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Title: **Rel-6 TS 32.423-100 Subscriber and equipment trace; Trace data definition and management - for Information**

Document for: **Information**

Agenda Item: **7.5.3**

3GPP TSG-SA5 (Telecom Management) **S5-042530**
Meeting #39, Montreal, CANADA, 16 - 20 August 2004

Presentation of Specification to TSG SA

Presentation to: **TSG SA Meeting #25**
Document for presentation: **TS 32.423, Version 1.0.0**
Presented for: **Information**

Abstract of document:

This TS describes Trace data definition and management.
It specifies the trace records content, their format and transfer.

Work is done against the WID contained in SP-020332 (Work Item ID: OAM-Trace).

This TS is a member of a family consisting of:

3GPP TS 32.421: "Telecommunication management; Subscriber and equipment trace; Trace concepts and requirements".
3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace; Trace control and Configuration Management (CM)".
3GPP TS 32.423: "Telecommunication management; Subscriber and equipment trace; Trace data definition and management".

Changes since last presentation to TSG: New

Outstanding Issues:

1. GGSN Trace Record Content table needs to be completed
2. MGW, S-CSCF, P-CSCF and HSS Trace Record Content tables need to be provided
3. File naming convention may need to be modified because of ongoing work in WTs related to Performance Management IRP and File Transfer IRP on the same topic.

Contentious Issues: None

3GPP TS 32.423 V1.0.0 (2004-09)

Technical Specification

3rd Generation Partnership Project; Technical Specification Group Services and System Aspects; Telecommunication management; Subscriber and equipment trace: Trace data definition and management (Release 6)

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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:

Version x.y.z

where:

- x the first digit:
  - 1 presented to TSG for information;
  - 2 presented to TSG for approval;
  - 3 or greater indicates TSG approved document under change control.
- y the second digit is incremented for all changes of substance, i.e. technical enhancements, corrections, updates, etc.
- z the third digit is incremented when editorial only changes have been incorporated in the document.

Introduction

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

TS 32.421: "Subscriber and equipment trace; Trace concepts and requirements";

TS 32.422: "Subscriber and equipment trace; Trace control and Configuration Management (CM)";

TS 32.423: "Subscriber and equipment trace; Trace data definition and management";

Subscriber and MS Trace provide very detailed information at call level on one or more specific mobile(s). This data is an additional source of information to Performance Measurements and allows going further in monitoring and optimisation operations.

Contrary to Performance Measurements, which are a permanent source of information, Trace is activated on user demand for a limited period of time for specific analysis purpose

Trace plays a major role in activities such as determination of the root cause of a malfunctioning mobile, advanced troubleshooting, optimisation of resource usage and quality, RF coverage control and capacity improvement, dropped call analysis, Core Network and UTRAN end to end 3G procedure validation.

The capability to log data on any interface at call level for a specific user (e.g. IMSI) or mobile type (e.g. IMEI or IMEISV) allows getting information which cannot be deduced from Performance Measurements such as perception of end-user QoS during his call (e.g. requested QoS vs. provided QoS), correlation between protocol messages and RF measurements, or interoperability with specific mobile vendors.

Moreover, Performance Measurements provide values aggregated on an observation period, Subscriber and Equipment Trace give instantaneous values for a specific event (e.g. call, location update, etc.).

If Performance Measurements are mandatory for daily operations, future network planning and primary trouble shooting, Subscriber and MS Trace is the easy way to go deeper into investigation and 3G network optimisation.

In order to produce this data, Subscriber and MS trace are carried out in the NEs, which comprise the network. The data can then be transferred to an external system (e.g. an Operations System (OS) in TMN terminology, for further evaluation).

1 Scope

The present document describes Trace data definition and management. It covers the trace records content, their format and transfer.

The objectives of the present document are:

- To provide the descriptions for a standard set of Trace data;
- To define the common format of trace records; and
- To define a method for Trace results reporting across the management interfaces.

Clause 4 details the various Trace records content, Annex A provides Trace report file format, Annex B provides the trace report file conventions and transfer procedure, Annex C provides the reporting trace functional architecture and Annex D provides some trace files examples. Trace concepts and requirements are covered in TS 32.421 [2] while Trace control and configuration management are described in 3GPP TS 32.422 [3].

The definition of Trace data is intended to result in comparability of Trace data produced in a multi-vendor wireless 3G network.

The following is beyond the scope of the present document, and therefore the present document does not describe:

- Any notification mechanisms or IRPs for trace. Only file transfer mechanism is specified for trace data transfer;
- Any data compression mechanisms for trace data transfer;
- Any Trace capability limitations (e.g. maximum number of simultaneous traced mobiles for a given NE).

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 TS 32.101: "Telecommunication management; Principles and high level requirements".

[2] 3GPP TS 32.421: "Telecommunication management; Subscriber and equipment trace: Trace concepts and requirements."

[3] 3GPP TS 32.422: "Telecommunication management; Subscriber and equipment trace: Trace control and Configuration Management (CM)".

[4] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[5] W3C Recommendation "Extensible Markup Language (XML) 1.0" (Second Edition, 6 October 2000) http://www.w3.org/TR/2000/REC-xml-20001006

[6] W3C Recommendation "Namespaces in XML" (14 January 1999) http://www.w3.org/TR/1999/REC-xml-names-19990114

[7] W3C Recommendation "XML Schema Part 0: Primer" (2 May 2001) http://www.w3.org/TR/2001/REC-xmlschema-0-20010502

[8] W3C Recommendation "XML Schema Part 1: Structures" (2 May 2001)
http://www.w3.org/TR/2001/REC-xmlschema-1-20010502

[9] W3C Recommendation "XML Schema Part 2: Datatypes" (2 May 2001)
http://www.w3.org/TR/2001/REC-xmlschema-2-20010502

[10] International Standard ISO 8601: 1988 (E) "Representations of dates and times" (1988-06-15)
http://www.iso.ch/markete/8601.pdf

[11] 3GPP TS 32.300: "Telecommunication management; Configuration Management (CM); Name convention for Managed Objects".

[12] 3GPP TS 32.622: "Telecommunication management; Configuration Management (CM); Generic network resources Integration Reference Point (IRP): Network Resource Model (NRM)".

3 Definitions, symbols and abbreviations

[Editorís note: All terminology shall be checked to ensure consistency with TSs 32.101 and 32.102. Also the impact of the split of documentation into three TSs needs to be checked.]

3.1 Definitions

For the purposes of the present document, the terms and definitions given in 3GPP TS 32.421 [2] and 3GPP TS 32.422 [3] apply.

Minimum Level of detail: Allows for retrieval of a decoded subset of the IEs contained in the signalling interface messages.

Medium Level of detail: Allows for retrieval of the decoded subset of the IEs contained in the signalling interface messages in the Minimum Level plus a selected set of decoded radio measurement IEs.

Maximum Level of detail: Allows for retrieval of signalling interface messages within the Trace Scope in encoded format.

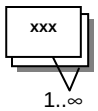
3.2 Symbols

[Editorís note: Shall be checked later.]

For the purposes of the present document, the following symbols apply:

<symbol> <Explanation>

: Element named xxx
The maximum number of occurrence is 1



: Element named xxx
The maximum number of occurrence is unbounded

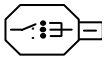
: Global element

The XML element has a value part

: Required element

: Optional element

: Sequence



: Choice

3.2 Abbreviations

[Editorís note: Shall be checked later.]

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [4] and 3GPP TS 32.101 [1] apply:

<ACRONYM> <Explanation>

4 Trace Record Contents

4.1 General

The trace reference, trace type and operation system identification are all provided on trace activation. Each record may contain an MSC Server, MGW, SGSN, GGSN, S-CSCF, P-CSCF, UTRAN, or HSS event record. A key is included in the table indicating whether or not the field is mandatory.

The following table shows the template for trace record description for minimum and medium trace depth:

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	

Interface name: Contains the name of the interface, where the IE is available.

