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Technical Specification

3rd Generation Partnership Project;

Technical Specification Group Services and System Aspects;

Telecommunication management;

Trace Management

Integration Reference Point (IRP);

Solution Set (SS) definitions

(Release 16)

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# Foreword

This Technical Specification has been produced by the 3rd Generation Partnership Project (3GPP).

The contents of the present document are subject to continuing work within the TSG and may change following formal TSG approval. Should the TSG modify the contents of the present document, it will be re-released by the TSG with an identifying change of release date and an increase in version number as follows:

Version x.y.z

where:

x the first digit:

1 presented to TSG for information;

2 presented to TSG for approval;

3 or greater indicates TSG approved document under change control.

y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.

z the third digit is incremented when editorial only changes have been incorporated in the document.

# Introduction

The present document is part of a TS-family covering the 3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; as identified below:

32.441 "Trace Management Integration Reference Point (IRP): Requirements".

32.442 "Trace Management Integration Reference Point (IRP): Information Service (IS)".

**32.446 "Trace Management Integration Reference Point (IRP): Solution Set (SS) definitions".**

The present document is part of a TS-family which describes the information service necessary for the Telecommunication Management (TM) of 3G systems. The TM principles and TM architecture are specified in 3GPP TS 32.101 [2] and 3GPP TS 32.102 [3].

Trace provides very detailed information on call level for a specific subscriber or MS. This data is an additional information source to Performance Measurements and allows deeper investigations in problems solving or in case of optimization.

# 1 Scope

The present document specifies the Solution Set definitions for the IRP whose semantics are specified in Trace Management IRP: Information Service (3GPP TS 32.442 [5]). This specification is applicable to UMTS networks and EPS networks. GSM Trace is outside of the scope of this specification.

The conditions for supporting Network Sharing are stated in 3GPP TS 32.441 [6].

This Solution Set specification is related to 3GPP TS 32.442 V14. 0.X [6].

# 2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non‑specific.

- For a specific reference, subsequent revisions do not apply.

- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 32.101: "Telecommunication management; Principles and high level requirements".

[3] 3GPP TS 32.102: "Telecommunication management; Architecture".

[4] 3GPP TS 32.150: "Telecommunication management; Integration Reference Point (IRP) Concept and definitions".

[5] 3GPP TS 32.442: "Telecommunication management; Trace Management Integration Reference Point (IRP): Information Service (IS)".

[6] void.

[7] 3GPP TS 32.311: "Telecommunication management; Generic Integration Reference Point (IRP): Requirements".

[8] void.

[9] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[10] 3GPP TS 32.306: "Telecommunication management; Configuration Management (CM); Notification Integration Reference Point (IRP): Solution Set definitions"

[11]  void.

[12] OMG TC Document telecom/98-11-01: "OMG Notification Service". <http://www.omg.org/technology/documents/>

[13] 3GPP TS 32.342: "Telecommunication management; File Transfer (FT) Integration Reference Point (IRP): Information Service (IS)".

[14] W3C REC-xml-20001006: "Extensible Markup Language (XML) 1.0 (Second Edition)".

[15] W3C REC-xmlschema-0-20010502: "XML Schema Part 0: Primer".

[16] W3C REC-xmlschema-1-20010502: "XML Schema Part 1: Structures".

[17] W3C REC-xmlschema-2-20010502: "XML Schema Part 2: Datatypes".

[18] void.

[19] void.

[20] void.

[21] W3C SOAP 1.1 specification (<http://www.w3.org/TR/2000/NOTE-SOAP-20000508/>)

[22] W3C XPath 1.0 specification (<http://www.w3.org/TR/1999/REC-xpath-19991116>)

[23] W3C WSDL 1.1 specification (<http://www.w3.org/TR/2001/NOTE-wsdl-20010315>)

[24] W3C SOAP 1.2 specification (<http://www.w3.org/TR/soap12-part1/>)

# 3 Definitions and abbreviations

## 3.1 Definitions

For the purposes of the present document, the terms and definitions given in TR 21.905 [1], 3GPP TS 32.101 [2], 3GPP TS 32.102 [3], 3GPP TS 32.150 [4] apply. A term defined in the present document takes precedence over the definition of the same term, if any, in TR 21.905 [1].

**IRP document version number string (or "IRPVersion"):** See 3GPP TS 32.311 [7].

**IRP:** See 3GPP TS 32.101 [2].

**IRPAgent:** See 3GPP TS 32.102 [3].

**IRPManager:** See 3GPP TS 32.102 [3].

**XML file:** file containing an XML document

**XML document:** composed of the succession of an optional XML declaration followed by a root XML element, see [14].

**XML declaration:** it specifies the version of XML being used, see [14].

**XML element:** has a type, is identified by a name, may have a set of XML attribute specifications and is either composed of the succession of an XML start-tag followed by the XML content of the XML element followed by an XML end-tag, or composed simply of an XML empty-element tag; each XML element may contain other XML elements, see [14].

**empty XML element:** having an empty XML content; an empty XML element still possibly has a set of XML attribute specifications; an empty XML element is either composed of the succession of an XML start-tag directly followed by an XML end-tag, or composed simply of an XML empty-element tag, see [14].

**XML content (of an XML element):** empty if the XML element is simply composed of an XML empty-element tag; otherwise the part, possibly empty, of the XML element between its XML start-tag and its XML end-tag, see [14].

**XML start-tag:** the beginning of a non-empty XML element is marked by an XML start-tag containing the name and the set of XML attribute specifications of the XML element, see [14].

**XML end-tag:** the end of a non-empty XML element is marked by an XML end-tag containing the name of the XML element, see [14].

**XML empty-element tag:** composed simply of an empty-element tag containing the name and the set of XML attribute specifications of the XML element, see [14].

**XML attribute specification:** has a name and a value, see [14].

**DTD:** defines structure and content constraints to be respected by an XML document to be valid with regard to this DTD, see [14].

**XML schema:** more powerful than a DTD, an XML schema defines structure and content constraints to be respected by an XML document to conform with this XML schema; through the use of XML namespaces several XML schemas can be used together by a single XML document; an XML schema is itself also an XML document that shall conform with the XML schema for XML schemas, see [15], [16] and [17].

**XML namespace:** enables qualifying element and attribute names used in XML documents by associating them with namespaces identified by different XML schemas, see [15], [16] and [17].

**XML complex type:** defined in an XML schema; cannot be directly used in an XML document; can be the concrete type or the derivation base type for an XML element type or for another XML complex type; ultimately defines constraints for an XML element on its XML attribute specifications and/or its XML content, see [15], [16] and [17].

**XML element type:** declared by an XML schema; can be directly used in an XML document; as the concrete type of an XML element, directly or indirectly defines constraints on its XML attribute specifications and/or its XML content; can also be the concrete type or the derivation base type for another XML element type, see [15], [16] and [17].

## 3.2 Abbreviations

For the purposes of the present document, the abbreviations given in TR 21.905 [1], in 3GPP TS 32.101 [2], 3GPP TS 32.102 [3], 3GPP TS 32.150 [4], and the following apply. An abbreviation defined in the present document takes precedence over the definition of the same abbreviation, if any, in TR 21.905 [1].

CM Configuration Management

CORBA Common Object Request Broker Architecture

DN Distinguished Name

EM Element Manager

IDL Interface Definition Language

IRP Integration Reference Point

Itf-N Interface N

IS Information Service

MDT Minimization of Drive Tests

MOC Managed Object Class

NE Network Element

OMG Object Management Group

RLF Radio Link Failure

SS Solution Set

TS Technical Specification

# 4 Solution Set definitions

This specification defines the following 3GPP Trace Management IRP Solution Set definitions:

Annex A provides the CORBA Solution Set.  
Annex B provides the XML definitions.  
Annex C provides the SOAP Solution Set.

Annex A (normative):  
CORBA Solution Set

This annex contains the CORBA Solution Set for the IRP whose semantics is specified in Trace Management IRP: Information Service (3GPP TS 32.442 [5]).

# A.1 Architectural features

The overall architectural feature of Trace Management IRP is specified in 3GPP TS 32.442 [5].

## A.1.1 Syntax for Distinguished Names

The format of a Distinguished Name is defined in 3GPP TS 32.300 [9].

The version of this IRP is represented as a string (see also clause 3 for versions).

## A.1.2 Notification Services

Notifications are sent according to the Notification IRP: CORBA SS (see 3GPP TS 32.306 [10]).

The contents of the TraceIRP notifications are defined in the present document.

## A.1.3 Push and Pull Style

OMG Notification Service defines two styles of interaction. One is called push style. In this style, IRPAgent pushes notifications to IRPManager as soon as they are available. The other is called pull style. In this style, IRPAgent keeps the notifications till IRPManager requests for them.

This CORBA SS specifies that support of Push style is Mandatory (M) and that support of Pull style is Optional (O).

## A.1.4 Support multiple notifications in one push operation

For efficiency reasons, IRPAgent may send multiple notifications using one single push operation. To pack multiple notifications into one push operation, IRPAgent may wait and not invoke the push operation as soon as notifications are available. To avoid IRPAgent to wait for an extended period of time that is objectionable to IRPManager, IRPAgent shall implement an IRPAgent wide timer configurable by administrator. On expiration of this timer, IRPAgent shall invoke push if there is at least one notification to be conveyed to IRPManager. This timer is re-started after each push invocation.

## A.1.5 Trace Management Notification Interface

OMG CORBA Notification push operation is used to realise the notification of TraceIRP Notifications. All the notifications in this interface are implemented using this push\_structured\_event method.

### A.1.5.1 Method push (M)

module CosNotifyComm {

…

Interface SequencePushConsumer : NotifyPublish {

void push\_structured\_events(

in CosNotification::EventBatch notifications)

raises( CosEventComm::Disconnected);

…

}; // SequencePushConsumer

…

}; // CosNotifyComm

NOTE 1: The push\_structured\_events method takes an input parameter of type EventBatch as defined in the OMG CosNotification module (OMG Notification Service [12]). This data type is the same as a sequence of Structured Events. Upon invocation, this parameter will contain a sequence of Structured Events being delivered to IRPManager by IRPAgent to which it is connected.

NOTE 2: The maximum number of events that will be transmitted within a single invocation of this operation is controlled by IRPAgent wide configuration parameter.

NOTE 3: The amount of time the supplier (IRPAgent) of a sequence of Structured Events will accumulate individual events into the sequence before invoking this operation is controlled by IRPAgent wide configuration parameter as well.

NOTE 4: IRPAgent may push EventBatch with only one Structured Event..

# A.2 Mapping

## A.2.1 Operation and Notification mapping

TraceIRP: IS 3GPP TS 32.442 [5] defines semantics of operation and notification visible across the TraceIRP.   
Table A.2.1 indicates mapping of these operations and notifications to their equivalents defined in this SS.

Table A.2.1: Mapping from IS Operations and Notification to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operations/ notification 3GPP TS 32.442 [5] | SS Method | Qualifier |
| activateTraceJob | activate\_trace\_job | M |
| deactivateTraceJob | deactivate\_trace\_job | M |
| listTraceJob | list\_trace\_job | M |
| listActivatedTraceJob | list\_activated\_trace\_job | M |
| notifyTraceRecordingSessionFailure | push\_structured\_events(See subclause A.1.5.1) | O |
| notifyTraceSessionLocalActivation | push\_structured\_events (See subclause A.1.5.1) | O |

## A.2.2 Operation parameter mapping

The TraceIRP: IS 3GPP TS 32.442 [5] defines semantics of parameters carried in operations across the TraceIRP. The following tables indicate the mapping of these parameters, as per operation, to their equivalents defined in this SS.

