TSGS#26(04)0770

Source: SA5 (Telecom Management)

Title: 4 Rel-6 CR 32.421/2 Trace concepts and requirements / Trace control and configuration management

Document for: Approval

Agenda Item: 7.5.3

Doc1stevel	Specific a	CR	R	Phase	Subject	Ca	VersCu	Doc2ndLev	WorkitemsI D
SP-040770	32.421	005	--	Rel-6	Remove requirement for having ASN.1 as Trace record format	C	6.4.0	S5-042737	OAM-Trace
SP-040770	32.421	006	--	Rel-6	Remove in Rel-6 the signalling based Trace in IMS due to missing SIP signalling support from CN1/IETF	C	6.4.0	S5-042743	OAM-Trace
SP-040770	32.422	001	--	Rel-6	Remove IMS entities from the Signalling Based Activation of the Trace functionality	C	6.0.0	S5-042736	OAM-Trace
SP-040770	32.422	002	--	Rel-6	Align Management Based Activation for Trace with RAN3's 25.413 (UTRAN Iu interface RANAP signalling)	F	6.0.0	S5-042745	OAM-Trace

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CHANGE REQUEST

⌘ 32.421 CR 005 ⌘rev - ⌘ Current version: 6.4.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: | UICC apps⌘ ☐ ME ☐ Radio Access Network X Core Network X

Title:	⌘	Remove requirement for having ASN.1 as Trace record format
Source:	⌘	**SA5** (kari.t.ronka@nokia.com)
Work item code:	⌘	OAM-Trace
Date:	⌘	13/11/2004
Category:	⌘	**C**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	SA5 has agreed earlier that only XML should be specified as Trace record format in Rel-6 and not ASN.1.
Summary of change:	⌘	Remove the requirement for having ASN.1 as Trace record format
Consequences if not approved:	⌘	This TS would not be in line with the other Trace specifications in 32.42x.

Clauses affected:	⌘	5.5			
Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

Change in Clause 5.5

5.5 Requirements for Trace Data reporting

The high level requirements for Trace Data reporting, common to both Management activation/deactivation and Signalling based activation/deactivation, are as follows (Trace record contents, file formats and file transfer mechanisms are defined in 3GPP TS 32.423 [3]):

- Trace records should be generated in each NE where a Trace Session has been activated and a Trace Recording Session has been started.
- Format of the Trace records shall be XML Schema ~~or ASN.1~~.
- Trace records should be transferred on the Itf-N to the Network Manager using one of two approaches: direct transfer from NE to NM or transfer from NE to NM via EM.

For transfer of Trace records via Itf-N, FTP shall be used.

End of Change in Clause 5.5
End of document

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CHANGE REQUEST

⌘ 32.421 CR 006 ⌘rev - ⌘ Current version: 6.4.0 ⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: | UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network X

Title:	⌘	Remove in Rel-6 the signalling based Trace in IMS due to missing SIP signalling support from CN1/IETF
Source:	⌘	**SA5** (kari.t.ronka@nokia.com)
Work item code:	⌘	OAM-Trace
Date:	⌘	13/11/2004
Category:	⌘	**C**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:
2 (GSM Phase 2)
R96 (Release 1996)
R97 (Release 1997)
R98 (Release 1998)
R99 (Release 1999)
Rel-4 (Release 4)
Rel-5 (Release 5)
Rel-6 (Release 6)

Reason for change:	⌘	SIP signalling support for signalling based Trace in IMS (from CN1/IETF) will not be available within Rel-6 timeframe. Hence, SA5 needs to remove signalling based Trace in IMS from the Rel-6 Trace specifications in 32.42x.
Summary of change:	⌘	Remove references to signalling based Trace in IMS.
Consequences if not approved:	⌘	This TS is not in line with SA5/SA/CN1/CN agreements and with the other Trace specifications 32.42x. Also, as in Rel-6 there will be NO enhancements for SIP for signalling based Trace in IMS, this CANNOT be implemented.

Clauses affected:	⌘	5.3.1, A.2.2

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
		X		O&M Specifications	Rel-6 32.422

Other comments:	⌘	Parent to 32.422 CR in S5-042736.

