**Technical Specification**

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Universal Mobile Telecommunications System (UMTS);
LTE;
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(3GPP TS 32.446 version 11.5.0 Release 11)

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# Foreword

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# Contents

# 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:

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# 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 V11. 5.X.

# 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/](http://www.w3.org/TR/2000/NOTE-SOAP-20000508/))

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

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

[24]        W3C SOAP 1.2 specification ([http://www.w3.org/TR/soap12-part1/](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<br>Exception:<br>ActivateTraceJob, InvalidTraceDepth, InvalidTraceTarget,<br>NotUniqueTraceReference<br>ManagedGenericIRPSystem::InvalidParameter,<br>ManagedGenericIRPSystem::ParameterNotSupported | M |
| pLMNTarget | TraceIRPConstDefs: PLMNTarget pLMN_target | 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<br>Exception:<br>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<br>Exception:<br>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 |

**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.<br>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.<br><br>Name of this NV pair is the MANAGED_OBJECT_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br>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.<br><br>Name of this NV pair is the MANAGED_OBJECT_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br>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.<br><br>Name of this NV pair is the MANAGED_OBJECT_INSTANCE of interface AttributeNameValue of module NotificationIRPConstDefs.<br><br>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.<br><br>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.<br><br>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.<br><br>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.<br><br>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<br><br>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.<br><br>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.<br><br>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 };
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,32000
ms,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;


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};

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,
      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,
)