Table A.2.2.1: Mapping from IS activateTraceJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| iocInstance | KernelCmConstDefs::DN moInstance | M |
| listOfInterfaces | TraceIRPConstDefs::ListOfInterfaces list\_of\_interfaces | O |
| listOfNeTypes | TraceIRPConstDefs::ListOfNeTypes list\_of\_ne\_types | CM |
| traceDepth | TraceIRPConstDefs::TraceDepth trace\_depth | M |
| traceReference | TraceIRPConstDefs::TraceReference trace\_reference | M |
| traceTarget | TraceIRPConstDefs::TraceTarget trace\_target | M |
| triggeringEvent | TraceIRPConstDefs:: TriggeringEvent triggering\_event | CO |
| traceCollectionEntityAddress | TraceIRPConstDefs::TraceCollectionEntityAddress trace\_collection\_entity\_address | CM |
| jobType | TraceIRPConstDefs:: JobType job\_type | M |
| areaScope | TraceIRPConstDefs::DNSet | CM |
| listOfMeasurements | TraceIRPConstDefs:: ListOf Measurements list\_of\_measurements | CM |
| reportingTrigger | TraceIRPConstDefs::ReportingTrigger reporting\_trigger | CM |
| reportInterval | TraceIRPConstDefs::ReportInterval report\_interval | CM |
| reportAmount | TraceIRPConstDefs::ReportAmount report\_amount | CM |
| eventThreshold | TraceIRPConstDefs::EventThreshold event\_threshold | CM |
| loggingInterval | TraceIRPConstDefs::LoggingInterval logging\_interval | CM |
| loggingDuration | TraceIRPConstDefs::LoggingDuration logging\_duration | CM |
| anonymizationOfMDTData | TraceIRPConstDefs: AnonymizationOfMDTData anonymization\_Of\_MDT\_Data | CM |
| measurementQuantity | TraceIRPConstDefs::MeasurementQuantity measurement\_quantity | CM |
| measurementPeirodLTE | TraceIRPConstDefs: MeasurementPeriodLTE measurement\_period\_lte | CM |
| measurementPeirodUMTS | TraceIRPConstDefs: MeasurementPeriodUMTS measurement\_period\_ umts | CM |
| collectionPeriodRrmUmts | TraceIRPConstDefs: CollectionPeriodRrmUmts collection\_period\_rrm\_umts | CM |
| collectionPeriodRrmLte | TraceIRPConstDefs: CollectionPeriodRrmLte collection\_period\_rrm\_lte | CM |
| positioningMethod | TraceIRPConstDefs: PositioningMethod positioning\_method | CO |
| unsupportedList | TraceIRPConstDefs: UnsupportedList unsupportedList | M |
| status | Return value of type TraceIRPConstDefs::Result  Exception:  ActivateTraceJob, InvalidTraceDepth, InvalidTraceTarget, NotUniqueTraceReference  ManagedGenericIRPSystem::InvalidParameter, ManagedGenericIRPSystem::ParameterNotSupported | M |
| pLMNTarget | TraceIRPConstDefs: PLMNTarget pLMN\_target | CM |
| mBSFNAreaList | TraceIRPConstDefs: MBSFNAreaList mBSFN\_AreaList | CM |

Table A.2.2.2: Mapping from IS deactivateTraceJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| traceReference | TraceIRPConstDefs:: TraceReference trace\_reference | M |
| traceTarget | TraceIRPConstDefs::TraceTarget trace\_target | M |
| status | Return value of type TraceIRPConstDefs::Result  Exception:  DeactivateTraceJob, NotUniqueTraceReference | M |
| traceRecordingSessionReference | TraceIRPConstDefs::TraceRecordingSessionReference trace\_recording\_session\_reference | CM |

Table A.2.2.3: Mapping from IS listTraceJob parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| traceReference | TraceIRPConstDefs::TraceReference trace\_reference | M |
| status | Return value of type TraceIRPConstDefs::Result  Exception:  ListTraceJob, NotUniqueTraceReference | M |
| iocInstance | KernelCmConstDefs::DN moInstance | M |
| listOfInterfaces | TraceIRPConstDefs::ListOfInterfaces list\_of\_interfaces | O |
| traceDepth | TraceIRPConstDefs::TraceDepth trace\_depth | M |
| traceRecordingSessionReference | TraceIRPConstDefs::TraceRecordingSessionReference trace\_recording\_session\_reference | CM |
| traceTarget | TraceIRPConstDefs::TraceTarget trace\_target | M |
| jobType | TraceIRPConstDefs::JobType job\_type | M |
| areaScope | TraceIRPConstDefs::DNSet | CM |
| listOfMeasurements | TraceIRPConstDefs:: ListOf Measurements list\_of\_measurements | CM |
| reportingTrigger | TraceIRPConstDefs::ReportingTrigger reporting\_trigger | CM |
| reportInterval | TraceIRPConstDefs::ReportInterval report\_interval | CM |
| reportAmount | TraceIRPConstDefs::ReportAmount report\_amount | CM |
| eventThreshold | TraceIRPConstDefs::EventThreshold event\_threshold | CM |
| loggingInterval | TraceIRPConstDefs::LoggingInterval logging\_interval | CM |
| loggingDuration | TraceIRPConstDefs::LoggingDuration logging\_duration | CM |
| triggeringEvent | TraceIRPConstDefs::TriggeringEvent triggering\_event | O |
| traceCollectionEntityAddress | TraceIRPConstDefs::TraceCollectionEntityAddress trace\_collection\_entity\_address | CM |
| anonymizationOfMDTData | TraceIRPConstDefs: AnonymizationOfMDTData anonymization\_Of\_MDT\_Data | CM |
| measurementQuantity | TraceIRPConstDefs::MeasurementQuantity measurement\_quantity | CM |
| measurementPeirodLTE | TraceIRPConstDefs: MeasurementPeriodLTE measurement\_period\_lte | CM |
| measurementPeirodUMTS | TraceIRPConstDefs: MeasurementPeriodUMTS measurement\_period\_ umts | CM |
| collectionPeriodRrmUmts | TraceIRPConstDefs: CollectionPeriodRrmUmts collection\_period\_rrm\_umts | CM |
| collectionPeriodRrmLte | TraceIRPConstDefs: CollectionPeriodRrmLte collection\_period\_rrm\_lte | CM |
| positioningMethod | TraceIRPConstDefs: PositioningMethod positioning\_method | CO |
| pLMNTarget | TraceIRPConstDefs: PLMNTarget pLMN\_target | CM |
| mBSFNAreaList | TraceIRPConstDefs: MBSFNAreaList mBSFN\_AreaList | CM |

Table A.2.2.4: Mapping from IS listActivatedTraceJobs parameters to SS equivalents

| IS Operation parameter | SS Method parameter | Qualifier |
| --- | --- | --- |
| traceReferenceList | TraceMIRPConstDefs::TraceReferenceList trace\_reference\_list | M |
| status | Return value of type TraceIRPConstDefs::Result | M |

## A.2.3 Notification parameter mapping

The TraceIRP: IS 3GPP TS 32.442 [5] defines semantics of parameters carried in notifications. The following table indicates the mapping of these parameters to their OMG CORBA Structured Event (defined in OMG Notification Service [12]) equivalents. The composition of OMG Structured Event, as defined in the OMG Notification Service [12], is:

Header

Fixed Header

domain\_name

type\_name

event\_name

Variable Header

Body

filterable\_body\_fields

remaining\_body

The following tables list all OMG Structured Event attributes in the second column. The first column identifies the TraceIRP: IS 3GPP TS 32.442 [5] defined notification parameters.

Table A.2.3.1: Mapping for notifyTraceRecordingSessionFailure

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyTraceRecordingSessionFailure". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| notificationId | One NV pair of remaining\_body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| traceRecordingSessionReference | One NV pair of remaining\_body | O | Name of NV pair is the TRACE\_RECORDING\_SESSION\_REFERENCE of TraceIRPNotifications::notifyTraceRecordingSessionFailure.  Value of NV pair is TraceRecordingSessionReference of module TraceIRPConstDefs. |
| traceReference | One NV pair of filterable\_body\_fields | M | Name of NV pair is the TRACE\_REFERENCE of TraceIRPNotifications::notifyTraceRecordingSessionFailure.  Value of NV pair is TraceReference of module TraceIRPConstDefs. |
| reason | One NV pair of remaining\_body | O | Name of NV pair is the REASON of  traceIRPNotifications:: notifyTraceRecordingSessionFailure.  Value of NV pair is a string. |

Table A.2.3.2: Mapping for notifyTraceSessionLocalActivation

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyThresholdMonitorObjectCreation". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| notificationId | One NV pair of remaining body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| traceReference | One NV pair of filterable\_body\_fields | M | Name of NV pair is the TRACE\_REFERENCE of module TraceIRPNotifications::notifyTraceSessionLocalActivation.  Value of NV pair is TraceReference of module TraceIRPConstDefs. |
| traceTarget | One NV pair of filterable\_body\_fields | M | Name of NV pair is the TRACE\_TARGET of module TraceIRPNotifications::notifyTraceSessionLocalActivation.  Value of NV pair is TraceTarget of module TraceIRPConstDefs. |
| iOCInstance | One NV pair of filterable\_body\_fields | M | Name of NV pair is the IOC\_INSTANCE of module TraceIRPNotifications::notifyTraceSessionLocalActivation.  Value of NV pair is MOClassName of module TraceIRPConstDefs. |

Table A.2.3.3: Mapping for notifyTraceSessionIdentities

| IS Parameters | OMG CORBA Structured Event attribute | Qualifier | Comment |
| --- | --- | --- | --- |
| There is no corresponding IS attribute. | domain\_name | M | It carries the IRP document version number string. See subclause 3.1.  It indicates the syntax and semantics of the Structured Event as defined by the present document. |
| notificationType | type\_name | M | This is constant string "notifyTraceSessionIdentities". |
| There is no corresponding IS attribute. | event\_name | M | It carries no information. |
| There is no corresponding IS attribute. | Variable Header |  |  |
| objectClass, objectInstance | One NV pair of filterable\_body\_fields | M | NV stands for name-value pair. Order arrangement of NV pairs is not significant. The name of NV-pair is always encoded in string.  Name of this NV pair is the MANAGED\_OBJECT\_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| notificationId | One NV pair of remaining body | M | Name of NV pair is the NOTIFICATION\_ID of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a long. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| eventTime | One NV pair of filterable\_body\_fields | M | Name of NV pair is the EVENT\_TIME of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is IRPTime. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| systemDN | One NV pair of filterable\_body\_fields | M | Name of NV pair is the SYSTEM\_DN of interface AttributeNameValue of module NotificationIRPConstDefs.  Value of NV pair is a string. See corresponding table in Notification IRP: CORBA SS (3GPP TS 32.306 [10]). |
| traceReference | One NV pair of filterable\_body\_fields | M | Name of NV pair is the TRACE\_REFERENCE of module TraceIRPNotifications::notifyTraceSessionLocalActivation .  Value of NV pair is TraceReference of module TraceIRPConstDefs. |
| traceRecordingSessionReference | One NV pair of filterable\_body\_fields | M | Name of NV pair is the TRACE\_RECORDING\_SESSION\_REFERENCE of TraceIRPNotifications::notifyTraceSessionIdentities  Value of NV pair is TraceReference of module TraceIRPConstDefs. |
| traceTarget | One NV pair of filterable\_body\_fields | M | Name of NV pair is the TRACE\_TARGET of module TraceIRPNotifications::notifyTraceSessionIdentities.  Value of NV pair is TraceTarget of module TraceIRPConstDefs. |
| iOCInstance | One NV pair of filterable\_body\_fields | M | Name of NV pair is the IOC\_INSTANCE of module TraceIRPNotifications::notifyTraceSessionIdentities.  Value of NV pair is MOClassName of module TraceIRPConstDefs. |

# A.3 Solution Set definitions

## A.3.1 IDL definition structure

Clause A.3.2 defines the constants and types used by the Trace Management IRP.