Change in Clause 5.3.1

5.3 Requirements for Trace activation

5.3.1 Requirements for Trace Session activation

The high level requirements for Trace Session activation, common to both Management activation and Signalling based activation), are as follows:

- In case of subscriber Trace, the Trace Session will be activated for a certain subscriber whose identification (IMSI in UTRAN/CS/PS ~~or Private ID in IMS~~) shall be known in the NEs where subscriber Trace is needed.
- In case of MS Trace, the Trace Session will be activated for a certain MS whose identification (IMEI or IMEISV) shall be known in the NEs where MS Trace is needed.
- Trace Session activation shall be possible for both home subscribers and visiting subscribers.
- There are two methods for Trace Session activation: Management activation and Signalling activation.
- For an established call/session within a Network Element, it is optional for the Network Element to start a Trace Recording Session for the associated Subscriber or MS upon receipt of the Trace activation request from the EM.
- A globally unique ID shall be generated for each Trace Session to identify the Trace Session. This is called the Trace Reference.
- Trace Session may be activated from the EM simultaneously to multiple NEs with the same Trace Reference (i.e. same Trace Session).
- The Trace Scope and Depth shall be specified within the control and configuration parameters during Trace Session activation.
- There can be cases in a NE when it receives multiple Trace Session activations for the same connection (e.g. simultaneous CS/PS connections). In these cases the starting time of the Trace Session Activation and the starting time of the first Trace Recording Session is the same using signalling based activation. For these cases there are two different cases for the Trace Session activation in a Network Element when it receives another Trace Session activation to the same subscriber or MS:
  - If the Trace Reference is equal to an existing one, a new Trace Session shall not be started;
  - If the Trace Reference is not equal to an existing one, a new Trace Session may be started.
- The EM shall always provide the trace control and configuration parameters to the appropriate NEs at the time of Trace Session activation.

The high level requirements for Trace Session activation, specific to Management activation, are as follows:

- In case of subscriber Trace, the Trace Session will be activated for a certain subscriber whose identification (IMSI in UTRAN/CS/PS or Private ID in IMS) shall be known in the NEs where subscriber Trace is needed.

End of Change in Clause 5.3.1

Change in Annex A, Clause A.2.2

A.2 Use case #2: subscriber complaint

A.2.1 Description

The aim of this use case is to check how the complaining subscriber's services are working, to get information on the services in order to find out the reason for the complaint.

The study can be started after a subscriber is complaining at his/her home or visited operator that some of the service to which he/she subscribed is not working. E.g. the subscriber:

- cannot make calls;
- cannot use some supplementary service;
- does not get the negotiated QoS level (e.g. Mobile subscriber activates video-streaming application to watch the latest sport events and every time the subscriber tries to connect to the service the system disconnects the subscriber's UMTS bearer).

As the Trace is activated for a subscriber, the signalling based Trace Session activation shall be used, as the location of the subscriber is not known.

A.2.2 Example of required data for this use case

The Trace parameters required to cover the use case #2 are listed below:

- The list of NEs where tracing may be needed depends on the service being complained about by the subscriber. For this use case, tracing should be possible in all network elements, such as: HSS, MSS, RNC, MGW, SGSN, GGSN~~, S-CSCF, P-CSCF~~.
- The identification of the subscriber in a Trace is IMSI in UTRAN/CS/PS ~~or Private ID in IMS~~. The identification of the MS in a Trace is IMEI or IMEISV.
- The data includes those Information Elements from the signalling messages, which are related to the service(s) being complained about by the subscriber (Medium Level).