Protocol name: Contains the protocol name on the interface, where the IE is available.

IE name: The name of the Information Element, which should be decoded.

Message name(s): The name of the message(s), where the IE is included.

Trace depth: Shows in which trace depth the IE should be recorded. It also classifies whether the IE is mandatory in the trace record or not (M, C, O or X: meaning described in the previous table)

M	Mandatory	This field must be in the trace record if it is available, i.e. if the message appears during the trace recording session and the IE is present in the message.
O	Optional	This field is optional and its support is a matter for agreement between equipment manufacturer and network operator.
X	Not applicable	This field is not required in this instance.

NOTE: Any kind of comments related to the IE can be made here. Also this is the placeholder for referencing the relevant 3GPP specifications, which define the IE.

4.2 MSC Server Trace Record Content

The following table shows the trace record content for MSC Server. The trace record is the same for management based activation and for signalling based activation.

For MSC Server, the Minimum level of detail shall be supported.

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	
Iu	CC	Facility	ALERTING CALL PROCEEDING CONNECT DISCONNECT FACILITY RELEASE RELEASE COMPLETE SETUP	M	M	TS 24.008 TS 24.080
		Bearer capability	CALL CONFIRMED CALL PROCEEDING EMERGENCY SETUP MODIFY MODIFY COMPLETE MODIFY REJECT SETUP	M	M	TS 24.008
		Cause	CALL CONFIRMED CONGESTION CONTROL DISCONNECT HOLD REJECT MODIFY REJECT RELEASE RELEASE COMPLETE RETRIEVE REJECT START DTMF REJECT STATUS	M	M	TS 24.008
		Connected number	CONNECT	M	M	TS 24.008
		Calling party BCD number	SETUP	M	M	TS 24.008
		Called party BCD number	SETUP	M	M	TS 24.008
		Redirecting party BCD number	SETUP	M	M	TS 24.008
Iu	MM	Reject cause	AUTHENTICATION FAILURE CM SERVICE REJECT ABORT LOCATION UPDATING REJECT MM STATUS	M	M	TS 24.008
		Location area identification	CM RE-ESTABLISHMENT REQUEST LOCATION UPDATING ACCEPT LOCATION UPDATING REQUEST TMSI REALLOCATION COMMAND	M	M	TS 24.008
		Mobile identity	CM RE-ESTABLISHMENT REQUEST CM SERVICE REQUEST IDENTITY REQUEST IDENTITY RESPONSE IMSI DETACH INDICATION LOCATION UPDATING ACCEPT LOCATION UPDATING REQUEST TMSI REALLOCATION COMMAND	M	M	TS 24.008
		CM service type	CM SERVICE REQUEST	M	M	TS 24.008
		Location updating type	LOCATION UPDATING REQUEST	M	M	TS 24.008
Iu	SS	Facility	FACILITY REGISTER RELEASE COMPLETE	M	M	TS 24.008
		Cause	RELEASE COMPLETE	M	M	TS 24.008
Iu	SMS	TP-Originating-Address	SMS-DELIVER	M	M	TS 23.040
		TP-Service-Centre-Time-Stamp	SMS-DELIVER SMS-SUBMIT-REPORT SMS-STATUS-REPORT	M	M	TS 23.040

		TP-Failure-Cause	SMS-DELIVER-REPORT SMS-SUBMIT-REPORT	M	M	TS 23.040
		TP-Destination-Address	SMS-SUBMIT SMS-COMMAND	M	M	TS 23.040
		TP-Recipient-Address	SMS-STATUS-REPORT	M	M	TS 23.040

4.3 MGW Trace Record Content

[Editorís Note: Awaiting contributions.]

4.4 SGSN Trace Record Content

The following table shows the trace record content for SGSN. The trace record is the same for management based activation and for signalling based activation.

For SGSN, the Minimum level of detail shall be supported.

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	
Iu	SM	Requested QoS/Requested new QoS	ACTIVATE PDP CONTEXT REQUEST ACTIVATE SECONDARY PDP CONTEXT REQUEST MODIFY PDP CONTEXT REQUEST	M	M	TS 24.008
		Requested PDP address	ACTIVATE PDP CONTEXT REQUEST	M	M	TS 24.008
		Access point name	ACTIVATE PDP CONTEXT REQUEST REQUEST PDP CONTEXT ACTIVATION	M	M	TS 24.008 TS 23.003
		Negotiated QoS/New QoS	ACTIVATE PDP CONTEXT ACCEPT ACTIVATE SECONDARY PDP CONTEXT ACCEPT MODIFY PDP CONTEXT REQUEST MODIFY PDP CONTEXT ACCEPT	M	M	TS 24.008
		PDP Address	ACTIVATE PDP CONTEXT ACCEPT MODIFY PDP CONTEXT REQUEST	M	M	TS 24.008
		SM cause	ACTIVATE PDP CONTEXT REJECT ACTIVATE SECONDARY PDP CONTEXT REJECT REQUEST PDP CONTEXT ACTIVATION REJECT MODIFY PDP CONTEXT REJECT DEACTIVATE PDP CONTEXT REQUEST SM STATUS	M	M	TS 24.008
		Offered PDP address	REQUEST PDP CONTEXT ACTIVATION	M	M	TS 24.008
Iu	MM	MS network capability	ATTACH REQUEST ROUTING AREA UPDATE REQUEST	M	M	TS 24.008
		Attach type	ATTACH REQUEST	M	M	TS 24.008
		IMSI	ATTACH REQUEST	M	M	TS 24.008
		MS Radio Access capability	ATTACH REQUEST ROUTING AREA UPDATE REQUEST	M	M	TS 24.008
		Attach result	ATTACH ACCEPT	M	M	TS 24.008
		Routing area identification	ATTACH ACCEPT ROUTING AREA UPDATE REQUEST ROUTING AREA UPDATE ACCEPT	M	M	TS 24.008

		GMM cause	ATTACH ACCEPT ATTACH REJECT DETACH REQUEST AUTHENTICATION AND CIPHERING FAILURE ROUTING AREA UPDATE ACCEPT ROUTING AREA UPDATE REJECT GMM STATUS	M	M	TS 24.008
		Detach type	DETACH REQUEST	M	M	TS 24.008
		Mobile identity	AUTHENTICATION AND CIPHERING RESPONSE IDENTITY RESPONSE ROUTING AREA UPDATE ACCEPT	M	M	TS 24.008
		Update type	ROUTING AREA UPDATE REQUEST	M	M	TS 24.008
		Update result	ROUTING AREA UPDATE ACCEPT	M	M	TS 24.008
Iu	SMS	TP-Originating-Address	SMS-DELIVER	M	M	TS 23.040
		TP-Service-Centre-Time-Stamp	SMS-DELIVER SMS-SUBMIT-REPORT SMS-STATUS-REPORT	M	M	TS 23.040
		TP-Failure-Cause	SMS-DELIVER-REPORT SMS-SUBMIT-REPORT	M	M	TS 23.040
		TP-Destination-Address	SMS-SUBMIT SMS-COMMAND	M	M	TS 23.040
		TP-Recipient-Address	SMS-STATUS-REPORT	M	M	TS 23.040
Gn	GTP	IMSI	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST PDU NOTIFICATION REQUEST IDENTIFICATION RESPONSE SGSN CONTEXT REQUEST FORWARD RELOCATION REQUEST RELOCATION CANCEL REQUEST MBMS NOTIFICATION REQUEST CREATE MBMS CONTEXT REQUEST UPDATE MBMS CONTEXT REQUEST DELETE MBMS CONTEXT REQUEST	M	M	TS 29.060
		RAI	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST IDENTIFICATION REQUEST SGSN CONTEXT REQUEST CREATE MBMS CONTEXT REQUEST UPDATE MBMS CONTEXT REQUEST	M	M	TS 29.060
		End User Address	CREATE PDP CONTEXT REQUEST CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT REQUEST PDU NOTIFICATION REQUEST PDU NOTIFICATION REJECT REQUEST MBMS NOTIFICATION REQUEST MBMS NOTIFICATION REJECT REQUEST CREATE MBMS CONTEXT REQUEST DELETE MBMS CONTEXT REQUEST MBMS REGISTRATION REQUEST MBMS DE-REGISTRATION REQUEST MBMS SESSION START REQUEST MBMS SESSION STOP REQUEST	M	M	TS 29.060