Clause A.3.3 defines the operations which are performed by the Trace Management IRP agent.

Clause A.3.4 defines the notifications which are emitted by the Trace Management IRP agent.

## A.3.2 IDL specification (file name "TraceIRPConstDefs.idl")

//File: TraceIRPConstDefs.idl

#ifndef \_Trace\_IRP\_CONST\_DEFS\_IDL\_

#define \_Trace\_IRP\_CONST\_DEFS\_IDL\_

#include <KernelCmConstDefs.idl>

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\* ## Module: TraceIRPConstDefs

This module contains commonly used definitions for Trace IRP

===============================================================

\*/

module TraceIRPConstDefs

{

enum Result Enum {OK, FAILURE, PARTIAL\_SUCCESS};

typedef struct TraceReference

{ short mcc;

short mnc;

unsigned long traceId;

};

typedef sequence<TraceReference> TraceReferenceList;

typedef unsigned long TraceRecordingSessionReference;

typedef string TraceCollectionEntityAddress;

/\* the values of the InterfaceBitmap is coming from the ListOfInterfaces trace parameter definition in 3GPP TS 32.422. The InterfaceBitmap shall carry the decimal value that is calculated from the bitmap, defined in TS 32.422.\*/

typedef struct Interfaces

{ NeType NetworkElement;

Integer InterfaceBitmap;

};

typedef sequence <Interfaces> ListofInterfaces;

/\*

ListOfInterfacesOptional is a type carrying a conditional parameter.

The boolean shall be TRUE, if the operation request uses this parameter. In this case the value is present. Otherwise the value is absent.

\*/

union ListOfInterfacesOptional switch (boolean)

{

case TRUE: ListOfInterfaces value;

};

enum NeType {MSC\_SERVER,MGW,RNC,SGSN,GGSN,BM\_SC,eNB,MME,SGW,PGW };

typedef sequence<NeType> ListOfNeTypes;

enum TraceDepth {MINIMUM, MEDIUM, MAXIMUM, VENDORMINIMUM, VENDORMEDIUM, VENDORMAXIMUM};

enum TraceTargetType {IMSI, IMEI, IMEISV, PUBLIC\_ID, UTRAN\_CELL, E-UTRAN\_CELL, eNB, RNC};

typedef struct TraceTarget

{ TraceTargetType typeFlag;

String traceTargetId;

};

enum JobType {IMMEDIATE\_MDT\_ONLY, LOGGED\_MDT\_ONLY, TRACE\_ONLY, IMMEDIATE\_MDT\_TRACE, RLF\_REPORT\_ONLY, RCEF\_REPORT\_ONLY, LOGGED\_MBSFN\_MDT };

typedef sequence <KernelCmConstDefs::DN> DNSet;

enum ReportAmount {1,2,4,8,16,32,64,INFINITY};

enum ReportInterval {250ms,500ms,1000ms,2000ms,3000ms,4000ms,6000ms,8000ms,12000ms,16000ms,20000ms,24000ms,28000ms,32000ms,64000ms,120ms,240ms,480ms,640ms,1024ms,2048ms,5120ms,10240ms,60000ms,360000ms,720000ms,1800000ms,3600000ms};

enum LoggingInterval {1.28s,2.56s,5.12s,10.24s,20.48s,30.72s,40.96s,61.44s};

enum LoggingDuration {600s,1200s,2400s,3600s,5400s,7200s};

enum AnonymizationOfMDTData {NO\_Identity, TAC\_of\_IMEI};

/\* the values of the EventBitmap is coming from the TriggeringEvent trace parameter definition in 3GPP TS 32.422. The EventBitmap shall carry the decimal value that is calculated from the triggereing event bitmap as defined in TS 32.422.\*/

typedef struct Events

{ NeType NetworkElement;

Integer EventBitmap;

};

typedef sequence <Interfaces> TriggeringEvent;

/\*

MeasurementsBitMap is used for MDT measurements item selection. Define it as a type of Integer means the selection is mapped into each bit of total 16 bit, as defined in 32.422 Claus 5.

\*/

/\* the values of the MeasurementsBitMap is coming from the TriggeringEvent trace parameter definition in 3GPP TS 32.422. The MeasurementsBitMap shall carry the decimal value that is calculated from the MDT Measurements bitmap as defined in TS 32.422.\*/

enum MobileTechType {UMTS, LTE};

typedef struct Measurements

{ MobileTechType MobilityTech;

Integer MeasurementsBitMap;

};

typedef sequence <Measurements> ListOfMeasurements;

/\* Event threshold parameter carries the threshold values used to event triggered MDT reporting. In LTE case either the EventThreshold RSRP or EventThresholdRSRQ is selected, in UMTS either EventThreshold1F or EventThreshold1I is selected. \*/

union EventThreshold switch (long)

{

case 0:

integer EventThresholdRSRP;

case 1:

integer EventThresholdRSRQ;

case 2:

integer EventThreshold1F;

case 3:

integer EventThreshold1I;

}

/\* the values of the MeasurementQuantity is coming from the MeasurementQuantity MDT parameter definition in 3GPP TS 32.422. The MeasurementsQuanityt shall carry the decimal value that is calculated from the MDT Measurement Quantity bitmap as defined in TS 32.422.\*/

Integer MeasurementQuantity;

/\*

ReportingTriggerBitMap is used for MDT measurements reporting. Define it as a type of Integer means the reporting mechanism is mapped into each bit of total 8 bit, as defined in 32.422 Claus 5.

\*/

/\* the values of the ReportingTriggerBitMap is coming from the TriggeringEvent trace parameter definition in 3GPP TS 32.422. The ReportingTriggerBitMap shall carry the decimal value that is calculated from the MDT Measurements bitmap as defined in TS 32.422.\*/

typedef struct ReportingTrigger

{ MobileTechType MobilityTech;

Integer ReportingTriggerBitMap;

};

/\*

TriggeringEventConditional is a type carrying a conditional parameter.

The boolean shall be TRUE, if the operation the condition is fulfilled and the request uses this parameter. In this case the value is present. Otherwise the value is absent.

\*/

union TriggeringEventConditional switch (boolean)

{

case TRUE: TriggeringEvent value;

};

enum measurementPeriodLTE {1024ms, 1280ms, 2048ms, 2560ms, 5120ms, 10240ms, 1min};

enum measurementPeriodUMTS {250ms, 500ms, 1000ms, 2000ms, 3000ms, 4000ms, 6000ms, 8000ms, 12000ms, 16000ms, 20000ms, 24000ms, 28000ms, 32000ms, 64000ms};

enum collectionPeriodRrmUmts {250ms, 500ms, 1000ms, 2000ms, 3000ms, 4000ms, 6000ms, 8000ms, 12000ms, 16000ms, 20000ms, 24000ms, 28000ms, 32000ms, 64000ms};

enum collectionPeriodRrmLte {1024ms, 1280ms, 2048ms, 2560ms, 5120ms, 10240ms, 1min};

/\*

PositioningMethod is used for MDT measurements reporting. Define it as a type of Integer means the reporting mechanism is mapped into each bit of total 8 bit, as defined in 32.422 Clause 5.

\*/

Integer PositioningMethod;

/\*

MBSFN Area(s) for MBSFN MDT measurement logging. The MBSFN Area consists of a MBSFN Area ID and Carrier Frequency (EARFCN). The target MBSFN area List can have up to 8 entries.

If target MBSFN area(s) is configured, UE applies it in addition to other restrictions such as the logging area. The UE will log measurements as long as it receives MBMS service from an indicated target MBSFN area and is within the configured logging area.

For further details see also TS 37.320 [30], TS 36.331 [32] and TS 36.413 [36].

This parameter is applicable only if the job type is Logged MBSFN MDT and for eUTRAN only.

\*/

typedef struct MbsfnArea

{ Integer MbsfnAreaId;

Integer earfcn;

};

typedef sequence<MbsfnArea> MbsfnAreaList;

enum UnsupportedItem {MANAGED\_ENTITY, TRACE\_DEPTH, LIST\_OF\_INTERFACES, TRACE\_TARGET, MDT\_AREA\_SCOPE, LIST\_OF\_MEASUREMENTS, REPORTING\_TRIGGER, REPORT\_INTERVAL, REPORT\_AMOUNT, EVENT\_THRESHOLD, LOGGING\_INTERVAL, LOGGING\_DURATION, ANONYMIZATION\_OF\_MDT\_DATA, MEASUREMENT\_PERIOD\_LTE, MEASUREMENT\_PERIOD\_ UMTS, COLLECTION\_PERIOD\_RRM\_UMTS, COLLECTION\_PERIOD\_RRM\_LTE, POSITIONING\_METHOD, REASON, LOGGED\_MBSFN\_MDT };

typedef sequence<UnsupportedItem> UnsupportedList;

/\*\*

\* This block identifies attributes which are included as part of the

\* notifications defined within TraceIRP. These attribute values should not

\* clash with those defined for the attributes of notification

\* header (see IDL of Notification IRP).

\*/

interface AttributeNameValue

{

const string TRACE\_RECORDING\_SESSION\_REFERENCE = "TRACE\_RECORDING\_SESSION\_REFERENCE";

const string TRACE\_REFERENCE = "TRACE\_REFERENCE";

const string TRACE\_TARGET = "TRACE\_TARGET";

const string MO\_INSTANCE = "MO\_INSTANCE";

const string REASON = "REASON";

};

};

## A.3.3 IDL specification (file name “TraceIRPSystem.idl”)

//File: TraceIRPSystem.idl

#ifndef \_TRACE\_IRP\_SYSTEM\_IDL\_

#define \_TRACE\_IRP\_SYSTEM\_IDL\_

#include <KernelCmConstDefs.idl>

#include <GenericIRPManagementConstDefs.idl>

#include <GenericIRPManagementSystem.idl>#include <TraceIRPConstDefs.idl>

//This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\* Module: TraceIRPSystem

This module contains the specification of all operations of Trace IRP Agent.

=============================================================================

\*/

module TraceIRP

{

exception ActivateTraceJob { string reason; };

exception NotUniqueTraceReference { string reason; };

exception DeactivateTraceJob { string reason; };

exception ListTraceJob { string reason; };

exception ListActivatedTraceJob { string reason; };

interface TraceIRP

{

/\*\*

\* Request to activate a TraceJob through Itf-N.