Example cases, which can be the basis for subscriber complaint:

~~1. The subscriber cannot make an IM session.~~

~~Tracing is needed in HSS, S-CSCF, P-CSCF, SGSN, GGSN and UTRAN. The subscriber identification for this case is Private ID in IMS and IMSI in PS domain. From the HSS Trace the operator can determine whether the service in question or IM session establishment is allowed for the subscriber. From the S-CSCF and P-CSCF Trace the operator can examine the SIP signalling together with the SDP, which contains information on the media, while in the P-CSCF Trace the QoS negotiation with GGSN can be determined so in P-CSCF the COPS messages should be traced. From COPS (see 3GPP TS 29.207 [6] for more information on COPS) those parameters are needed, which show how the QoS Policy control is working, whether the session was dropped due to the QoS negotiation. If the source of the complaint is not found in IMS, tracing in SGSN, GGSN and in UTRAN is needed. From SGSN Trace record the QoS parameters, PDP contexts related information can be known while from UTRAN Trace information on the radio coverage and also some QoS related information can be known.~~

~~2~~1. The subscriber's CS call is misrouted

This illustrates an instance where a subscriber complains that his calls are being cross-connected (or misrouted). Such a complaint involves setting up a Trace at all the 3GPP standardised interfaces being handled by the MSC. However, the Trace functionality shall not cover MSC internal or vendor proprietary interfaces. The Trace record shall need to have the dialled number and connected number.

~~3~~2. The subscriber's call is dropped

Tracing data is required from the radio network (UTRAN) or from the core network (MSS, SGSN, GGSN). In the radio network the radio coverage shall be checked. See use case #4 (checking radio coverage). Beside the radio coverage, other information can be useful as well, like RLC parameter, power information (OLPC or RRC measurement report), error ratios (BLER / BER, SDU error ratio), etc. Tracing in the core network is needed also, if the problem is not in the radio network. E.g. in case of PS domain the call can be dropped by the application due to the long delays or congestions in TCP layer or due to bad QoS. Thus in SGSN the requested and negotiated QoS parameters should be included in the Trace record.

~~4~~3. The received QoS level is less than the negotiated level.

To be able to solve the possible problem Tracing data is required from HSS, SGSN, GGSN, and UTRAN. Furthermore in case of problem in CS calls tracing in MGW shall be performed.

From HSS Trace data the operator can monitor whether the subscriber's authentication to the network is successful, and what kind of QoS parameters are allowed to the subscriber. From SGSN Trace data the operator can monitor PDP context creation request from mobile. Request seem to contain legal QoS profile (incl. Maximum bandwidth, guaranteed bandwidth etc) and the local resources in SGSN are available to provide the service as requested by the subscriber. From UTRAN Trace data the operator can monitor whether the maximum bandwidth and guaranteed bandwidth, requested by SGSN, acceptable for UTRAN. Thus to check whether UTRAN can provide and maintain the requested radio access bearer services. From GGSN Trace data the operator can monitor PDP context activation between SGSN and GGSN. If the problem is in the CS domain the MGW Trace can provide the QoS data.

End of Change in Annex A, Clause A.2.2
End of document

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CHANGE REQUEST

⌘ 32.422 CR 001 ⌘rev - ⌘ Current version: 6.0.0 ⌘

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Proposed change affects: | UICC apps⌘ ☐ ME ☐ Radio Access Network ☐ Core Network X

Title:	⌘	Remove IMS entities from the Signalling Based Activation of the Trace functionality
Source:	⌘	**SA5** (gyula.bodog@nokia.com)
Work item code:	⌘	OAM-Trace
Date:	⌘	10/11/2004
Category:	⌘	**C**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	Signalling support for the Signalling Based Trace Activation in IMS is NOT available in Rel-6. This work has been shifted to the 3GPP Rel-7. Progress is linked and dependent on CN1/IETF work progress on SIP
Summary of change:	⌘	Remove IMS related sections from Signalling Based Trace Activation and some editorial clean-up.
Consequences if not approved:	⌘	The functionality is specified even though there is no signalling support for this. Therefore on system level the functionality is not working. Also 32.422 would not be aligned with the other 32.42x Trace specifications.

Clauses affected:	⌘	1, 4, 5.3

		Y	N			
Other specs affected:	⌘		X	Other core specifications	⌘	
			X	Test specifications		
		X		O&M Specifications		Rel-6 32.421

Other comments:	⌘	Parent CR 32.421 in S5-042743.