		Access Point Name	CREATE PDP CONTEXT REQUEST PDU NOTIFICATION REQUEST PDU NOTIFICATION REJECT REQUEST MBMS NOTIFICATION REQUEST MBMS NOTIFICATION REJECT REQUEST CREATE MBMS CONTEXT REQUEST DELETE MBMS CONTEXT REQUEST MBMS REGISTRATION REQUEST MBMS DE-REGISTRATION REQUEST MBMS SESSION START REQUEST MBMS SESSION STOP REQUEST	M	M	TS 29.060
		SGSN Address for signalling	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST IDENTIFICATION REQUEST SGSN CONTEXT REQUEST SGSN CONTEXT RESPONSE FORWARD RELOCATION REQUEST FORWARD RELOCATION RESPONSE CREATE MBMS CONTEXT REQUEST UPDATE MBMS CONTEXT REQUEST	M	M	TS 29.060
		SGSN Address for user traffic	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST SGSN CONTEXT ACKNOWLEDGE MBMS SESSION START RESPONSE	M	M	TS 29.060
		MSISDN	CREATE PDP CONTEXT REQUEST CREATE MBMS CONTEXT REQUEST	M	M	TS 29.060
		Quality of Service Profile	CREATE PDP CONTEXT REQUEST CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT RESPONSE MBMS SESSION START REQUEST	M	M	TS 29.060
		RAT Type	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST	M	M	TS 29.060
		IMEI(SV)	CREATE PDP CONTEXT REQUEST	M	M	TS 29.060
		User Location Information	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST	M	M	TS 29.060

		Cause	CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT RESPONSE DELETE PDP CONTEXT RESPONSE PDU NOTIFICATION RESPONSE PDU NOTIFICATION REJECT REQUEST PDU NOTIFICATION REJECT RESPONSE IDENTIFICATION RESPONSE SGSN CONTEXT RESPONSE SGSN CONTEXT ACKNOWLEDGE FORWARD RELOCATION RESPONSE RELOCATION CANCEL RESPONSE FORWARD RELOCATION COMPLETE ACKNOWLEDGE FORWARD SRNS CONTEXT ACKNOWLEDGE MBMS NOTIFICATION RESPONSE MBMS NOTIFICATION REJECT REQUEST MBMS NOTIFICATION REJECT RESPONSE CREATE MBMS CONTEXT RESPONSE UPDATE MBMS CONTEXT RESPONSE DELETE MBMS CONTEXT RESPONSE MBMS REGISTRATION RESPONSE MBMS DE-REGISTRATION RESPONSE MBMS SESSION START RESPONSE MBMS SESSION STOP RESPONSE	M	M	TS 29.060
		GGSN Address for Control Plane	CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT RESPONSE PDU NOTIFICATION REQUEST MBMS NOTIFICATION REQUEST CREATE MBMS CONTEXT RESPONSE UPDATE MBMS CONTEXT RESPONSE	M	M	TS 29.060
		GGSN Address for user traffic	CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT RESPONSE	M	M	TS 29.060
		GSN Address	ERROR INDICATION	M	M	TS 29.060
		SGSN Number	SGSN CONTEXT REQUEST FORWARD RELOCATION RESPONSE	M	M	TS 29.060
		MBMS UE Context	SGSN CONTEXT RESPONSE FORWARD RELOCATION REQUEST	M	M	TS 29.060
		RANAP Cause	FORWARD RELOCATION REQUEST FORWARD RELOCATION RESPONSE	M	M	TS 29.060
		Target Identification	FORWARD RELOCATION REQUEST	M	M	TS 29.060

Gs	BSSAP+	IMSI	BSSAP+-ALERT-ACK BSSAP+-ALERT-REJECT BSSAP+-ALERT-REQUEST BSSAP+-DOWNLINK-TUNNEL-REQUEST BSSAP+-GPRS-DETACH-ACK BSSAP+-GPRS-DETACH-INDICATION BSSAP+-IMSI-DETACH-ACK BSSAP+-IMSI-DETACH-INDICATION BSSAP+-LOCATION-UPDATE-ACCEPT BSSAP+-LOCATION-UPDATE-REJECT BSSAP+-LOCATION-UPDATE-REQUEST BSSAP+-MOBILE-STATUS BSSAP+-MS-ACTIVITY-INDICATION BSSAP+-MS-UNREACHABLE BSSAP+-PAGING-REJECT BSSAP+-PAGING-REQUEST BSSAP+-TMSI-REALLOCATION-COMPLETE BSSAP+-UPLINK-TUNNEL-REQUEST	M	M	TS 29.018
		Gs Cause	BSSAP+-ALERT-REJECT BSSAP+-MOBILE-STATUS BSSAP+-MS-UNREACHABLE BSSAP+-PAGING-REJECT	M	M	TS 29.018
		VLR number	BSSAP+-DOWNLINK-TUNNEL-REQUEST BSSAP+-PAGING-REQUEST BSSAP+-RESET-ACK BSSAP+-RESET-INDICATION	M	M	TS 29.018
		SGSN number	BSSAP+-GPRS-DETACH-INDICATION BSSAP+-IMSI-DETACH-INDICATION BSSAP+-LOCATION-UPDATE-REQUEST BSSAP+-RESET-ACK BSSAP+-RESET-INDICATION BSSAP+-UPLINK-TUNNEL-REQUEST	M	M	TS 29.018
		IMSI detach from GPRS service type	BSSAP+-GPRS-DETACH-INDICATION	M	M	TS 29.018
		Cell global identity/ New CGI	BSSAP+-GPRS-DETACH-INDICATION BSSAP+-IMSI-DETACH-INDICATION BSSAP+-LOCATION-UPDATE-REQUEST BSSAP+-MS-ACTIVITY-INDICATION BSSAP+-TMSI-REALLOCATION-COMPLETE	M	M	TS 29.018
		Service area identification /New SAI	BSSAP+-GPRS-DETACH-INDICATION BSSAP+-IMSI-DETACH-INDICATION BSSAP+-LOCATION-UPDATE-REQUEST BSSAP+-MS-ACTIVITY-INDICATION BSSAP+-TMSI-REALLOCATION-COMPLETE	M	M	TS 29.018
		Detach type	BSSAP+-IMSI-DETACH-INDICATION	M	M	TS 29.018
		Reject cause	BSSAP+-LOCATION-UPDATE-REJECT	M	M	TS 29.018
		Update type	BSSAP+-LOCATION-UPDATE-REQUEST	M	M	TS 29.018
		LAI/Old LAI	BSSAP+-LOCATION-UPDATE-ACCEPT BSSAP+-LOCATION-UPDATE-REQUEST BSSAP+-PAGING-REQUEST	M	M	TS 29.018

		IMEISV	BSSAP+-LOCATION-UPDATE-REQUEST	M	M	TS 29.018
		Erroneous message	BSSAP+-MOBILE-STATUS	M	M	TS 29.018

4.5 GGSN Trace Record Content

The following table describes the trace record content for minimum and medium trace depth for GGSN. The record content is same for management based activation and for signalling based activation.

For GGSN, the Minimum level of detail shall be supported.