\*\*/

TraceIRPConstDefs::ResultEnum activateTraceJob (

in KernelCmConstDefs::DN moInstance,

in TraceIRPConstDefs::ListOfInterfacesOptional listOfInterfaces,

in TraceIRPConstDefs::ListOfNeTypes listOfNeTypes,

in TraceIRPConstDefs::TraceDepth traceDepth,

in TraceIRPConstDefs::TraceReference traceReference,

in TraceIRPConstDefs::TraceTarget traceTarget,

in TraceIRPConstDefs::TriggeringEventConditional triggeringEvent,

in TraceIRPConstDefs::TraceCollectionEntityAddress traceCollectionEntityAddress,

in TraceIRPConstDefs::JobType jobType,

in TraceIRPConstDefs::DNSet areaScope,

in TraceIRPConstDefs::ListOfMeasurements listOfMeasurements,

in TraceIRPConstDefs::ReportingTrigger reportingTrigger,

in TraceIRPConstDefs::ReportInterval reportInterval,

in TraceIRPConstDefs::ReportAmount reportAmount,

in TraceIRPConstDefs::EventThreshold eventThreshold,

in TraceIRPConstDefs::LoggingInterval loggingInterval,

in TraceIRPConstDefs::LoggingDuration loggingDuration,

in TraceIRPConstDefs::AnonymizationOfMDTData anonymizationOfMDTData,

in TraceIRPConstDefs::MeasurementQuantity measurementQuantity,

in TraceIRPConstDefs::MeasurementPeriodLTE measurementPeriodLTE,

in TraceIRPConstDefs::MeasurementPeriodUMTS measurementPeriodUMTS,

in TraceIRPConstDefs::CollectionPeriodRrmUmts collectionPeriodRrmUmts,

in TraceIRPConstDefs::CollectionPeriodRrmLte collectionPeriodRrmLte,

in TraceIRPConstDefs::PositioningMethod positioningMethod,

in TraceIRPConstDefs::PLMNTarget pLMNTarget,

in TraceIRPConstDefs::MbsfnAreaList mbsfnAreaList,

out TraceIRPConstDefs:: UnsupportedList unsupportedList

)

raises (ActivateTraceJob,

GenericIRPManagementSystem::InvalidParameter,

GenericIRPManagementSystem::ValueNotSupported,

GenericIRPManagementSystem::OperationNotSupported,

NotUniqueTraceReference);

/\*\*

\* Request to deactivate a TraceJob through Itf-N.

\*\*/

TraceIRPConstDefs::ResultEnum deactivateTraceJob (

in TraceIRPConstDefs::TraceReference traceReference,

in TraceIRPConstDefs::TraceTarget traceTarget,

out TraceIRPConstDefs::TraceRecordingSessionReference traceRecordingSessionReference)

raises (DeactivateTraceJob,

NotUniqueTraceReference,

GenericIRPManagementSystem::InvalidParameter,

GenericIRPManagementSystem::ValueNotSupported,

GenericIRPManagementSystem::OperationNotSupported);

/\*\*

\* Request to list the parameters of a specific TraceJob through Itf-N.

\*\*/

TraceIRPConstDefs::ResultEnum listTraceJob (

in TraceIRPConstDefs::TraceReference traceReference,

out KernelCmConstDefs::DN moInstance,

out TraceIRPConstDefs::ListOfInterfaces listOfInterfaces,

out TraceIRPConstDefs::TraceDepth traceDepth,

out TraceIRPConstDefs::TraceRecordingSessionReference traceRecordingSessionReference,

out TraceIRPConstDefs::TraceTarget traceTarget,

out TraceIRPConstDefs::TriggeringEvent triggeringEvent,

out TraceIRPConstDefs::TraceCollectionEntityAddress traceCollectionEntityAddress,

out TraceIRPConstDefs::JobType jobType,

out TraceIRPConstDefs::DNSet areaScope,

out TraceIRPConstDefs::ListOfMeasurements listOfMeasurements,

out TraceIRPConstDefs::ReportingTrigger reportingTrigger,

out TraceIRPConstDefs::ReportInterval reportInterval,

out TraceIRPConstDefs::ReportAmount reportAmount,

out TraceIRPConstDefs::Integer eventThreshold,

out TraceIRPConstDefs::LoggingInterval loggingInterval,

out TraceIRPConstDefs::LoggingDuration loggingDuration,

out TraceIRPConstDefs::AnonymizationOfMDTData anonymizationOfMDTData,

out TraceIRPConstDefs::MeasurementQuantity measurementQuantity)

out TraceIRPConstDefs::MeasurementPeriodLTE measurementPeriodLTE,

out TraceIRPConstDefs::MeasurementPeriodUMTS measurementPeriodUMTS,

out TraceIRPConstDefs::CollectionPeriodRrmUmts collectionPeriodRrmUmts,

out TraceIRPConstDefs::CollectionPeriodRrmLte collectionPeriodRrmLte,

out TraceIRPConstDefs::PositioningMethod positioningMethod,

out TraceIRPConstDefs::PLMNTarget pLMNTarget,

out TraceIRPConstDefs::MBSFNAreaList mBSFNAreaList

)

raises (ListTraceJob,

NotUniqueTraceReference,

GenericIRPManagementSystem::InvalidParameter,

GenericIRPManagementSystem::ValueNotSupported,

GenericIRPManagementSystem::OperationNotSupported);

/\*\*

\* Request to list the activated TraceJobs through Itf-N.

\*\*/

TraceIRPConstDefs::ResultEnum listActivatedTraceJob (

out TraceIRPConstDefs::TraceReferenceList traceReferenceList)

raises (ListActivatedTraceJob,

GenericIRPManagementSystem::InvalidParameter,

GenericIRPManagementSystem::ValueNotSupported,

GenericIRPManagementSystem::OperationNotSupported);

};

};

#endif // \_TRACE\_IRP\_SYSTEM\_IDL\_

## A.3.4 IDL specification (file name “TraceIRPNotifications.idl”)

//File: TraceIRPNotifications.idl

#ifndef \_TRACE\_IRP\_NOTIFICATIONS\_IDL\_

#define \_TRACE\_IRP\_NOTIFICATIONS\_IDL\_

#include <TraceIRPConstDefs.idl>

#include <NotificationIRPNotifications.idl>

// This statement must appear after all include statements

#pragma prefix "3gppsa5.org"

/\* Module: TraceIRPNotifications

This module contains the specification of all notifications of Trace IRP Agent.

=============================================================================

\*/

module TraceIRPNotifications

{

/\*\*

\* Constant definitions for the notifyTraceRecordingSessionFailure notification

\*\*/

interface NotifyTraceRecordingSessionFailure: NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyTraceRecordingSessionFailure";

/\*\*

\* This constant defines the name of the TraceRecordingSessionReference property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceRecordingSessionReference.

\*\*/

const string TRACE\_RECORDING\_SESSION\_REFERENCE = TraceIRPConstDefs::AttributeNameValue::TRACE\_RECORDING\_SESSION\_REFERENCE;

/\*\*

\* This constant defines the name of the TraceReference property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceReference.

\*\*/

const string TRACE\_REFERENCE = TraceIRPConstDefs::AttributeNameValue::TRACE\_REFERENCE;

/\*\*

\* This constant defines the name of the reason property.

\* The data type for the value of this property is string.

\*/

const string REASON = TraceIRPConstDefs::AttributeNameValue::REASON;

};

/\*\*

\* Constant definitions for the notifyTraceSessionLocalActivation notification

\*\*/

interface NotifyTraceSessionLocalActivation: NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyTraceSessionLocalActivation";

/\*\*

\* This constant defines the name of the TraceReference property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceReference.

\*\*/

const string TRACE\_REFERENCE = TraceIRPConstDefs::AttributeNameValue::TRACE\_REFERENCE;

/\*\*

\* This constant defines the name of the TraceTarget property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceTarget.

\*\*/

const string TRACE\_TARGET = TraceIRPConstDefs::AttributeNameValue::TRACE\_TARGET;

/\*\*

\* This constant defines the name of the Managed Entity Object Instance property.

\* The data type for the value of this property is string.

\*/

const string MO\_INSTANCE = TraceIRPConstDefs::AttributeNameValue::MO\_INSTANCE;

};

/\*\*

\* Constant definitions for the notifyTraceSessionIdentities notification

\*\*/

interface NotifyTraceSessionIdentities: NotificationIRPNotifications::Notify

{

const string EVENT\_TYPE = "notifyTraceSessionIdentities";

/\*\*

\* This constant defines the name of the TraceReference property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceReference.

\*\*/

const string TRACE\_REFERENCE = TraceIRPConstDefs::AttributeNameValue::TRACE\_REFERENCE;

/\*\*

\* This constant defines the name of the TraceRecordingSessionReference property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceRecordingSessionReference.

\*\*/

const string TRACE\_RECORDING\_SESSION\_REFERENCE =

TraceIRPConstDefs::AttributeNameValue::TRACE\_RECORDING\_SESSION\_REFERENCE;

/\*\*

\* This constant defines the name of the TraceTarget property.

\* The data type for the value of this property is

\* TraceIRPConstDefs::TraceTarget.

\*\*/

const string TRACE\_TARGET = TraceIRPConstDefs::AttributeNameValue::TRACE\_TARGET;

/\*\*

\* This constant defines the name of the Managed Entity Object Instance property.

\* The data type for the value of this property is string.

\*/

const string MO\_INSTANCE = TraceIRPConstDefs::AttributeNameValue::MO\_INSTANCE;

};

};

#endif // \_TRACE\_IRP\_NOTIFICATIONS\_IDL\_

Annex B (normative):  
XML definitions

This annex contains the XML definitions for the Trace ManagementIRP for the IRP whose semantics is specified in Trace ManagementIRP: Information Service (3GPP TS 32.442 [5]).

This XML definitions specification defines the XML syntax of the Trace Management IRP XML Data File.

# B.1 Architectural Features

The overall architectural feature of Trace Management IRP is specified in 3G TS 32.442 [5]. This clause specifies features that are specific to the XML definitions.

## B.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [9].

## B.1.2 Notification Services

This annex defines the XML syntax of Trace Management IRP notifications that is to be used for the Trace Management IRP SOAP Solution Set and in conjunction with Notification Log IRP XML definitions for Notification Log IRP XML Data File and the NL IRP XML Notification Format.

## B.1.3 IOC definitions

This annex defines the XML syntax for the IOC definitions of the Trace Management IRP IS [5], which are used by the XML definitions for the Trace Management IRP notifications and the Trace Management IRP IS operations.

# B.2 Mapping

Not present in the current version of this specification.