Change in Clause 1

1 Scope

The present document describes the mechanisms used for the control and configuration of the Trace functionality at the EMs and NEs. It covers the triggering events for starting/stopping of subscriber/MS activity traced over 3GPP standardized signalling interfaces, the types of trace mechanisms, configuration of a trace, level of detail available in the trace data, the generation of Trace results in the Network Elements (NEs) and the transfer of these results to one or more EM(s) and/or Network Manager(s) (NM(s)).

The mechanisms for Trace activation/deactivation are detailed in clause 4; clause 5 details the various Trace control and configuration parameters and the triggering events that can be set in a network. ~~Annex A provides the high level functional architecture for Trace Session activation and deactivation.~~ Trace concepts and requirements are covered in 3GPP TS 32.421 [2] while Trace data definition and management is covered in 3GPP TS 32.423 [3].

End of change in Clause 1

Change in Clause 4

4.1.3.1 General

In Signalling activation, the Trace Activation shall be carried out from the Core Network EM only [EM (PS), EM (CS), and EM (HSS) are generally considered to be in the Core Network~~/W~~. A Core Network EM can be any of these or their combinations].

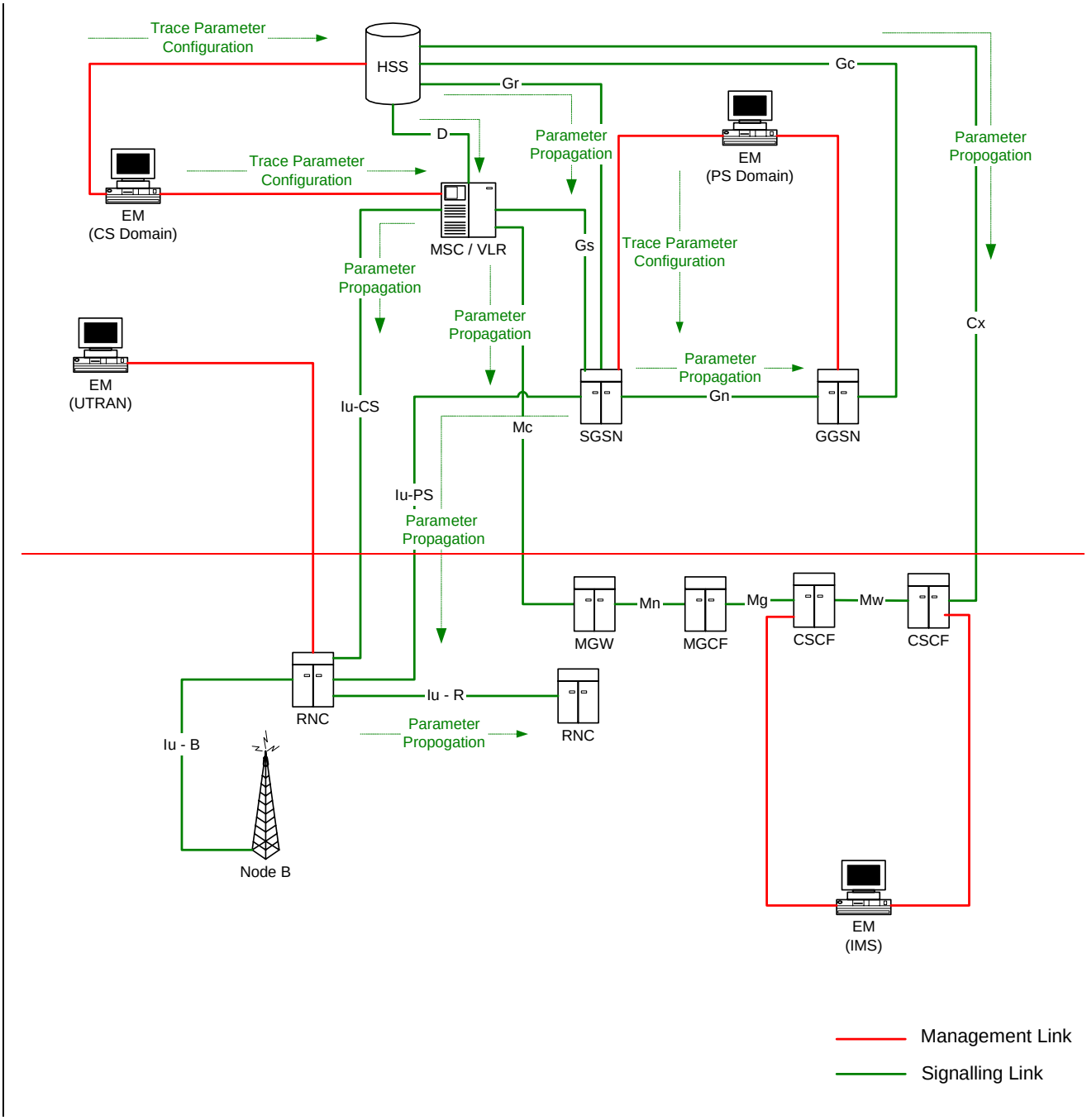
In case of home subscriber trace (i.e. in the HPLMN) the Trace Session activation shall go to the HSS / MSC Server / SGSN. Instances where the home subscriber is roaming in a VPLMN, the HSS may initiate a trace in that VPLMN. The VPLMN may reject such requests.