Interface name	Prot. Name	IE name	MESSAGE NAME(S)	Trace depth		Notes
				Min	Med	
Gn	GTP	IMSI	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST PDU NOTIFICATION REQUEST SEND ROUTEING INFORMATION FOR GPRS REQUEST SEND ROUTEING INFORMATION FOR GPRS RESPONSE FAILURE REPORT REQUEST NOTE MS PRESENT REQUEST MBMS NOTIFICATION REQUEST CREATE MBMS CONTEXT REQUEST UPDATE MBMS CONTEXT REQUEST DELETE MBMS CONTEXT REQUEST	M	M	TS 29.060
		RAI	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST CREATE MBMS CONTEXT REQUEST UPDATE MBMS CONTEXT REQUEST	M	M	TS 29.060
		End User Address	CREATE PDP CONTEXT REQUEST CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT REQUEST PDU NOTIFICATION REQUEST PDU NOTIFICATION REJECT REQUEST MBMS NOTIFICATION REQUEST MBMS NOTIFICATION REJECT REQUEST CREATE MBMS CONTEXT REQUEST DELETE MBMS CONTEXT REQUEST MBMS REGISTRATION REQUEST MBMS DE-REGISTRATION REQUEST MBMS SESSION START REQUEST MBMS SESSION STOP REQUEST	M	M	TS 29.060
		Access Point Name	CREATE PDP CONTEXT REQUEST PDU NOTIFICATION REQUEST PDU NOTIFICATION REJECT REQUEST MBMS NOTIFICATION REQUEST MBMS NOTIFICATION REJECT REQUEST CREATE MBMS CONTEXT REQUEST DELETE MBMS CONTEXT REQUEST MBMS REGISTRATION REQUEST MBMS DE-REGISTRATION REQUEST MBMS SESSION START REQUEST MBMS SESSION STOP REQUEST	M	M	TS 29.060
		SGSN Address for signalling	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST CREATE MBMS CONTEXT REQUEST UPDATE MBMS CONTEXT REQUEST	M	M	TS 29.060
		SGSN Address for user traffic	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST MBMS SESSION START RESPONSE	M	M	TS 29.060
		MSISDN	CREATE PDP CONTEXT REQUEST CREATE MBMS CONTEXT REQUEST	M	M	TS 29.060
		Quality of Service Profile	CREATE PDP CONTEXT REQUEST CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT RESPONSE MBMS SESSION START REQUEST	M	M	TS 29.060
		RAT Type	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST	M	M	TS 29.060
		IMEI(SV)	CREATE PDP CONTEXT REQUEST	M	M	TS 29.060

		User Location Information	CREATE PDP CONTEXT REQUEST UPDATE PDP CONTEXT REQUEST	M	M	TS 29.060
		Cause	CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT RESPONSE DELETE PDP CONTEXT RESPONSE PDU NOTIFICATION RESPONSE PDU NOTIFICATION REJECT REQUEST PDU NOTIFICATION REJECT RESPONSE SEND ROUTEING INFORMATION FOR GPRS RESPONSE FAILURE REPORT RESPONSE NOTE MS GPRS PRESENT RESPONSE MBMS NOTIFICATION RESPONSE MBMS NOTIFICATION REJECT REQUEST MBMS NOTIFICATION REJECT RESPONSE CREATE MBMS CONTEXT RESPONSE UPDATE MBMS CONTEXT RESPONSE DELETE MBMS CONTEXT RESPONSE MBMS REGISTRATION RESPONSE MBMS DE-REGISTRATION RESPONSE MBMS SESSION START RESPONSE MBMS SESSION STOP RESPONSE	M	M	TS 29.060
		GGSN Address for Control Plane	CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT RESPONSE PDU NOTIFICATION REQUEST MBMS NOTIFICATION REQUEST CREATE MBMS CONTEXT RESPONSE UPDATE MBMS CONTEXT RESPONSE	M	M	TS 29.060
		GGSN Address for user traffic	CREATE PDP CONTEXT RESPONSE UPDATE PDP CONTEXT RESPONSE	M	M	TS 29.060
		MAP Cause	SEND ROUTEING INFORMATION FOR GPRS RESPONSE FAILURE REPORT RESPONSE	M	M	TS 29.060
		GSN Address	SEND ROUTEING INFORMATION FOR GPRS RESPONSE NOTE MS PRESENT REQUEST	M	M	TS 29.060

4.6 UTRAN Trace Record Content

For RNC, the Maximum level of detail shall be supported.

Table 4.6.1.: UTRAN Trace Record Content

Interface (specific messages)	Format	Level of details			Description
		Minimum	Medium	Maximum	
RRC (without rrc dedicated measurements)	Decoded	M	M	O	Message name
		O	O	O	Record extensions
		M	M	X	rncID of traced RNC
		M	M	X	Dedicated IE extracted from RRC messages between the traced RNC and the UE. A subset of IEs as given in the table 4.6.2. is provided.
	ASN.1	X	X	M	Raw Uu Messages: RRC messages between the traced RNC and the UE. The encoded content of the message is provided
Iub (without nbap dedicated measurements)	Decoded	M	M	O	Message name
		O	O	O	Record extensions
		M	M	X	rncID of traced RNC cId
		M	M	X	rbId + Dedicated IE extracted from NBAP messages send/received inside traced UEs communication context. A subset of IEs as given in the table 4.6.2.is provided
	ASN.1	X	X	M	Raw Iub Messages: NBAP messages between the traced RNC and the NodeB or cell. The encoded content of the message is provided
Iu	Decoded	M	M	O	Message name
		O	O	O	Record extensions
		M	M	X	rncID of traced RNC CoreNetworkID CN Domain Indicator
		M	M	X	rabId + Dedicated IE extracted from RANAP messages between the traced RNC and Core Network. A subset of IEs as given in the table 4.6.2. is provided.
	ASN.1	X	X	M	Raw Iu Messages RANAP: messages between the traced RNC and Core Network The encoded content of the message is provided
Iur	Decoded	M	M	O	Message name
		O	O	O	Record extensions
		M	M	X	rncID of traced RNC rncID of neighbouring RNC
		M	M	X	rlId + Dedicated IE extracted from RNSAP messages between the traced RNC and the neighbouring RNC. A subset of IEs as given in the table 4.6.2.is provided
	ASN.1	X	X	M	Raw Iur Messages: RNSAP messages between the traced RNC and the neighbouring RNC. The encoded content of the message is provided
nbap (only dedicated measurements)	Decoded	X	M	X	Iub IEs from NBAP measurement reports messages
	ASN.1	X	X	M	NBAP measurement reports messages

rrc (only dedicated measurements)	Decoded	X	M	X	Uu IEs from RRC measurement reports messages
	ASN.1	X	X	M	RRC measurement reports messages

Definitions:

- rncID of traced RNC: The id of the RNC traced, e.g. the RNC which handles the connection of the traced MS, during the Trace Recording Session.
- rncID of neighbouring RNC: The ids of all Neighboring RNC involved in the Iur procedures during the Trace Recording Session.
- cId: The cIds of all cells involved in the Iub and Iur procedures during the Trace Recording Session. The cId is provided with each NBAP and RNSAP messages for which the cId is relevant.
- rabId: Specific recorded IE that contains the RAB identifier.
- rlId: Specific recorded IE that contains the Radio Link identifier
- rbId: Specific recorded IE that contains the Radio Bearer identifier
- Message name: Name of the protocol message
- Record extensions: A set of manufacturer specific extensions to the record
- Decoded: Some IEs shall be decoded (cf. detailed list in table 4.6.2. depending on trace depth)
- ASN.1: Messages in encoded format