# B.3 Solution Set definitions

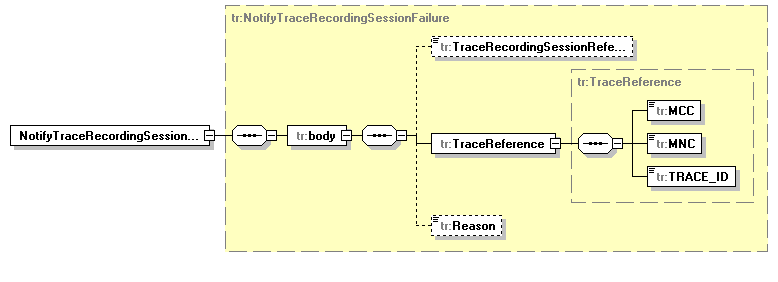
## B.3.1 XML definition structure

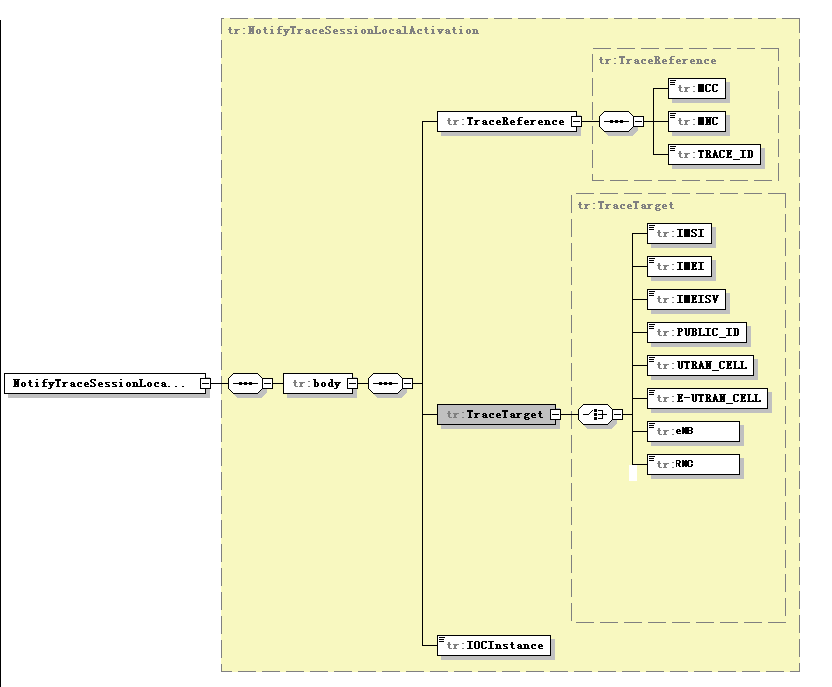
Clause B.3.2 provides a graphical representation of the XML elements.

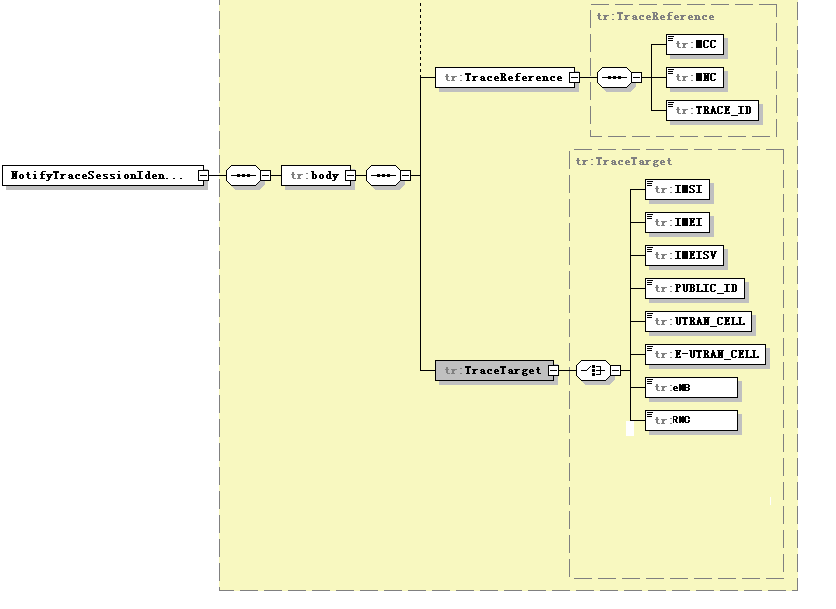
Clause B.3.3 provides XML definitions of Trace Management IRP notifications as defined in [5]. These definitions are to be used for the Trace Management IRP SOAP Solution Set. For Trace IRP XML File Name Conventions the generic file name definitions as specified by the FT IRP apply (see [13]).

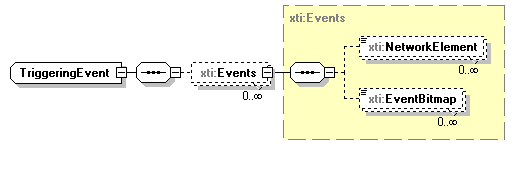
Clause B.3.4 provides XML definitions of Trace Management IOC as defined in [5].

## B.3.2 Graphical Representation









## B.3.3 XML Schema ”tMIRPNotif.xsd”

<?xml version="1.0" encoding="UTF-8"?>

<!--

3GPP TS 32.446 Trace Management IRP Notification

Trace IRP specific data file XML schema

tMIRPNotif.xsd

-->

<schema xmlns="http://www.w3.org/2001/XMLSchema" xmlns:tr="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#tMIRPNotif" xmlns:xe="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification" targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#tMIRPNotif" elementFormDefault="qualified">

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification"/>

<!-- XML types specific for trace IRP notifications -->

<complexType name="TraceReference">

<sequence>

<element name="MCC" type="short"/>

<element name="MNC" type="short"/>

<element name="TRACE\_ID" type="integer"/>

</sequence>

</complexType>

<complexType name="NotifyTraceRecordingSessionFailure">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="TraceRecordingSessionReference" type="integer" minOccurs="0"/>

<element name="TraceReference" type="tr:TraceReference"/>

<element name="Reason" type="string" minOccurs="0"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<element name="NotifyTraceRecordingSessionFailure" type="tr:NotifyTraceRecordingSessionFailure"/>

<complexType name="TraceTarget">

<choice>

<element name="IMSI" type="string"/>

<element name="IMEI" type="string"/>

<element name="IMEISV" type="string"/>

<element name="PUBLIC\_ID" type="string"/>

<element name="UTRAN\_CELL" type="string"/>

<element name="E-UTRAN\_CELL" type="string"/>

<element name="eNB" type="string"/>

<element name="RNC" type="string"/>

</choice>

</complexType>

<complexType name="NotifyTraceSessionLocalActivation">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="TraceReference" type="tr:TraceReference"/>

<element name="TraceTarget" type="tr:TraceTarget"/>

<element name="IOCInstance" type="string"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<element name="NotifyTraceSessionLocalActivation" type="tr:NotifyTraceSessionLocalActivation"/>

<complexType name="NotifyTraceSessionIdentities">

<complexContent>

<extension base="xe:Notification">

<sequence>

<element name="body">

<complexType>

<sequence>

<element name="TraceRecordingSessionReference" type="integer" minOccurs="0"/>

<element name="TraceReference" type="tr:TraceReference"/>

<element name="TraceTarget" type="tr:TraceTarget"/>

</sequence>

</complexType>

</element>

</sequence>

</extension>

</complexContent>

</complexType>

<element name="NotifyTraceSessionIdentities" type="tr:NotifyTraceSessionIdentities"/>

</schema>

## B.3.4 XML Schema ”tMIRPIOCs.xsd”

<?xml version="1.0" encoding="UTF-8"?>

<!--

3GPP TS 32.446 Trace Management IRP IOC XML Schema

tMIRPIOCs.xsd

-->

<schema xmlns:xti="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#tMIRPIOCs" xmlns:xe="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#notification"

xmlns:xn=http://www.3gpp.org/ftp/specs/archive/32\_series/32.626#genericNrm

xmlns="http://www.w3.org/2001/XMLSchema" targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#tMIRPIOCs" <import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.626#genericNrm"/>

elementFormDefault="qualified" attributeFormDefault="unqualified">

<complexType name="ListOfInterfaces">

<sequence>

<element name="Interface" type="integer" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<simpleType name="NeType">

<restriction base="string">

<enumeration value="MSC\_SERVER"/>

<enumeration value="MGW"/>

<enumeration value="RNC"/>

<enumeration value="SGSN"/>

<enumeration value="GGSN"/>

<enumeration value="BM\_SC"/>

<enumeration value="eNB"/>

<enumeration value="MME"/>

<enumeration value="SGW"/>

<enumeration value="PGW"/>

</restriction>

</simpleType>

<simpleType name="MobilityTechType">

<restriction base="string">

<enumeration value="UMTS"/>

<enumeration value="LTE"/>

</restriction>

</simpleType>

<complexType name="ListOfNeTypes">

<sequence>

<element name="NE" type="xti:NeType" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="DNSet">

<sequence>

<element name="DN" type="xn:DN" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<simpleType name="TraceDepth">

<restriction base="string">

<enumeration value="MINIMUM"/>

<enumeration value="MEDIUM"/>

<enumeration value="MAXIMUM"/>

<enumeration value="VENDORMINIMUM"/>

<enumeration value="VENDORMEDIUM"/>

<enumeration value="VENDORMAXIMUM"/>

</restriction>

</simpleType>

<simpleType name="TraceTargetType">

<restriction base="string">

<enumeration value="IMSI"/>

<enumeration value="IMEI"/>

<enumeration value="IMEISV"/>

<enumeration value="PUBLIC\_ID"/>

<enumeration value="UTRAN\_CELL\_ID"/>

<enumeration value="EUTRAN\_CELL\_ID"/>

<enumeration value="eNB\_ID"/>

<enumeration value="RNC\_ID"/>

</restriction>

</simpleType>

<complexType name="TraceTarget">

<sequence>

<element name="typeFlag" type="xti: TraceTargetType"/>

<element name="traceTargetId" type="string"/>

</sequence>

</complexType>

<!-- the values of the EventBitmap is coming from the TriggeringEvent trace parameter definition in 3GPP TS 32.422 -->

<complexType name="Events">

<sequence>

<element name="NetworkElement" type="xti:NeType" minOccurs="0" maxOccurs="unbounded"/>

<element name="EventBitmap" type="integer" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name=" TriggeringEvent">

<sequence>

<element name="Events" type="xti:Events" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<simpleType name="UnsupportedItem">

<restriction base="string">

<enumeration value="MANAGED\_ENTITY"/>

<enumeration value="TRACE\_DEPTH"/>

<enumeration value="LIST\_OF\_INTERFACES"/>

<enumeration value="TRACE\_TARGET"/>

<enumeration value="LIST\_OF\_MEASUREMENTS"/>

<enumeration value="MDT\_AREA\_SCOPE"/>

<enumeration value="REPORTING\_TRIGGER"/>

<enumeration value="REPORT\_INTERVAL"/>

<enumeration value="REPORT\_AMOUNT"/>

<enumeration value="EVENT\_THRESHOLD"/>

<enumeration value="LOGGING\_INTERVAL"/>

<enumeration value="LOGGING\_DURATION"/>

<enumeration value="ANONYMIZATION\_OF\_MDT\_DATA"/>

<enumeration value="MEASUREMENT\_QUANTITY"/>

<enumeration value="REASON"/>

<enumeration value="MBSFN\_AREA\_LIST"/>

</restriction>

</simpleType>

<simpleType name="JobType">

<restriction base="string">

<enumeration value="IMMEDIATE\_MDT\_ONLY"/>

<enumeration value="LOGGED\_MDT\_ONLY"/>

<enumeration value="TRACE\_ONLY"/>

<enumeration value="IMMEDIATE\_MDT AND TRACE"/>

<enumeration value="RLF\_REPORT\_ONLY"/>

<enumeration value="RCEF\_REPORT\_ONLY"/>

<enumeration value="LOGGED\_MBSFN\_MDT"/>

</restriction>

</simpleType>

<complexType name="Measurements">

<sequence>

<element name="MobilityTech" type="xti:MobilityTechType" minOccurs="0" maxOccurs="unbounded"/>

<element name="MeasurementsBitmap" type="integer" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="ListOfMeasurements">

<sequence>

<element name="Measurements" type="xti:Measurements" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<complexType name="ReportingTrigger">

<sequence>

<element name="MobilityTech" type="xti:MobilityTechType" minOccurs="0" maxOccurs="unbounded"/>