In case of foreign subscriber trace (i.e. the HPLMN operator wishes to trace foreign subscribers roaming in his PLMN) the Trace Session activation shall go the MSC Server/VLR or SGSN. Depending on the Trace Control and Configuration parameters received, the Core Network shall propagate the activation to selected NE's in the entire network ~~,~~ UTRAN and CN.~~, CN and IMS~~.

4.1.3.2 Intra PLMN signalling activation

Figure 4.1.3 presents the signalling based trace functionality within a PLMN. The figure represents a typical PLMN network. A dotted arrow with "Trace Parameter Configuration" represents the availability of the trace functionality at the EM for that domain. E.g. you cannot invoke a Signalling Trace at the EM (UTRAN) because there is no such arrow shown in the figure. You can however do it from the EM (CS Domain). Similarly "Trace Parameter Propagation" is allowed only for the interfaces indicated in the figure. E.g. there is no parameter propagation over Iu-B.

NOTE: For tracing on the basis of IMEI(SV), the signalling based activation can be only initiated from the MSC/VLR or SGSN.


Trace Parameter Configuration
HSS
Gc
Gr
D
Parameter Propagation
EM (PS Domain)
Parameter Propogation
Trace Parameter Configuration
EM (CS Domain)
MSC / VLR
Gs
Trace Parameter Configuration
Parameter Propagation
Parameter Propagation
Cx
EM (UTRAN)
Parameter Propagation
Gn
Iu-CS
Mc
SGSN
GGSN
Iu-PS
Parameter Propagation
Mn
Mg
Mw
MGW
MGCF
CSCF
CSCF
RNC
Iu - R
RNC
Parameter Propogation
Iu - B
Node B
EM (IMS)
Management Link
Signalling Link