Table 4.6.2: trace record description for minimum and medium trace depth

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	
Uu	RRC	RAB info type	RADIO BEARER SETUP HO TO UTRAN COMMAND RADIO BEARER RELEASE RADIO BEARER RECONFIGURATION	M	M	TS 25.331
		RB info type	RADIO BEARER RECONFIGURATION RADIO BEARER RELEASE RADIO BEARER SETUP HO TO UTRAN COMMAND	M	M	TS 25.331
		URA identity	RADIO BEARER SETUP RADIO BEARER RELEASE URA UPDATE CONFIRM RADIO BEARER RECONFIGURATION	M	M	TS 25.331
		CN domain	SIGNALLING CONNECTION RELEASE INITIAL DIRECT TRANSFER DL DIRECT TRANSFER UL DIRECT TRANSFER	M	M	TS 25.331
		Logical channel priority	RADIO BEARER SETUP	M	M	TS 25.331
		RRC state indicator	RADIO BEARER SETUP PHYSICAL CHANNEL RECONFIGURATION TRANSPORT CHANNEL RECONFIGURATION RADIO BEARER RECONFIGURATION CELL UPDATE CONFIRM URA UPDATE CONFIRM	M	M	TS 25.331
		Primary CPICH scrambling code of added cell	ACTIVE SET UPDATE	M	M	TS 25.331
		Primary CPICH scrambling code of removed cell	ACTIVE SET UPDATE	M	M	TS 25.331
		Target cell identity	CELL CHANGE ORDER	M	M	TS 25.331
		SFN-SFN observed time difference	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331
		CFN-SFN observed time difference	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331
		CPICH Ec/No	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331
		RSCP	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331
		Pathloss	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331
		UARFCN	RRC/MEASUREMENT REPORT for measurement = inter frequency	X	M	TS 25.331
		SFN-SFN observed time	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	
		difference				
		CFN-SFN observed time difference	RRC/MEASUREMENT REPORT for measurement = intra frequency	X	M	TS 25.331
		CPICH Ec/No	RRC/MEASUREMENT REPORT for measurement = inter frequency	X	M	TS 25.331
		RSCP	RRC/MEASUREMENT REPORT for measurement = inter frequency	X	M	TS 25.331
		Pathloss	RRC/MEASUREMENT REPORT for measurement = inter frequency	X	M	TS 25.331
		BCCH ARFCN	RRC/MEASUREMENT REPORT for measurement = inter RAT	X	M	TS 25.331
		UTRA Carrier RSSI	RRC/MEASUREMENT REPORT for measurement = inter RAT	X	M	TS 25.331
		Observed time difference to GSM cell	RRC/MEASUREMENT REPORT for measurement = intra RAT	X	M	TS 25.331
		RLC buffer Payload	RRC/MEASUREMENT REPORT for measurement = traffic volume	X	M	TS 25.331
		Average RLC buffer payload	RRC/MEASUREMENT REPORT for measurement = traffic volume	X	M	TS 25.331
		Variance of RLC buffer payload	RRC/MEASUREMENT REPORT for measurement = traffic volume	X	M	TS 25.331
Iub	NBAP	RL identity	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST RADIO LINK RECONFIGURATION READY RADIO LINK RECONFIGURATION FAILURE RADIO LINK RECONFIGURATION RESPONSE RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION REQUEST RADIO LINK SETUP RESPONSE RADIO LINK SETUP FAILURE RADIO LINK ADDITION RESPONSE RADIO LINK ADDITION FAILURE RADIO LINK DELETION REQUEST	M	M	TS 25.433
		RL info type	RADIO LINK SETUP FAILURE RADIO LINK ADDITION FAILURE RADIO LINK RECONFIGURATION FAILURE	M	M	TS 25.433
		C-ID	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST	M	M	TS 25.433
		UL Scrambling Code	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.433
		UL SIR target	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.433
		Minimum UL channelization length	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.433
		Initial DL transmission Power	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST	M	M	TS 25.433
		Maximum DL transmission	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.433

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	
		Power	RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION REQUEST			
		Minimum DL transmission Power	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.433
		DL scrambling code	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.433
		DL Code information	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.433
		Puncture limit	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.433
		Received total wide band power	RADIO LINK SETUP RESPONSE RADIO LINK SETUP FAILURE RADIO LINK ADDITION RESPONSE RADIO LINK ADDITION FAILURE	M	M	TS 25.433
Iu	RANAP	RAB identity	All messages where it is present	M	M	TS 25.413
		RAB info type	RAB ASSIGNMENT REQUEST RELOCATION REQUEST RAB MODIFY REQUEST RAB ASSIGNMENT RESPONSE	M	M	TS 25.413
		RAB parameters	RAB ASSIGNMENT REQUEST RELOCATION REQUEST	M	M	TS 25.413
		Assigned RAB parameters values	RAB ASSIGNMENT RESPONSE	M	M	TS 25.413
		Requested RAB parameters values	RAB MODIFY REQUEST	M	M	TS 25.413
		Source ID	RELOCATION REQUIRED	M	M	TS 25.413
		Target ID	RELOCATION REQUIRED	M	M	TS 25.413
		LAI	DIRECT TRANSFER	M	M	TS 25.413
		RAC	DIRECT TRANSFER	M	M	TS 25.413
		SAI	DIRECT TRANSFER	M	M	TS 25.413
Iur	RNSAP	RL id identity	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST RADIO LINK RECONFIGURATION READY RADIO LINK RECONFIGURATION FAILURE RADIO LINK RECONFIGURATION RESPONSE RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION REQUEST RADIO LINK SETUP RESPONSE RADIO LINK SETUP FAILURE RADIO LINK ADDITION RESPONSE	M	M	TS 25.423

Interface name	Prot. name	IE name	Message name(s)	Trace depth		Notes
				Min	Med	
			RADIO LINK ADDITION FAILURE RADIO LINK DELETION REQUEST			
		C-ID	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST	M	M	TS 25.423
		RL info type	RADIO LINK SETUP FAILURE RADIO LINK ADDITION FAILURE RADIO LINK SETUP FAILURE RADIO LINK RECONFIGURATION FAILURE	M	M	TS 25.423
		UL Scrambling Code	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.423
		UL SIR target	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.423
		Minimum UL channelization length	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.423
		Initial DL transmission Power	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST	M	M	TS 25.423
		Maximum DL transmission Power	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.423
		Minimum DL transmission Power	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.423
		DL scrambling code	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.423
		DL channelization code	RADIO LINK SETUP REQUEST RADIO LINK ADDITION REQUEST RADIO LINK RECONFIGURATION PREPARE RADIO LINK RECONFIGURATION REQUEST	M	M	TS 25.423
		Puncture limit	RADIO LINK SETUP REQUEST RADIO LINK RECONFIGURATION PREPARE	M	M	TS 25.423
		Received total wide band power	RADIO LINK SETUP RESPONSE RADIO LINK SETUP FAILURE RADIO LINK ADDITION RESPONSE RADIO LINK ADDITION FAILURE	M	M	TS 25.423

4.7 S-CSCF Trace Record Content

[Editorís Note: Awaiting contributions.]

4.8 P-CSCF Trace Record Content

[Editorís Note: Awaiting contributions.]

4.9 HSS Trace Record Content

[Editorís Note: Awaiting contributions.]

Annex A (normative): Trace Report File Format

This annex describes the format of trace result files. Those files are to be transferred from the network (NEs or EM) to the NM.

The following conditions have been considered for the definition of this file format:

- The trace data volume and trace duration is not predictable. Depending on the data retrieval and storage mechanisms, several consecutive trace result files could be generated for a single traced call. The file naming convention shall allow rebuilding the temporal file sequences.
- Since the files are transferred via a machine-machine interface, the files should be machine-readable using standard tools.
- The file format should be independent from the data transfer protocol used to carry the file from one system to another.
- The file format should be generic across 3G systems.
- The file format should be flexible enough to support further trace data types and decoded IEs, as well as vendor specific trace data.

A.1. Parameter description and mapping table

Table A.1.1 describes the XML trace file parameters.