<element name="ReportingTriggerBitmap" type="integer" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType> <simpleType name="ReportInterval">

<restriction base="string">

<enumeration value="250ms"/>

<enumeration value="500ms"/>

<enumeration value="1000ms"/>

<enumeration value="2000ms"/>

<enumeration value="3000ms"/>

<enumeration value="4000ms"/>

<enumeration value="6000ms"/>

<enumeration value="8000ms"/>

<enumeration value="12000ms"/>

<enumeration value="16000ms"/>

<enumeration value="20000ms"/>

<enumeration value="24000ms"/>

<enumeration value="28000ms"/>

<enumeration value="32000ms"/>

<enumeration value="64000ms"/>

<enumeration value="120ms"/>

<enumeration value="240ms"/>

<enumeration value="480ms"/>

<enumeration value="640ms"/>

<enumeration value="1024ms"/>

<enumeration value="2048ms"/>

<enumeration value="5120ms"/>

<enumeration value="10240ms"/>

<enumeration value="60000ms"/>

<enumeration value="360000ms"/>

<enumeration value="720000ms"/>

<enumeration value="1800000ms"/>

<enumeration value="3600000ms"/>

</restriction>

</simpleType>

<simpleType name="ReportAmount">

<restriction base="string">

<enumeration value="1"/>

<enumeration value="2"/>

<enumeration value="4"/>

<enumeration value="8"/>

<enumeration value="16"/>

<enumeration value="32"/>

<enumeration value="64"/>

<enumeration value="INFINITY"/>

</restriction>

</simpleType>

<simpleType name="LoggingInterval">

<restriction base="string">

<enumeration value="1.28s"/>

<enumeration value="2.56s"/>

<enumeration value="5.12s"/>

<enumeration value="10.24s"/>

<enumeration value="20.48s"/>

<enumeration value="30.72s"/>

<enumeration value="40.96s"/>

<enumeration value="61.44s"/>

</restriction>

</simpleType>

<simpleType name="LoggingDuration">

<restriction base="string">

<enumeration value="600s"/>

<enumeration value="1200s"/>

<enumeration value="2400s"/>

<enumeration value="3600s"/>

<enumeration value="5400s"/>

<enumeration value="7200s"/>

</restriction>

</simpleType>

<simpleType name="AnonymizationOfMDTData">

<restriction base="string">

<enumeration value="NO\_IDENTITY"/>

<enumeration value="TAC\_OF\_IMEI"/>

</restriction>

</simpleType>

<complexType name=”EventThreshold”>

<choice>

<element name=”EventThresholdRSRP” type=”integer”>

<element name=”EventThresholdRSRQ” type=”integer”>

<element name=”EventThreshold1F” type=”integer”>

<element name=”EventThreshold1I” type=”integer”>

</choice>

</complexType>

<simpleType name="MeasurementPeriodLTE">

<restriction base="string">

<enumeration value="1024ms"/>

<enumeration value="1280ms"/>

<enumeration value="2048ms"/>

<enumeration value="2560ms"/>

<enumeration value="5120ms"/>

<enumeration value="10240ms"/>

<enumeration value="1min"/>

</restriction>

</simpleType>

<simpleType name=" MeasurementPeriodUMTS ">

<restriction base="string">

<enumeration value="250ms"/>

<enumeration value="500ms"/>

<enumeration value="1000ms"/>

<enumeration value="2000ms"/>

<enumeration value="3000ms"/>

<enumeration value="4000ms"/>

<enumeration value="6000ms"/>

<enumeration value="8000ms"/>

<enumeration value="12000ms"/>

<enumeration value="16000ms"/>

<enumeration value="20000ms"/>

<enumeration value="24000ms"/>

<enumeration value="28000ms"/>

<enumeration value="32000ms"/>

<enumeration value="64000ms"/>

</restriction>

</simpleType>

<simpleType name="CollectionPeriodRrmUmts">

<restriction base="string">

<enumeration value="250ms"/>

<enumeration value="500ms"/>

<enumeration value="1000ms"/>

<enumeration value="2000ms"/>

<enumeration value="3000ms"/>

<enumeration value="4000ms"/>

<enumeration value="6000ms"/>

<enumeration value="8000ms"/>

<enumeration value="12000ms"/>

<enumeration value="16000ms"/>

<enumeration value="20000ms"/>

<enumeration value="24000ms"/>

<enumeration value="28000ms"/>

<enumeration value="32000ms"/>

<enumeration value="64000ms"/>

</restriction>

</simpleType>

<simpleType name="CollectionPeriodRrmLte">

<restriction base="string">

<enumeration value="1024ms"/>

<enumeration value="1280ms"/>

<enumeration value="2048ms"/>

<enumeration value="2560ms"/>

<enumeration value="5120ms"/>

<enumeration value="10240ms"/>

<enumeration value="1min"/>

</restriction>

</simpleType>

<simpleType name="PositioningMethod" type="integer" minOccurs="0" maxOccurs="unbounded"/>

<complexType name="MbsfnAreaList">  
    <sequence>  
        <element name="mbfsnArea"  maxOccurs="8" minOccurs="0">  
        <complexType>  
            <attribute name="mbsfnAreaId" use="required" type="positiveInteger"/>  
            <attribute name="earfcn" use="required" type="positiveInteger"/>  
        </complexType>  
        </element>  
    </sequence>  
</complexType>

<complexType name="UnsupportedList">

<sequence>

<element name="UnsupportedItem" type="xti:UnsupportedItem" minOccurs="0" maxOccurs="unbounded"/>

</sequence>

</complexType>

<!-- Attributes of the TraceJob IOC -->

<element name="traceReference" type="unsignedLong"/>

<element name="listOfInterfaces" type="xti:ListOfInterfaces"/>

<element name="listOfNeTypes" type="xti:ListOfNeTypes"/>

<element name="traceDepth" type="xti:TraceDepth"/>

<element name="traceTarget" type="xti:TraceTarget"/>

<element name="triggeringEvent" type="xti:TraceTarget"/>

<element name="traceCollectionEntityAddress" type="string"/>

<element name="jobType" type="xti:JobType"/>

<element name="areaScope" type="xti:DNSet"/>

<element name="listOfMeasurements" type="xti:ListOfMeasurements"/>

<element name="reportingTrigger" type="xti:ReportingTrigger"/>

<element name="reportInterval" type="xti:ReportInterval"/>

<element name="reportAmount" type="xti:ReportAmount"/>

<element name="eventThreshold" type="xti:EventThreshold"/>

<element name="loggingInterval" type="xti:LoggingInterval"/>

<element name="loggingDuration" type="xti:LoggingDuration"/>

<element name="anonymizationOfMDTData" type="xti:anonymizationOfMDTData"/>

<element name="measurementQuantity" type="integer"/>

<element name="measurementPeriodLTE" type="xti:measurementPeriodLTE"/>

<element name=" measurementPeriodUMTS " type="xti: measurementPeriodUMTS"/>

<element name="collectionPeriodRrmUmts" type="xti:collectionPeriodRrmUmts"/>

<element name="collectionPeriodRrmLte" type="xti:collectionPeriodRrmLte"/>

<element name="positioningMethod" type="xti:positioningMethod"/>

<element name="mBSFNAreaList" type="xti:mBSFNAreaList"/>

<!-- Attributes of the TraceRecord IOC -->

<element name="fileName" type="string"/>

</schema>

Annex C (normative):  
SOAP Solution Set

This annex specifies the SOAP Solution Set for the IRP whose semantics are specified in Trace Management IRP: Information Service (3GPP TS 32.442 [5]).

# C.1 Architectural features

The overall architectural feature of the Trace Management IRP is specified in 3GPP TS 32.442 [5]. This clause specifies features that are specific to the SOAP solution set.

## C.1.1 Syntax for Distinguished Names

The syntax of a Distinguished Name is defined in 3GPP TS 32.300 [9].

## C.1.2 Notification Services

The Trace Management IRP SOAP SS uses the Notification IRP SOAP SS of 3GPP TS 32.306 [10]. The IRPAgent shall support the push interface model, which means that the IRPAgent sends trace management notifications to the IRPManager as soon as new events occur. The IRPManager does not need to check ("pull") for events.

## C.1.3 Supported W3C specifications

The SOAP 1.1 specification [21] and WSDL 1.1 specification [23] are supported.

The SOAP 1.2 specification [24] is supported optionally.

This specification uses "document" style in WSDL file.

This specification uses "literal" encoding style in WSDL file.

The filter language used in the SS is the XPath Language (see W3C XPath 1.0 specification [22]). IRPAgents may throw a FilterComplexityLimit fault when a given filter is too complex.

Relevant definitions are imported from the Trace Management IRP XML definitions of Annex B

## C.1.4 Prefixes and namespaces

This specification uses a number of namespace prefixes throughout that are listed in Table C.1.4.

Table C.1.4: Prefixes and Namespaces used in this specification

|  |  |
| --- | --- |
| **PREFIX** | **NAMESPACE** |
| (no prefix) | http://schemas.xmlsoap.org/wsdl/ |
| soap | http://schemas.xmlsoap.org/wsdl/soap/ |
| traceRPSystem | http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRPSystem |
| traceIRPData | http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRPData |
| xti | http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#tMIRPIOCs |
| xn | http://www.3gpp.org/ftp/specs/archive/32\_series/32.626#genericNrm |
| genericIRPSystem | http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRPSystem |
| ntfIRPNtfSystem | http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#NotificationIRPNtfSystem |

# C.2 Mapping

## C.2.1 Operation and notification mapping

The Trace Management IRP IS (3GPP TS 32.442 [5]) defines semantics of operation and notification visible across the Itf-N. Table C.2.1 indicates mapping of these operations and notifications to their equivalents defined in this SS.

Table C.2.1: Mapping from IS Operation to SS Equivalents

|  |  |  |  |
| --- | --- | --- | --- |
| IS Operations in 3GPP TS 32.442 [5] | SS Operations | SS Port | Qualifier |
| activateTraceJob | activateTraceJob | TraceIRPManagementPort | M |
| deactivateTraceJob | deactivateTraceJob | TraceIRPManagementPort | M |
| listTraceJob | listTraceJob | TraceIRPManagementPort | M |
| listActivatedTraceJobs | listActivatedTraceJobs | TraceIRPManagementPort | O |
| notifyTraceRecordingSessionFailure | notify (note 1) | NotificationIRPNtfPort | O |
| notifyTraceSessionLocalActivation | notify (note 1) | NotificationIRPNtfPort | M |
| notifyTraceSessionIdentities | notify (note 1) | NotificationIRPNtfPort | CM |
| NOTE 1: The IS equivalent maps to an XML definition specified in Annex B, and this being an input parameter to the operation notify under the port type ntfIRPNtfSystem:NotificationIRPNtf and under the binding ntfIRPNtfSystem:NotificationIRPNtf of 3GPP TS 32.306 [10]. | | | |

## C.2.2 Operation parameter mapping

The Trace Management IRP IS (3GPP TS 32.442 [5]) defines semantics of parameters carried in the operations. The tables below show the mapping of these parameters, as per operation, to their equivalents defined in this SS.