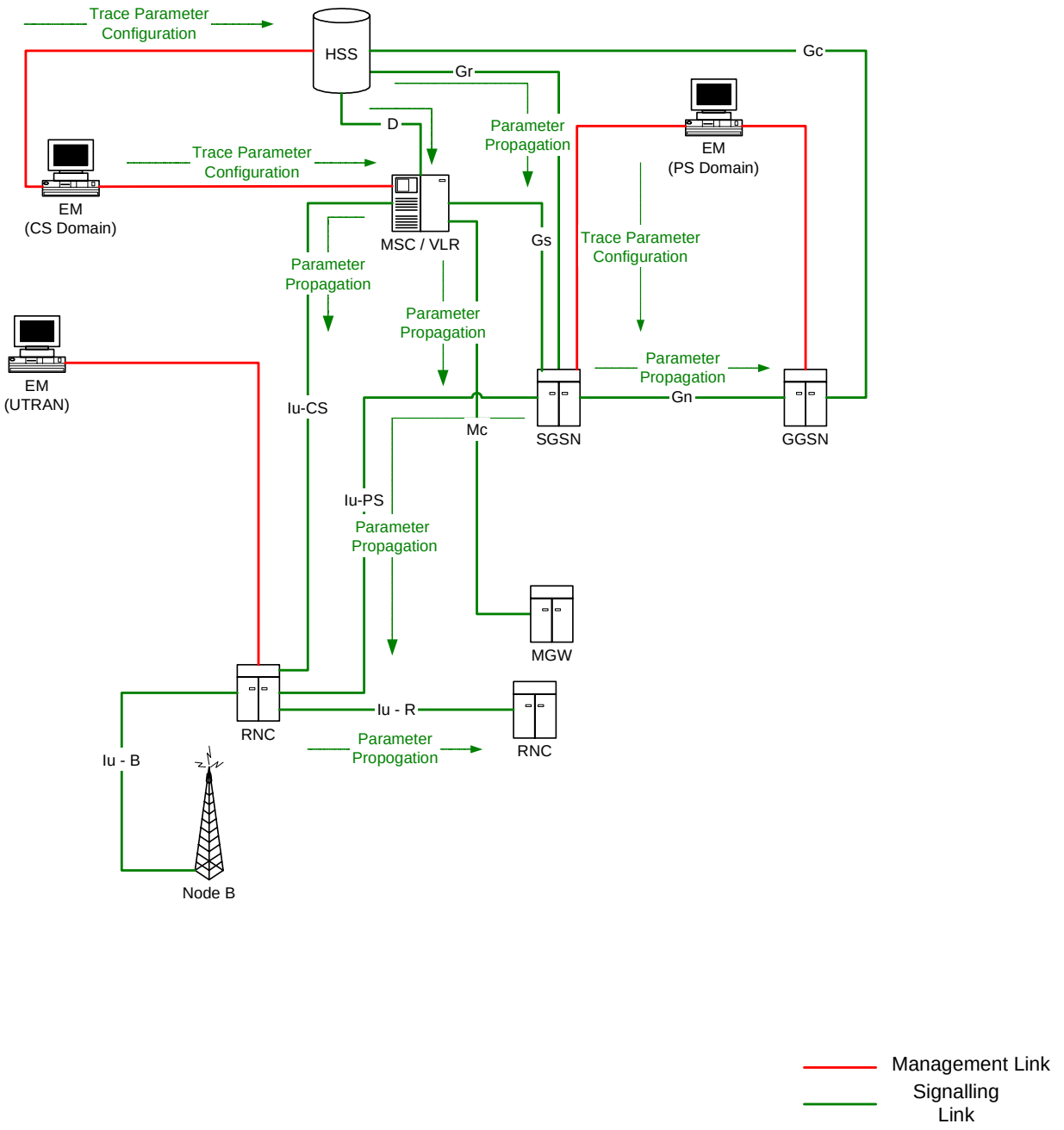
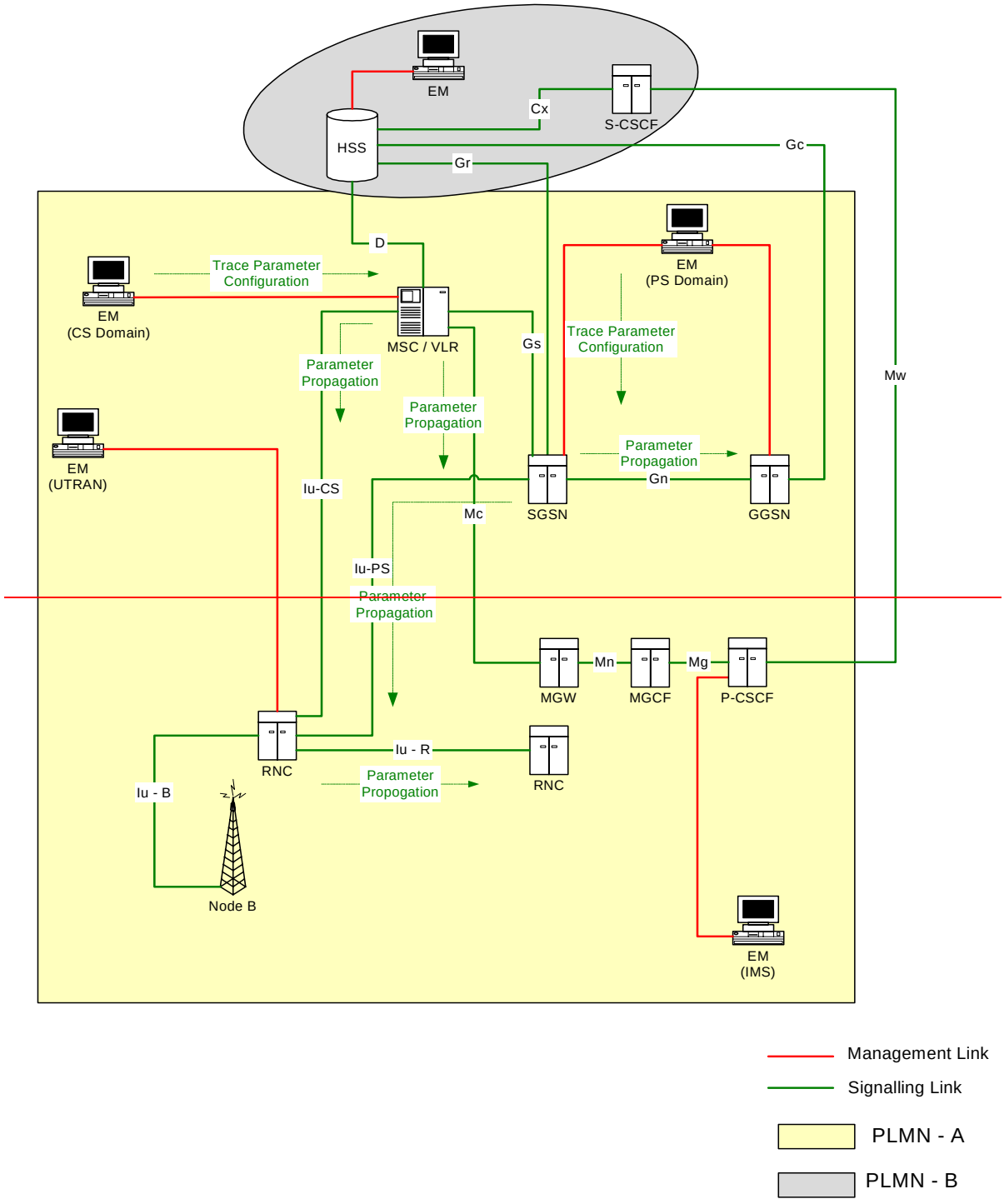