        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 Management IRP for the IRP whose semantics is specified in Trace Management IRP: 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
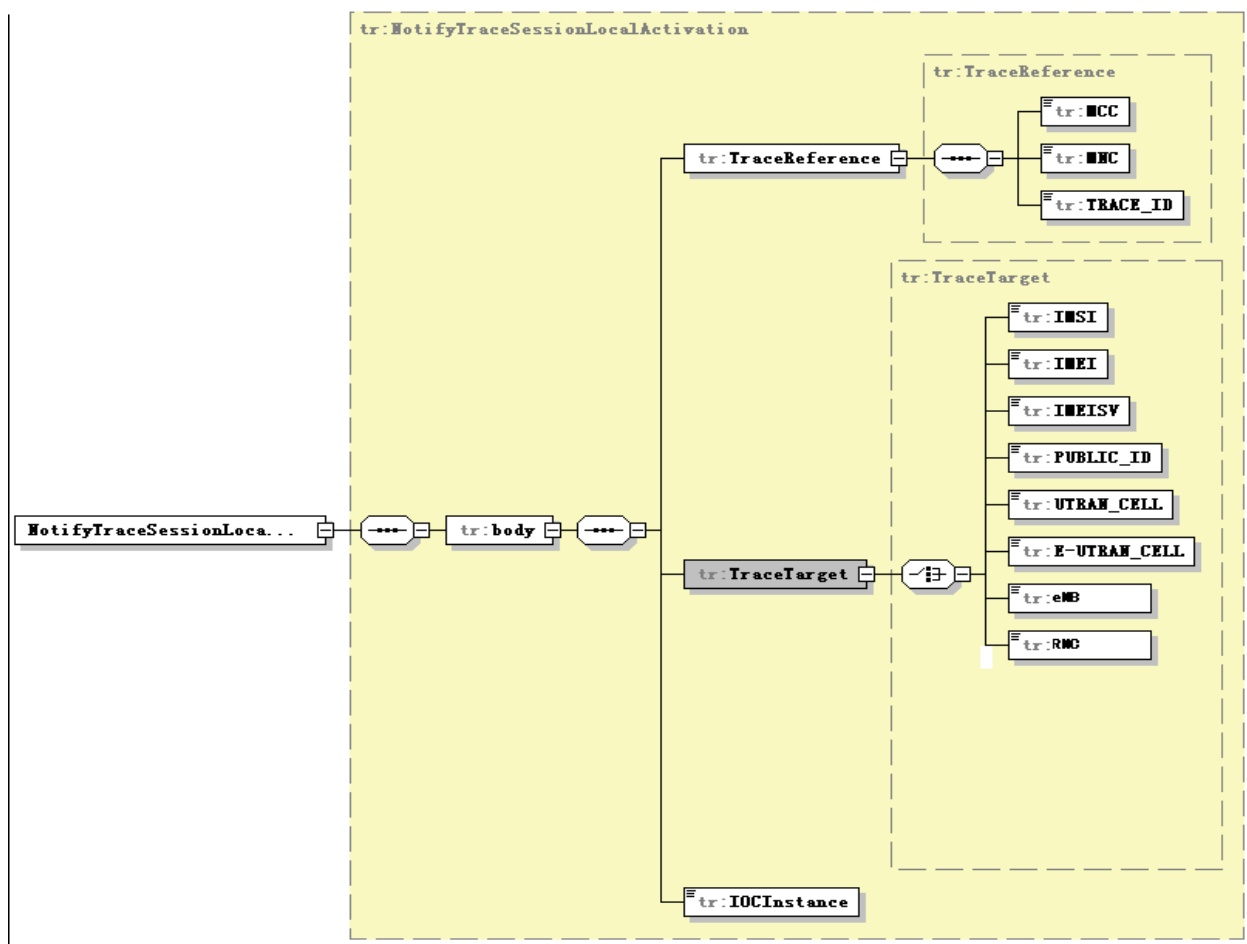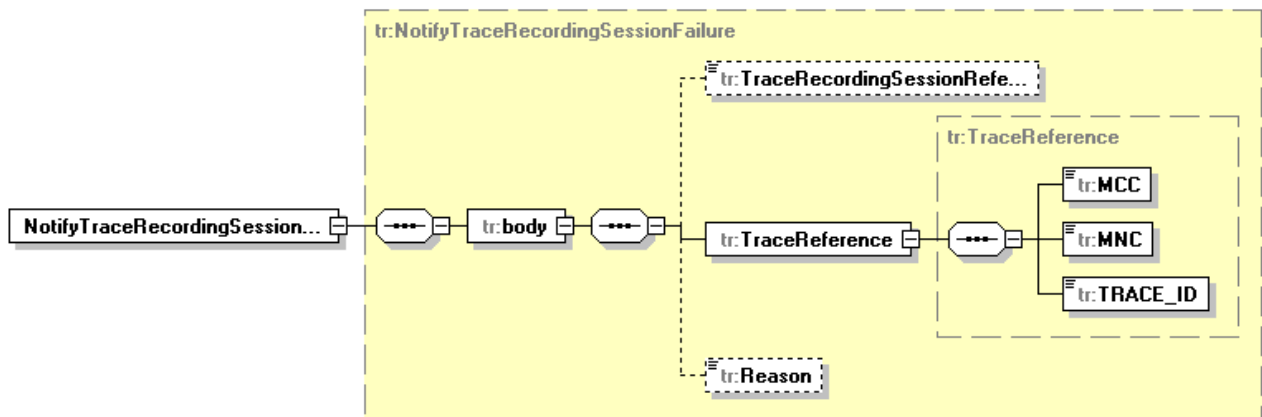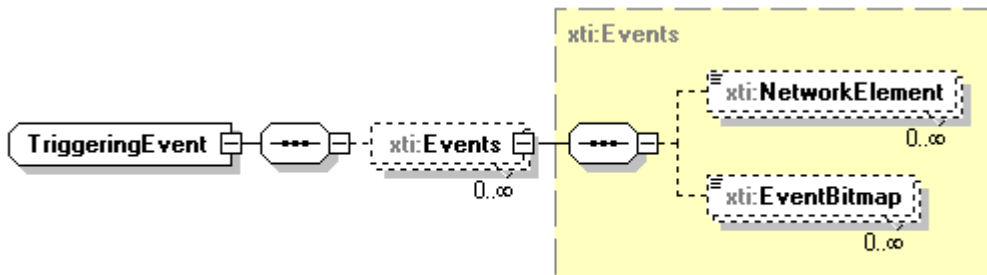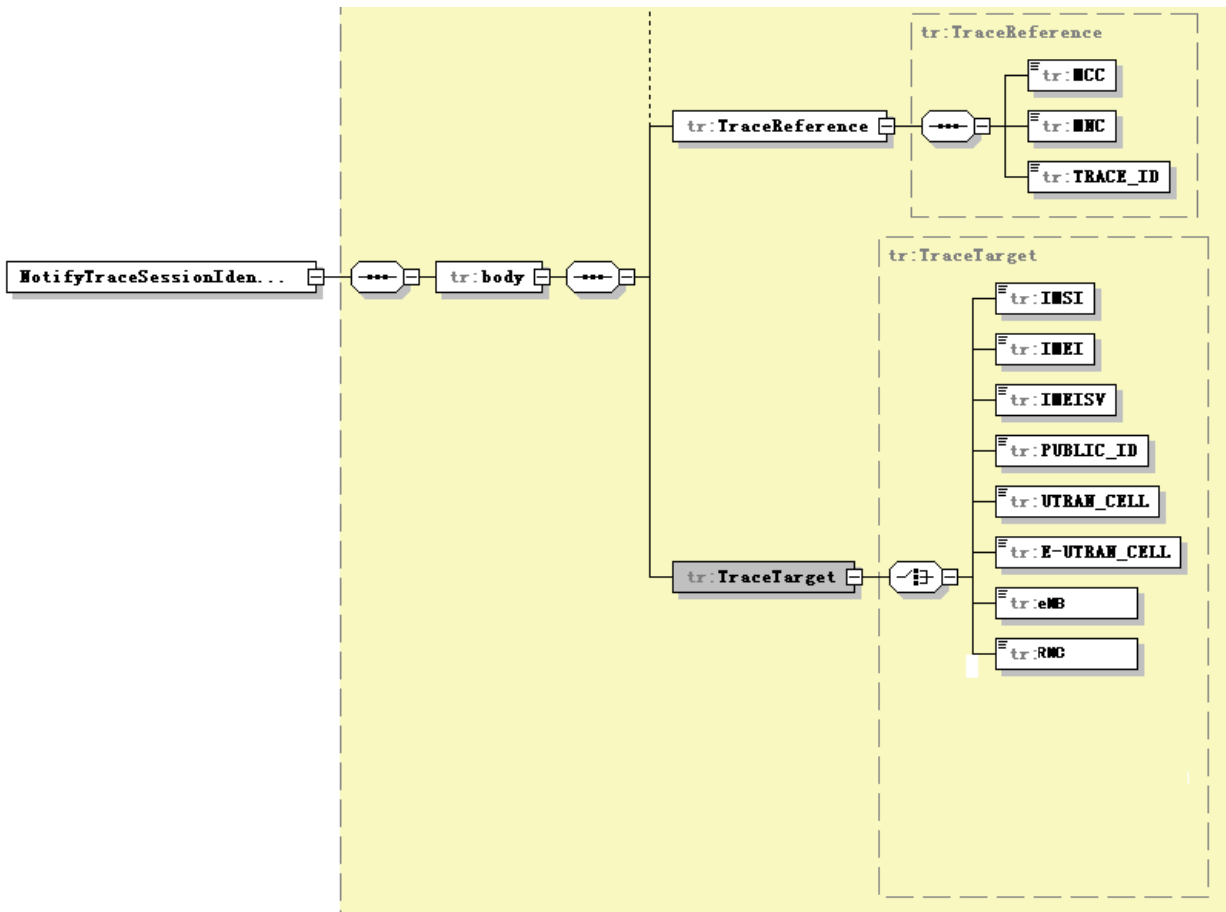
## B.3.3    XML Schema 'tMIRPNotif.xsd'

```
<?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
<?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>
```