Table C.2.2.1: Mapping from IS activateTraceJob parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS Method parameter | Qualifier |
| iOCInstance | iOCInstance | M |
| listOfInterfaces | listOfInterfaces | O |
| listOfNeTypes | listOfNeTypes | CM |
| traceDepth | traceDepth | M |
| traceReference | traceReference | M |
| traceTarget | traceTarget | M |
| triggeringEvent | triggeringEvent | CO |
| traceCollectionEntityAddress | traceCollectionEntityAddress | CM |
| jobType | jobType | M |
| areaScope | areaScope | CM |
| listOfMeaurements | listOfMeaurements | CM |
| reportingTrigger | reportingTrigger | CM |
| reportInterval | reportInterval | CM |
| reportAmount | reportAmount | CM |
| eventThreshold | eventThreshold | CM |
| loggingInterval | loggingInterval | CM |
| loggingDuration | loggingDuration | CM |
| anonymizationOfMDTData | anonymizationOfMDTData | CM |
| measurementQuantity | measurementQuantity | CM |
| measurementPeriodLTE | measurementPeriodLTE | CM |
| measurementPeriodUMTS | measurementPeriodUMTS | CM |
| collectionPeriodRrmUmts | collectionPeriodRrmUmts | CM |
| collectionPeriodRrmLte | collectionPeriodRrmLte | CM |
| positioningMethod | positioningMethod | CO |
| unsupportedList | unsupportedList | M |
| status | status | M |
| pLMNTarget | pLMNTarget | CM |
| mBSFNAreaList | mBSFNAreaList | CM |

Table C.2.2.2: Mapping from IS deactivateTraceJob parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS Method parameter | Qualifier |
| traceReference | traceReference | M |
| traceTarget | traceTarget | M |
| traceRecordingSessionReference | traceRecordingSessionReference | CM |
| status | status | M |

Table C.2.2.3: Mapping from IS listTraceJob parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS Method parameter | Qualifier |
| traceReference | traceReference | M |
| iOCInstance | iOCInstance | M |
| listOfInterfaces | listOfInterfaces | O |
| traceDepth | traceDepth | M |
| traceRecordingSessionReference | traceRecordingSessionReference | CM |
| traceTarget | traceTarget | M |
| triggeringEvent | triggeringEvent | O |
| traceCollectionEntityAddress | traceCollectionEntityAddress | CM |
| jobType | jobType | M |
| areaScope | areaScope | CM |
| listOfMeaurements | listOfMeaurements | CM |
| reportingTrigger | reportingTrigger | CM |
| reportInterval | reportInterval | CM |
| reportAmount | reportAmount | CM |
| eventThreshold | eventThreshold | CM |
| loggingInterval | loggingInterval | CM |
| loggingDuration | loggingDuration | CM |
| anonymizationOfMDTData | anonymizationOfMDTData | CM |
| measurementQuantity | measurementQuantity | CM |
| measurementPeriodLTE | measurementPeriodLTE | CM |
| measurementPeriodUMTS | measurementPeriodUMTS | CM |
| collectionPeriodRrmUmts | collectionPeriodRrmUmts | CM |
| collectionPeriodRrmLte | collectionPeriodRrmLte | CM |
| positioningMethod | positioningMethod | CO |
| status | status | M |
| pLMNTarget | pLMNTarget | CM |
| mBSFNAreaList | mBSFNAreaList | CM |

Table C.2.2.4: Mapping from IS listTraceJobs parameters to SS equivalents

|  |  |  |
| --- | --- | --- |
| IS Operation parameter | SS Method parameter | Qualifier |
| traceReferenceList | traceReferenceList | M |
| status | status | M |

## C.2.3 Notification parameter mapping

The Trace Management IRP IS (3GPP TS 32.442 [5]) defines semantics of parameters carried in notifications. The following tables indicate the mapping of these parameters to their SS equivalents.

Table C.2.3.1: Mapping for notifyTraceRecordingSessionFailure

|  |  |  |  |
| --- | --- | --- | --- |
| IS Parameters | <SS> Parameters | Qualifier | Comment |
| objectClass | objectClass | M |  |
| objectInstance | objectInstance | M |  |
| eventTime | eventTime | M |  |
| notificationType | notificationType | M |  |
| systemDN | systemDN | M |  |
| notificationID | notificationID | O |  |
| traceRecordingSessionReference | traceRecordingSessionReference | O |  |
| traceReference | traceReference | M |  |
| reason | reason | O |  |

Table C.2.3.2: Mapping for notifyTraceSessionLocalActivation

|  |  |  |  |
| --- | --- | --- | --- |
| IS Parameters | <SS> Parameters | Qualifier | Comment |
| objectClass | objectClass | M |  |
| objectInstance | objectInstance | M |  |
| eventTime | eventTime | M |  |
| notificationType | notificationType | M |  |
| systemDN | systemDN | M |  |
| notificationID | notificationID | O |  |
| traceReference | traceReference | M |  |
| traceTarget | traceTarget | M |  |
| iOCInstance | iOCInstance | M |  |

Table C.2.3.3: Mapping for notifyTraceSessionIdentities

|  |  |  |  |
| --- | --- | --- | --- |
| IS Parameters | <SS> Parameters | Qualifier | Comment |
| objectClass | objectClass | M |  |
| objectInstance | objectInstance | M |  |
| eventTime | eventTime | M |  |
| notificationType | notificationType | M |  |
| systemDN | systemDN | M |  |
| notificationID | notificationID | O |  |
| traceReference | traceReference | M |  |
| traceRecordingSessionReference | traceRecordingSessionReference | M |  |
| traceTarget | traceTarget | M |  |

# C.3 Solution Set definitions

## C.3.1 WSDL definition structure

Clause C.3.2 provides a graphical representation of the Trace Management IRP service.

Clause C.3.3 defines the services which are supported the Trace Management IRP agent.

## C.3.2 Graphical Representation

The WSDL structure is depicted in Figure C.3.2 below, depicting port type, binding and service. The port type contains port type operations, which again contains input, output and fault messages. The binding contains binding operations, which have the same name as the port type operations. The binding connects to a port inside the service.



Figure C.3.2: Trace Management IRP SOAP Solution Set WSDL structure

### C.3.3 WSDL specification “TraceIRPSystem.wsdl”

<?xml version="1.0" encoding="UTF-8"?>

<!--

3GPP TS 32.446 Trace Management IRP SOAP Solution Set

-->

<definitions xmlns="http://schemas.xmlsoap.org/wsdl/" xmlns:soap="http://schemas.xmlsoap.org/wsdl/soap/" xmlns:traceIRPSystem="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRPSystem" xmlns:traceIRPData="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRPData" xmlns:xn="http://www.3gpp.org/ftp/specs/archive/32\_series/32.626#genericNrm" xmlns:genericIRPSystem="http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRPSystem" xmlns:ntfIRPNtfSystem="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#NotificationIRPNtfSystem" targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRPSystem">

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRPSystem"/>

<import namespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.307/schema/32306#notification/NotificationIRPNtfSystem"/>

<types>

<schema targetNamespace="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRPData" xmlns="http://www.w3.org/2001/XMLSchema" xmlns:xti="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#tMIRPIOCs">

<!-- activateTraceJob Request -->

<element name="activateTraceJobRequest">

<complexType>

<sequence>

<element name="iOCInstance" type="xn:dn"/>

<element name="listOfInterfaces" type="xti:ListOfInterfaces" minOccurs="0"/>

<element name="listOfNeTypes" type="xti:ListOfNeTypes" minOccurs="0"/>

<element name="traceDepth" type="xti:TraceDepth"/>

<element name="traceReference" type="unsignedLong"/>

<element name="traceTarget" type="xti:TraceTarget"/>

<element name="triggeringEvent" type="xti:TriggeringEvent" minOccurs="0"/>

<element name="traceCollectionEntityAddress" type="string" minOccurs="0"/>

<element name="jobType" type="xti:JobType" minOccurs="0"/>

<element name="areaScope" type="xti:DNSet" minOccurs="0"/>

<element name="listOfMeasurements" type="xti:ListOfMeasurements" minOccurs="0"/>

<element name="reportingTrigger" type="xti:ReportingTrigger" minOccurs="0"/>

<element name="reportInterval" type="xti:ReportInterval" minOccurs="0"/>

<element name="reportAmount" type="xti:ReportAmount" minOccurs="0"/>

<element name="eventThreshold" type="xti:EventThreshold" minOccurs="0"/>

<element name="loggingInterval" type="xti:LoggingInterval" minOccurs="0"/>

<element name="loggingDuration" type="xti:LoggingDuration" minOccurs="0"/>

<element name="anonymizationOfMDTData" type="xti:anonymizationOfMDTData" minOccurs="0"/>

<element name="measurementQuantity" type="integer" minOccurs="0"/>

<element name="measurementPeriodLTE" type="xti:measurementPeriodLTE" minOccurs="0"/>

<element name=" measurementPeriodUMTS " type="xti: measurementPeriodUMTS" minOccurs="0"/>

<element name="collectionPeriodRrmUmts" type="xti:collectionPeriodRrmUmts" minOccurs="0"/>

<element name="collectionPeriodRrmLte" type="xti:collectionPeriodRrmLte" minOccurs="0"/>

<element name="positioningMethod" type="xti:positioningMethod" minOccurs="0"/>

<element name="pLMNTarget" type="xti:pLMNTarget" minOccurs="0"/>

<element name="mBSFNAreaList" type="xti:mBSFNAreaList" minOccurs="0"/>

</sequence>

</complexType>

</element>

<!-- activateTraceJob Response -->

<element name="activateTraceJobResponse">

<complexType>

<sequence>

<element name="status">

<simpleType>

<restriction base="string">

<enumeration value="Success"/>

<enumeration value="Failure"/>

<enumeration value="PartialSuccess"/>

</restriction>

</simpleType>

</element>

<element name="unsupportedList" type="xti:UnsupportedList" minOccurs="0"/>

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<enumeration value="invalidTraceDepth"/>

<enumeration value="invalidListOfInterfaces"/>

<enumeration value="invalidTraceTarget"/>

<enumeration value="invalidAreaScope"/>

<enumeration value="invalidListOfMeasurements"/>

<enumeration value="invalidReportingTrigger"/>

<enumeration value="invalidReportInterval"/>

<enumeration value="invalidReportAmount"/>

<enumeration value="invalidEventThreshold"/>

<enumeration value="invalidLoggingInterval"/>

<enumeration value="invalidLoggingDuration"/>

<enumeration value="notuniqueTraceReference"/>

<enumeration value="invalidAnonymizationOfMDTData"/>

<enumeration value="invalidMeasurementPeriodLTE"/>

<enumeration value=" invalidMeasurementPeriodUMTS"/>

<enumeration value="invalidPLMNTarget"/>

<enumeration value="invalidCollectionPeriodRrmUmts"/>

<enumeration value="invalidCollectionPeriodRrmLte"/>

<enumeration value="operation\_failed\_unsupported\_optional\_input\_parameter\_PositioningMethod"/>

<enumeration value="operation\_failed"/>

<enumeration value="operation\_failed\_invalid\_input\_parameter"/>

<enumeration value="operation\_failed\_unsupported\_optional\_input\_parameter\_listOfInterfaces"/>

<enumeration value="operation\_failed\_unsupported\_optional\_input\_parameter\_listOfNeTypes"/>

<enumeration value="operation\_failed\_unsupported\_optional\_input\_parameter\_triggeringEvent"/>

<enumeration value="operation\_failed\_unsupported\_optional\_input\_parameter\_traceCollectionEntityAddress"/>