Table A.1.1: XML trace file parameters

XML element / XML attribute specification	Description
`traceCollecFile`	This is the top-level element. It identifies the file as a collection of trace data. This element includes: - a file header (element "`fileHeader`") - the collection of trace data items (elements "`traceRecSession`").
`fileHeader`	This is the trace file header element. This element includes: - a version indicator (attribute specification "`fileFormatVersion`") - the vendor name of the sending network node (attribute specification "`vendorName`") - the name of the sending network node (attribute specification "`fileSender elementDn`") - the type of the sending network node (attribute specification "`fileSender elementType`") - a time stamp (attribute specification "`traceCollec beginTime`").
`fileHeader fileFormatVersion`	This attribute specification identifies the file format version applied by the sender. The format version defined in the present document shall be the abridged number and version of this 3GPP document (see below). The abridged number and version of a 3GPP document is constructed from its version specific full reference "`3GPP [Ö] (yyyy-mm)`" by: - removing the leading "`3GPP TS`" - removing everything including and after the version third digit, representing editorial only changes, together with its preceding dot character - from the resulting string, removing leading and trailing white space, replacing every multi character white space by a single space character and changing the case of all characters to uppercase.
`fileHeader vendorName`	Optional attribute specification that has the following value part: vendor of the equipment that provided the trace file.
`fileSender elementDn`	Optional attribute specification that uniquely identifies the NE or EM that assembled this trace file, according to the definitions in 3GPP TS 32.300 [11].

XML element / XML attribute specification	Description
fileSender elementType	Optional attribute specification that identifies type of the network node that generated the file, e.g. "RNC", "SGSN".
traceCollec beginTime	This attribute specification contains a timestamp that refers to the start of the first trace data that is stored in this file. It is a complete timestamp including day, time and delta UTC hour. E.g. "2001-09-11T09:30:47-05:00".
traceRecSession	Optional element that contains the traced data associated to a Trace Recording Session. It includes: - the DN prefix (attribute specification "dnPrefix") - the trace session identifier (attribute specification "traceSessionRef") - the trace recording session identifier (attribute specification "traceRecSessionRef") - the start time of the call (attribute specification "stime") - the ue identifier (element "ue") - the traced messages (elements "msg")
traceRecSession dnPrefix	Optional attribute specification that provides the DN prefix (see 3GPP TS 32.300 [11]).
traceRecSession traceSessionRef	Attribute specification that provides a unique trace session identifier as described in 3GPP TS 32.421 [2].
traceRecSession traceRecSessionRef	Attribute specification that provides a unique trace recording session identifier as described in 3GPP TS 32.421 [2] and 3GPP TS 32.422 [3].
traceRecSession stime	Optional attribute specification that provides the start time of the call.
ue	This element gives the ue identifier provided in trace activation messages. It includes: - the ue identifier type (attribute specification "idType") - the ue identifier value (attribute specification "idValue")
ue idType	Attribute specification that provides the ue identifier type (IMSI, IMEI (SV), or Private User Id).
ue idValue	Attribute specification that provides the ue identifier value.
msg	This element contains the information associated to a traced message. It includes: - the function name associated to the traced message (attribute specification "function") - the time difference with attribute specification "traceCollec beginTime" (attribute specification "changeTime") - a boolean value that indicates if the message is vendor specific (attribute specification "vendorSpecific") - the protocol message name (attribute specification "name") - the NE initiator of the protocol message (element "initiator") - the NE target of the protocol message (element "target") - the encoded protocol message (element "rawMsg") - the traced IEs, either simple (elements "ie") or complex (elements "ieGroup"), in any order
msg function	Attribute specification that provides the function name associated to the traced message (e.g. Iuu, Iu CS, Iub, Intra frequency measurement, Gb, Ö).
msg changeTime	Attribute specification that provides the time difference with attribute specification "traceCollec beginTime". It is expressed in number of seconds and milliseconds (nbsec.ms).
msg vendorSpecific	Attribute specification whose value part is a boolean value that indicates if the message is vendor specific (true) or not (false).
msg name	Attribute specification that provides the protocol message name.
initiator	Optional element that identifies the NE initiator of the protocol message. It includes: - the type of the network node that initiate the message (attribute specification "type") - the LDN of NE initiator of the protocol message (element's content). The element's content may be empty in case the initiator is the sender or the mobile
initiator type	Optional attribute specification that provides the type of the network node that initiate the message, e.g. "RNC", "SGSN".
target	Optional element that identifies the NE target of the protocol message. It includes: - the type of the network node that receive the message (attribute specification "type") - the LDN of NE target of the protocol message (element's content). The element's content may be empty in case the target is the sender or the mobile
target type	Optional attribute specification that provides the type of the network node that receive the message, e.g. "RNC", "SGSN".

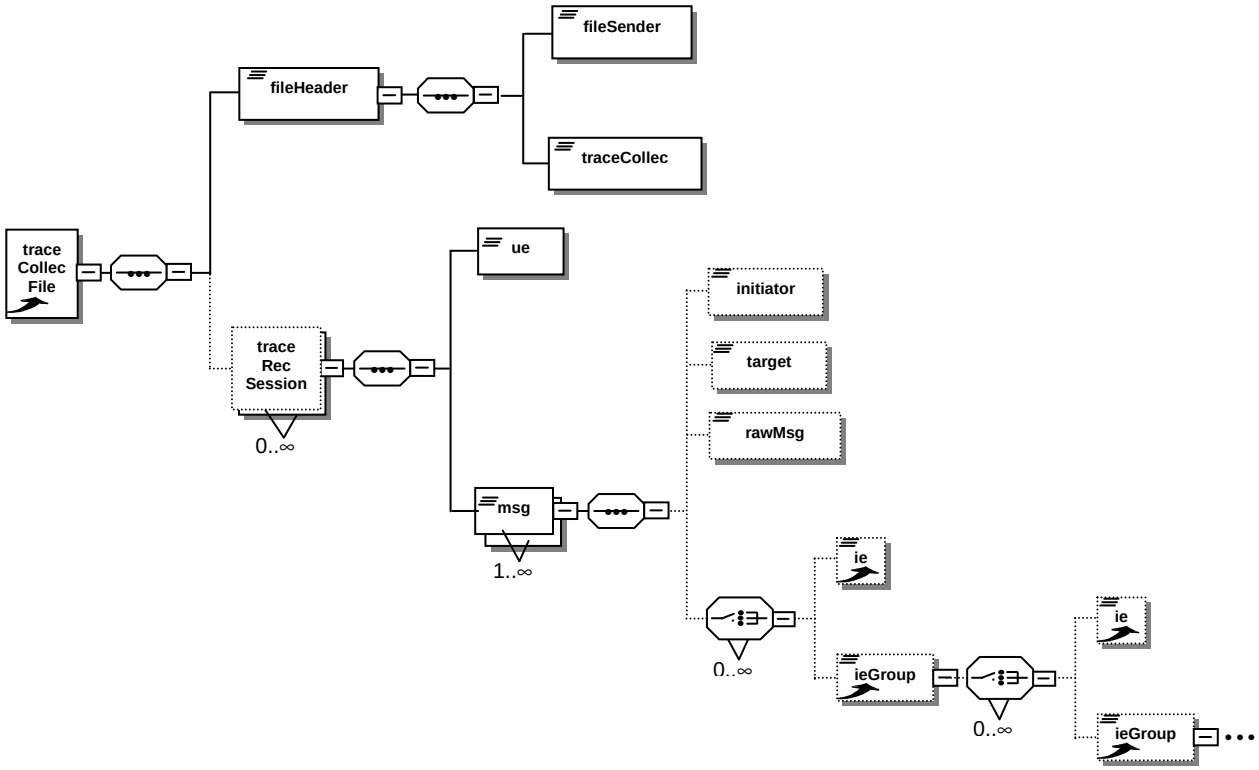
XML element / XML attribute specification	Description
rawMsg	Optional element that contains the encoded protocol message. It includes: - the protocol name associated to the event (attribute specification "protocol") - the protocol version (attribute specification "version") - the hexadecimal encoded form of the message (element's content) This element is available only if the trace depth is maximum.
rawMsg protocol	Attribute specification that provides the protocol name associated to the event (e.g. "Ranap").
rawMsg version	Attribute specification that provides the protocol version.
ieGroup	Optional element that contains a complex traced IE, i.e. an IE that contains other traced IEs. It includes: - the IE group name (attribute specification "name") - the IE group value (attribute specification "value") - zero or more traced IEs, either simple (elements "ie") or complex (elements "ieGroup"), in any order This element is available only if the trace depth is medium or minimum.
ieGroup name	Optional attribute specification that provides the IE group name (e.g. "RAB parameters").
ieGroup value	Optional attribute specification that provides the IE group value when it exists (e.g. "RAB identifier").
ie	Optional element that contains a simple traced IE, i.e. an IE decoded from the traced message. It includes: - the IE name (attribute specification "name") - the IE value (element's content) This element is available only if the trace depth is medium or minimum.
ie name	Attribute specification that provides the IE name (e.g. "Minimum DL Power").