*ETSI*

```
        </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"/>
            </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"/>
            </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="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"/>
    <!-- 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 |

**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 |

**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.
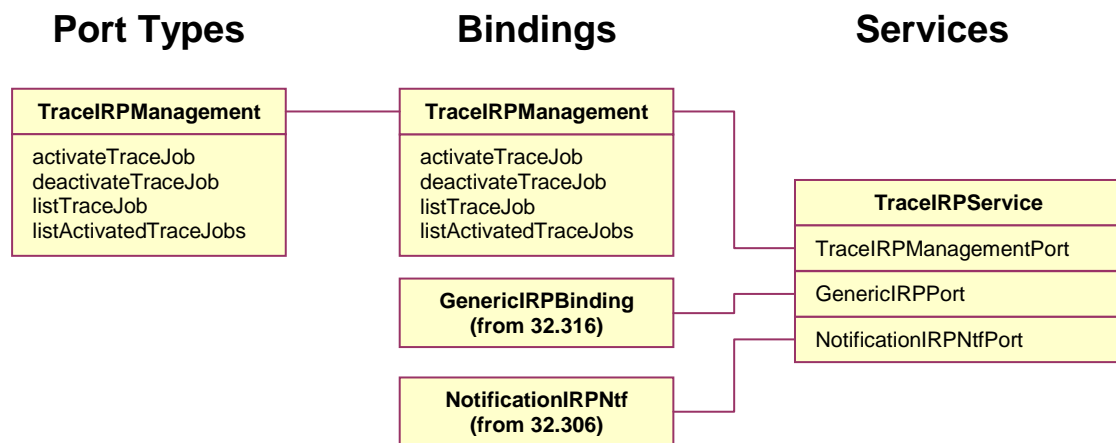


**Figure C.3.2:   Trace Management IRP SOAP Solution Set WSDL structure**

## C.3.3    WSDL specification 'TraceIRPSystem.wsdl'

```xml
<?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#NotificationIRPNtfSyst
em" 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/Notifica
tionIRPNtfSystem"/>
  <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"/>