<enumeration value="operation\_failed\_internal\_problem"/>

<enumeration value="invalidMeasurementQuantity"/>

</restriction>

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</element>

</sequence>

</complexType>

</element>

<!-- activateTraceJob Fault -->

<element name="activateTraceJobFault">

<simpleType>

<restriction base="string">

<enumeration value="OperationFailed"/>

</restriction>

</simpleType>

</element>

<!-- deactivateTraceJob Request -->

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<element name="traceReference" type="unsignedLong"/>

<element name="traceTarget" type="xti:TraceTarget"/>

</sequence>

</complexType>

</element>

<!-- deactivateTraceJob Response -->

<element name="deactivateTraceJobResponse">

<complexType>

<sequence>

<element name="status">

<simpleType>

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<enumeration value="Success"/>

<enumeration value="Failure"/>

</restriction>

</simpleType>

</element>

<element name="traceRecordingSessionReference" type="integer" minOccurs="0"/>

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<enumeration value="operation\_failed"/>

<enumeration value="operation\_failed\_internal\_problem"/>

</restriction>

</simpleType>

</element>

</sequence>

</complexType>

</element>

<!-- deactivateTraceJob Fault -->

<element name="deactivateTraceJobFault">

<simpleType>

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<enumeration value="OperationFailed"/>

</restriction>

</simpleType>

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<!-- listTraceJob Request -->

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</sequence>

</complexType>

</element>

<!-- listTraceJob Response -->

<element name="listTraceJobResponse">

<complexType>

<sequence>

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<enumeration value="Failure"/>

</restriction>

</simpleType>

</element>

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<element name="loggingInterval" type="xti:LoggingInterval" minOccurs="0"/>

<element name="loggingDuration" type="xti:LoggingDuration" minOccurs="0"/>

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<element name="collectionPeriodRrmLte" type="xti:CollectionPeriodRrmLte" minOccurs="0"/>

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</restriction>

</simpleType>

</element>

</sequence>

</complexType>

</element>

<!-- listTraceJob Fault -->

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<simpleType>

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</restriction>

</simpleType>

</element>

<!-- listActivatedTraceJobs Request -->

<element name="listActivatedTraceJobsRequest">

</element>

<!-- listActivatedTraceJobs Response -->

<element name="listActivatedTraceJobsResponse">

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</sequence>

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</simpleType>

</element>

<element name="failureReason" minOccurs="0">

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<restriction base="string">

<enumeration value="operation\_failed"/>

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</restriction>

</simpleType>

</element>

</sequence>

</complexType>

</element>

<!-- listActivatedTraceJobs Fault -->

<element name="listActivatedTraceJobsFault">

<simpleType>

<restriction base="string">

<enumeration value="OperationFailed"/>

</restriction>

</simpleType>

</element>

</schema>

</types>

<message name="activateTraceJobRequest">

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</message>

<message name="activateTraceJobResponse">

<part name="parameter" element="traceIRPData:activateTraceJobResponse"/>

</message>

<message name="activateTraceJobFault">

<part name="parameter" element="traceIRPData:activateTraceJobFault"/>

</message>

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</message>

<message name="deactivateTraceJobResponse">

<part name="parameter" element="traceIRPData:deactivateTraceJobResponse"/>

</message>

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<part name="parameter" element="traceIRPData:deactivateTraceJobFault"/>

</message>

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<part name="parameter" element="traceIRPData:listTraceJobRequest"/>

</message>

<message name="listTraceJobResponse">

<part name="parameter" element="traceIRPData:listTraceJobResponse"/>

</message>

<message name="listTraceJobFault">

<part name="parameter" element="traceIRPData:listTraceJobFault"/>

</message>

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<part name="parameter" element="traceIRPData:listActivatedTraceJobsRequest"/>

</message>

<message name="listActivatedTraceJobsResponse">

<part name="parameter" element="traceIRPData:listActivatedTraceJobsResponse"/>

</message>

<message name="listActivatedTraceJobsFault">

<part name="parameter" element="traceIRPData:listActivatedTraceJobsFault"/>

</message>

<portType name="TraceIRPManagement">

<operation name="activateTraceJob">

<input message="traceIRPSystem:activateTraceJobRequest"/>

<output message="traceIRPSystem:activateTraceJobResponse"/>

<fault name="activateTraceJobFault" message="traceIRPSystem:activateTraceJobFault"/>

</operation>

<operation name="deactivateTraceJob">

<input message="traceIRPSystem:deactivateTraceJobRequest"/>

<output message="traceIRPSystem:deactivateTraceJobResponse"/>

<fault name="deactivateTraceJobFault" message="traceIRPSystem:deactivateTraceJobFault"/>

</operation>

<operation name="listTraceJob">

<input message="traceIRPSystem:listTraceJobRequest"/>

<output message="traceIRPSystem:listTraceJobResponse"/>

<fault name="listTraceJobFault" message="traceIRPSystem:listTraceJobFault"/>

</operation>

<operation name="listActivatedTraceJobs">

<input message="traceIRPSystem:listActivatedTraceJobsRequest"/>

<output message="traceIRPSystem:listActivatedTraceJobsResponse"/>

<fault name="listActivatedTraceJobsFault" message="traceIRPSystem:listActivatedTraceJobsFault"/>

</operation>

</portType>

<binding name="TraceIRPManagement" type="traceIRPSystem:TraceIRPManagement">

<soap:binding style="document" transport="http://schemas.xmlsoap.org/soap/http"/>

<operation name="activateTraceJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#activateTraceJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="activateTraceJobFault">

<soap:fault name="activateTraceJobFault" use="literal"/>

</fault>

</operation>

<operation name="deactivateTraceJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#deactivateTraceJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="deactivateTraceJobFault">

<soap:fault name="deactivateTraceJobFault" use="literal"/>

</fault>

</operation>

<operation name="listTraceJob">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#listTraceJob" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

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<fault name="listTraceJobFault">

<soap:fault name="listTraceJobFault" use="literal"/>

</fault>

</operation>

<operation name="listActivatedTraceJobs">

<soap:operation soapAction="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#listActivatedTraceJobs" style="document"/>

<input>

<soap:body use="literal"/>

</input>

<output>

<soap:body use="literal"/>

</output>

<fault name="listActivatedTraceJobsFault">

<soap:fault name="listActivatedTraceJobsFault" use="literal"/>

</fault>

</operation>

</binding>

<service name="TraceIRPService">

<port name="TraceIRPManagementPort" binding="traceIRPSystem:TraceIRPManagement">

<soap:address location="http://www.3gpp.org/ftp/specs/archive/32\_series/32.446#TraceIRP"/>

</port>

<port name="GenericIRPPort" binding="genericIRPSystem:GenericIRPBinding">

<soap:address location="http://www.3gpp.org/ftp/specs/archive/32\_series/32.316#GenericIRP"/>

</port>

<port name="NotificationIRPNtfPort" binding="ntfIRPNtfSystem:NotificationIRPNtf">

<soap:address location="http://www.3gpp.org/ftp/specs/archive/32\_series/32.306#NotificationIRPNtf"/>

</port>

</service>

</definitions>

Annex D (informative):  
Change history

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **TSG #** | **TSG Doc.** | **CR** | **Rev** | **Subject/Comment** | **Old** | **New** |
| 2010-09 | SA#49 | SP-100508 | -- | -- | Presentation to SA for Information and Approval | --- | 1.0.0 |
| 2010-10 | -- | -- | -- | -- | Publication | 1.0.0 | 10.0.0 |
| 2010-12 | SA#50 | SP-100833 | 001 | 1 | Correcting the Identification of IMS Subscriber Tracing - Align with 32.421 and 32.442 | 10.0.0 | 10.1.0 |
| 2011-03 | SA#51 | SP-110093 | 002 | - | Add the missing input parameter of activateTraceJob - Align with 32.442 Trace Management IRP Information Service | 10.1.0 | 10.2.0 |
| 2011-03 | SA#51 | SP-110095 | 003 | - | Add mapping of notifyTraceSessionIdentities in SOAP solution set - Align with 32.442 Trace Management IRP Information Service | 10.1.0 | 10.2.0 |
| 2011-03 | SA#51 | SP-110102 | 030 | 1 | Extend TraceIRP operation to support MDT configuration - Align with 32.442 | 10.1.0 | 10.2.0 |
| 2011-06 | SA#52 | SP-110292 | 031 | 1 | Add areascope parameter as a MDT configuration | 10.2.0 | 10.3.0 |
| 2011-06 | SA#52 | SP-110286 | 032 | 1 | Modify the definition of traceTarget - Aligned with TS 32.442 | 10.3.0 | 11.0.0 |
| 2011-12 | SA#54 | SP-110715 | 035 | - | Support multiple cells in area based MDT -Align with 32.442 | 11.0.0 | 11.1.0 |
| 2011-12 | SA#54 | SP-110716 | 033 | - | Add RLF reporting configuration - Align with 32.442 | 11.0.0 | 11.1.0 |
| 2012-03 | SA#55 | SP-120053 | 038 | -- | Inconsistency correction on trace target -Align with 32.442 IS version number | 11.1.0 | 11.2.0 |
| 2012-06 | SA#56 | SP-120368 | 041 | -- | Alignment of the Anonymization parameter with TS 32.422 – Solution Set | 11.2.0 | 11.3.0 |
| 2012-09 | SA#57 | SP-120571 | 044 | 1 | Adding new MDT parameters to align with TS 32.422 and TS 37.320 | 11.3.0 | 11.4.0 |
| 2012-09 | SA#57 | SP-120570 | 047 | -- | Add missing threshold parameter for UMTS event triggered measurements | 11.3.0 | 11.4.0 |
| 2012-12 | SA#58 | SP-120795 | 045 | 1 | Add RCEF reporting | 11.4.0 | 11.5.0 |
| SP-120794 | 051 | 1 | Correction of UMTS M2 reporting trigger configuration -Align with 32.442 |
| SP-120795 | 052 | 1 | Correction on the scope, references and abbreviations related to MDTand RLF |
| SP-120796 | 053 | 1 | Addition of Network Sharing |
| SP-120795 | 054 | 1 | Add measurement M7 |
| SP-120795 | 055 | - | Introducing common MDT measurement period attribute in Trace IRP |
| SP-120795 | 056 | - | Combine measurement period parameters for LTE |
| 2014-09 | SA#65 | SP-140559 | 058 | - | Update the link from Solution Set to Information Service due to the end of Release 12 | 11.5.0 | 12.0.0 |
| 2015-06 | SA#68 | SP-150315 | 060 | 1 | Multi-Broadcast Single Frequency Network (MBSFN) Minimization of Drive Tests (MDT) enhancement. | 12.0.0 | 13.0.0 |

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| --- | --- | --- | --- | --- | --- | --- | --- |
| **Change history** | | | | | | | |
| **Date** | **Meeting** | **Tdoc** | **CR** | **Rev** | **Cat** | **Subject/Comment** | **New version** |
| 2016-12 |  |  |  |  |  | Correction of LTE logo (MCC) | 13.0.1 |
| 2017-04 | SA#75 | - | - |  |  | Promotion to Release 14 without technical change | 14.0.0 |
| 2017-06 | SA#76 | SP-170502 | 0061 | - | F | |  | | --- | | Update the link from IRP Solution Set to IRP Information Service | | 14.1.0 |
| 2018-06 | - | - | - | - | - | Update to Rel-15 version (MCC) | **15.0.0** |
| 2020-07 | - | - | - | - | - | Update to Rel-16 version (MCC) | **16.0.0** |