRelated	(1518)
testAssist	(1519)

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