          </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"/>
            <element name="failureReason" minOccurs="0">
              <simpleType>
                <restriction base="string">
                  <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>
                  </simpleType>
                </element>
            </sequence>
          </complexType>
      </element>
      <!-- activateTraceJob Fault -->
      <element name="activateTraceJobFault">
        <simpleType>
          <restriction base="string">
            <enumeration value="OperationFailed"/>
          </restriction>
        </simpleType>
      </element>
      <!-- deactivateTraceJob Request -->
      <element name="deactivateTraceJobRequest">
        <complexType>
          <sequence>
            <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>
                <restriction base="string">
                  <enumeration value="Success"/>
                  <enumeration value="Failure"/>
                </restriction>
              </simpleType>
            </element>
            <element name="traceRecordingSessionReference" type="integer" minOccurs="0"/>
            <element name="failureReason" minOccurs="0">
              <simpleType>
                <restriction base="string">
                  <enumeration value="notuniqueTraceReference"/>
                  <enumeration value="operation_failed"/>
                  <enumeration value="operation_failed_internal_problem"/>
                </restriction>
              </simpleType>
            </element>
          </sequence>
        </complexType>
      </element>
```

```
        <!-- deactivateTraceJob Fault -->
        <element name="deactivateTraceJobFault">
          <simpleType>
            <restriction base="string">
              <enumeration value="OperationFailed"/>
            </restriction>
          </simpleType>
        </element>
        <!-- listTraceJob Request -->
        <element name="listTraceJobRequest">
          <complexType>
            <sequence>
              <element name="traceReference" type="unsignedLong"/>
            </sequence>
          </complexType>
        </element>
        <!-- listTraceJob Response -->
        <element name="listTraceJobResponse">
          <complexType>
            <sequence>
              <element name="iOCInstance" type="xn:dn"/>
              <element name="listOfInterfaces" type="xti:ListOfInterfaces" minOccurs="0"/>
              <element name="status">
                <simpleType>
                  <restriction base="string">
                    <enumeration value="Success"/>
                    <enumeration value="Failure"/>
                  </restriction>
                </simpleType>
              </element>
              <element name="traceDepth" type="xti:TraceDepth"/>
              <element name="traceRecordingSessionReference" type="integer" minOccurs="0"/>
              <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="Integer" 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="failureReason" minOccurs="0">
                <simpleType>
                  <restriction base="string">
                    <enumeration value="notuniqueTraceReference"/>
                    <enumeration value="operation_failed"/>
                    <enumeration value="operation_failed_internal_problem"/>
                  </restriction>
                </simpleType>
              </element>
            </sequence>
          </complexType>
        </element>
        <!-- listTraceJob Fault -->
        <element name="listTraceJobFault">
          <simpleType>
            <restriction base="string">
              <enumeration value="OperationFailed"/>
            </restriction>
          </simpleType>
        </element>
        <!-- listActivatedTraceJobs Request -->
        <element name="listActivatedTraceJobsRequest">
        </element>
        <!-- listActivatedTraceJobs Response -->
```

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```
        <element name="listActivatedTraceJobsResponse">
          <complexType>
            <sequence>
              <element name="traceReferenceList">
                <complexType>
                  <sequence minOccurs="0" maxOccurs="unbounded">
                    <element name="traceReference" type="unsignedLong"/>
                  </sequence>
                </complexType>
              </element>
              <element name="status">
                <simpleType>
                  <restriction base="string">
                    <enumeration value="Success"/>
                    <enumeration value="Failure"/>
                  </restriction>
                </simpleType>
              </element>
              <element name="failureReason" minOccurs="0">
                <simpleType>
                  <restriction base="string">
                    <enumeration value="operation_failed"/>
                    <enumeration value="operation_failed_internal_problem"/>
                  </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">
      <part name="parameter" element="traceIRPData:activateTraceJobRequest"/>
    </message>
    <message name="activateTraceJobResponse">
      <part name="parameter" element="traceIRPData:activateTraceJobResponse"/>
    </message>
    <message name="activateTraceJobFault">
      <part name="parameter" element="traceIRPData:activateTraceJobFault"/>
    </message>
    <message name="deactivateTraceJobRequest">
      <part name="parameter" element="traceIRPData:deactivateTraceJobRequest"/>
    </message>
    <message name="deactivateTraceJobResponse">
      <part name="parameter" element="traceIRPData:deactivateTraceJobResponse"/>
    </message>
    <message name="deactivateTraceJobFault">
      <part name="parameter" element="traceIRPData:deactivateTraceJobFault"/>
    </message>
    <message name="listTraceJobRequest">
      <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>
    <message name="listActivatedTraceJobsRequest">
      <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"/>
        </output>
        <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>
```

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```
  <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>
```

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# 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 | | | |

# History

| Document history | | |
|---|---|---|
| V11.4.0 | September 2012 | Publication |
| V11.5.0 | February 2013 | Publication |
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