A.2 XML file format definition

For encoding of the information content, XML (see Extensible Markup Language (XML) 1.0, W3C Recommendation 10-Feb-98) will be used. The XML schema contains the mark-up declarations that provide a grammar for the trace file format. The XML schema is defined below.

A.2.1 XML trace file diagram

The following figure describes the XML element structure of a trace XML file.



Note: Refer to ì Symbolî paragraph for the symbols meaning

Figure A.2.1: XML trace file diagram

A.2.2 Trace data file XML schema

The following XML schema `traceData.xsd` is the schema for trace data XML files:

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

<!--
  3GPP TS 32.423 Subscriber and Equipment Trace data definition and management
  Trace data file XML schema
  traceData.xsd
-->

<schema
  targetNamespace=
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32423-600.zip#traceData"
  elementFormDefault="qualified"
  xmlns="http://www.w3.org/2001/XMLSchema"
  xmlns:td=
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32423-600.zip#traceData"
>

  <!-- Trace data file root XML element -->

  <element name="traceCollecFile">
    <complexType>
      <sequence>
        <element name="fileHeader">
          <complexType>
```

```
      <sequence>
        <element name="fileSender">
          <complexType>
            <attribute name="elementDn" type="string" use="optional"/>
            <attribute name="elementType" type="string" use="optional"/>
          </complexType>
        </element>
        <element name="traceCollec">
          <complexType>
            <attribute name="beginTime" type="dateTime" use="required"/>
          </complexType>
        </element>
      </sequence>
      <attribute name="fileFormatVersion" type="string" use="required"/>
      <attribute name="vendorName" type="string" use="optional"/>
    </complexType>
  </element>
  <element name="traceRecSession" minOccurs="0" maxOccurs="unbounded">
    <complexType>
      <sequence>
        <element name="ue">
          <complexType>
            <attribute
              name="idType"
              type="string"
              use="required"
              default="IMSI"
            />
            <attribute name="idValue" type="long" use="required"/>
          </complexType>
        </element>
        <element name="msg" maxOccurs="unbounded">
          <complexType>
            <sequence>
              <element name="initiator" minOccurs="0">
                <complexType>
                  <simpleContent>
                    <restriction base="string"/>
                  </simpleContent>
                  <attribute name="type" type="NCName" use="optional"/>
                </complexType>
              </element>
              <element name="target" minOccurs="0">
                <complexType>
                  <simpleContent>
                    <restriction base="string"/>
                  </simpleContent>
                  <attribute name="type" type="NCName" use="optional"/>
                </complexType>
              </element>
              <element name="rawMsg" minOccurs="0">
                <complexType>
                  <simpleContent>
                    <restriction base="hexBinary"/>
                  </simpleContent>
                  <attribute
                    name="protocol"
                    type="string"
                    use="required"
                  />
                  <attribute name="version" type="string" use="required"/>
                </complexType>
              </element>
```

```
                  <choice minOccurs="0" maxOccurs="unbounded">
                    <element ref="td:ie"/>
                    <element ref="td:ieGroup"/>
                  </choice>
                </sequence>
                <attribute name="function" type="string" use="required"/>
                <attribute name="name" type="string" use="required"/>
                <attribute name="changeTime" type="float" use="required"/>
                <attribute
                  name="vendorSpecific"
                  type="boolean"
                  use="required"
                />
              </complexType>
            </element>
          </sequence>
          <attribute name="dnPrefix" type="string" use="optional"/>
          <attribute name="traceSessionRef" type="long" use="required"/>
          <attribute name="traceRecSessionRef" type="long" use="required"/>
          <attribute name="stime" type="dateTime" use="optional"/>
        </complexType>
      </element>
    </sequence>
  </complexType>
</element>

<!-- Additional supporting XML elements -->

<element name="ieGroup">
  <complexType>
    <choice minOccurs="0" maxOccurs="unbounded">
      <element ref="td:ie"/>
      <element ref="td:ieGroup"/>
    </choice>
    <attribute name="name" type="string" use="optional"/>
    <attribute name="value" type="string" use="optional"/>
  </complexType>
</element>

<element name="ie">
  <complexType>
    <simpleContent>
      <restriction base="string"/>
    </simpleContent>
    <attribute name="name" type="string" use="required"/>
  </complexType>
</element>

</schema>
```

Annex B (normative): Trace Report File Conventions and Transfer Procedure

This annex describes naming conventions of files containing trace results and the procedure to transfer these files from the network to the NM.

B.1. File naming convention

The following convention shall be applied for trace result file naming:

<Type><Startdate>.<Starttime>-<SenderType>.<SenderName>.[<TraceReference>].[<TraceRecordingSessionRef>]

1) The Type field indicates if the file contains trace data for single or multiple calls, where:
   - "A" means single Trace Recording Session, single sender NE
   - "B" means multiple Trace Recording Sessions, single sender NE
2) The Startdate field indicates the date of the first record in the trace file. The Startdate field is of the form YYYYMMDD, where:
   - YYYY is the year in four-digit notation;
   - MM is the month in two digit notation (01 - 12);
   - DD is the day in two digit notation (01 - 31).
3) The Starttime field indicates the time of the first record in the trace file. The Starttime field is of the form HHMMshhmm, where:
   - HH is the two digit hour of the day (local time), based on 24 hour clock (00 - 23);
   - MM is the two digit minute of the hour (local time),
   - s is the sign of the local time differential from UTC (+ or -), in case the time differential to UTC is 0 then the sign may be arbitrarily set to "+" or "-";
   - hh is the two digit number of hours of the local time differential from UTC (00-23);
   - mm is the two digit number of minutes of the local time differential from UTC (00-59).
4) SenderType field is the type of NE defined by IOC attribute managedElementType in 3GPP TS 32.622 [12] that recorded and sent the trace file; SenderName field is the identifier of the NE that recorded and sent the trace file.
5) TraceRecordingSessionReference field is set only if the type field is A.
6) TraceReference field is set only if the type field is A.

Some examples describing file naming convention:

1) file name: A20030225.2315+0200-RNC.RNC01.01.125,

   meaning: file produced by RNC<RNC01> on February 25, 2003, first trace record at 23:15 local with a time differential of +2 hours against UTC. The file contains trace data for the Trace Session with the Trace reference 01 and for the Trace Recording Session with the reference 125.

2) file name: B20030115.1700-0300-RNC.RNC02,

   meaning: file produced by RNC<RNC02> on January 15, 2003, first trace record at 17:00 local with a time differential of -3 hours against UTC. The file contains trace data for several Trace Recording Sessions.

B.2. File transfer

Data retrieval and storage mechanisms are vendor specific.

There is no constraint on data retrieval periodicity.

Annex C (informative): Trace Functional Architecture: Reporting

C.1 Figure of Trace Reporting

The following represents the trace reporting procedures.

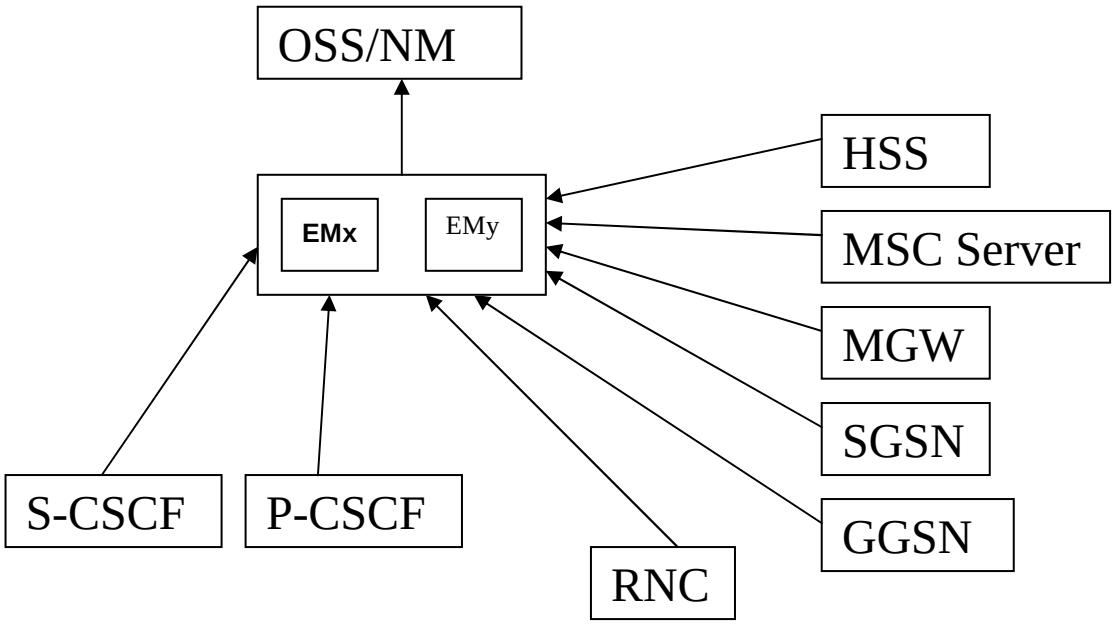


Figure C.1.1: Trace Reporting in System context A

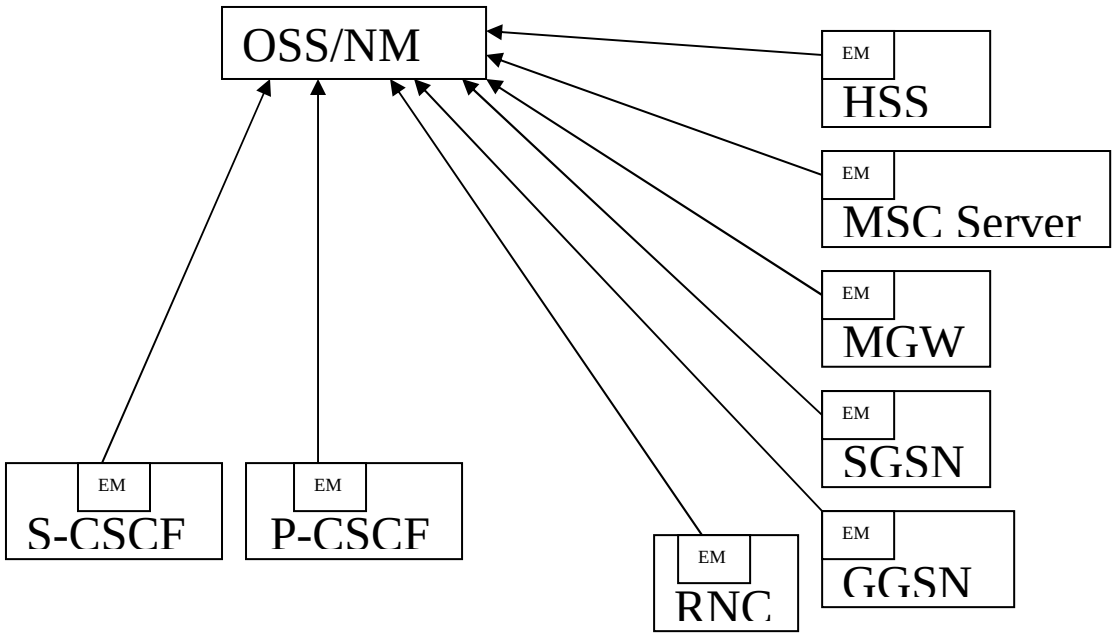


Figure C.1.2: Trace Reporting in System Context B

Annex D (informative): Examples of trace files

D.1 Examples of trace XML file

D.1.1 Example of XML trace file with the maximum level of details

```
<?xml version="1.0" encoding="UTF-8"?>
<traceCollecFile
  xmlns=
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32423-600.zip#traceData"
>
  <fileHeader fileFormatVersion="32.423 V6.0"
              vendorName="Company NN"
    <fileSender
      elementDn=
      "DC=a1.companyNN.com,SubNetwork=1,SubNetwork=1,ManagedElement=RNC-1"
      elementType="RNC"
    />
    <traceCollec beginTime="2001-09-11T09:30:47-05:00"/>
  </fileHeader>
  <traceRecSession
    dnPrefix="DC=a1.companyNN.com,SubNetwork=1>
    traceSessionRef="1"
    traceRecSessionRef="2147483647"
    stime="2001-09-11T09:30:47-05:00"
  >
    <ue idType="IMSI" idValue="32795"/>
    <msg
      function="Iub"
      name="Radio LinkSetup Request"
      changeTime="0.005"
      vendorSpecific="false"
    >
      <target type="Cell">SubNetwork=1,ManagedElement=Cell-1</target>
      <rawMsg protocol="Nbap" version="001">A9FD64E12C</rawMsg>
    </msg>
  </traceRecSession>
</traceCollecFile>
```

D.1.2 Example of XML trace file with the minimum level of details

```
<?xml version="1.0" encoding="UTF-8"?>
<traceCollecFile
  xmlns=
"http://www.3gpp.org/ftp/specs/latest/rel-6/32_series/32423-600.zip#traceData"
>
  <fileHeader fileFormatVersion="32.423 V6.0"
              vendorName="Company NN"
    <fileSender
      elementDn=
      "DC=a1.companyNN.com,SubNetwork=1,SubNetwork=1,ManagedElement=RNC-1"
      elementType="RNC"
    />
    <traceCollec beginTime="2001-09-11T09:30:47-05:00"/>
  </fileHeader>
```

```
  <traceRecSession
    dnPrefix="DC=a1.companyNN.com,SubNetwork=1"
    traceSessionRef="1"
    traceRecSessionRef="2147483647"
    stime="2001-09-11T09:30:47-05:00"
    >
    <ue idType="IMSI" idValue="32795"/>
    <msg
      function="Iub"
      name="Radio Link Setup Request"
      changeTime="0.005"
      vendorSpecific="false"
    >
      <target type="Cell">SubNetwork=1,ManagedElement=Cell-1</target>
      <ie name="UL Scrambling Code">54</ie>
      <ie name="UL SIR Target">17.3</ie>
      <ie name="Min UL Channelisation Code Length">8</ie>
      <ie name="Poncture Limit">2</ie>
      <ieGroup name="RadioLink" value="1">
        <ie name="DL Scrambling Code">1</ie>
        <ie name="DL Channelisation Code Number">15</ie>
        <ie name="Maximum DL Power">9.3</ie>
        <ie name="Minimum DL Power">-10.1</ie>
      </ieGroup>
    </msg>
    <msg
      function="IuPs"
      name="RAB Assignment Response"
      changeTime="0.010"
      vendorSpecific="false"
    >
      <ieGroup name="RAB" value="1">
        <ieGroup name="RAB Failed To Setup Or Modify">
          <ie name="cause">2</ie>
        </ieGroup>
      </ieGroup>
    </msg>
  </traceRecSession>
</traceCollecFile>
```

Annex E (informative): Change history

Change history							
Date	TSG #	TSG Doc.	CR	Rev	Subject/Comment	Old	New
Sep 2004	S_25	SP-040564	--	--	Submitted to TSG SA#25 for Information	1.0.0	