Figure 4.1.3: Overview of Intra-PLMN Signalling Activation

4.1.3.3 Inter PLMN Signalling Activation

Figure 4.1.4 presents the signalling based trace functionality between PLMNs. This is particularly useful when a roaming subscriber needs to be traced in a network. The figure represents a typical PLMN network and its connections with another PLMN's HSS. A dotted arrow with "Trace Parameter Configuration" represents the availability of the trace functionality at the EM for that domain. E.g. you cannot invoke a Signalling Trace at the EM (UTRAN) because there is no such arrow shown in the figure. You can however do it from the EM (CS Domain). Similarly "Trace Parameter Propagation" is allowed only for the interfaces indicated in the figure. E.g. there is no parameter propagation over Iu-B.

NOTE: There is no intention to allow tracing of a home subscriber roaming in a foreign network i.e. the trace function is limited to a single PLMN.


EM
HSS
Cx
S-CSCF
Gr
Gc
D
EM
(PS Domain)
Trace Parameter
Configuration
EM
(CS Domain)
MSC / VLR
Gs
Mw
Parameter
Propagation
Trace Parameter
Configuration
Parameter
Propagation
EM
(UTRAN)
Parameter
Propagation
Gn
Iu-CS
Mc
SGSN
GGSN
Iu-PS
Parameter
Propagation
MGW
Mn
MGCF
Mg
P-CSCF
RNC
Iu - R
RNC
Parameter
Propogation
Iu - B
Node B
EM
(IMS)
Management Link
Signalling Link
PLMN - A
PLMN - B

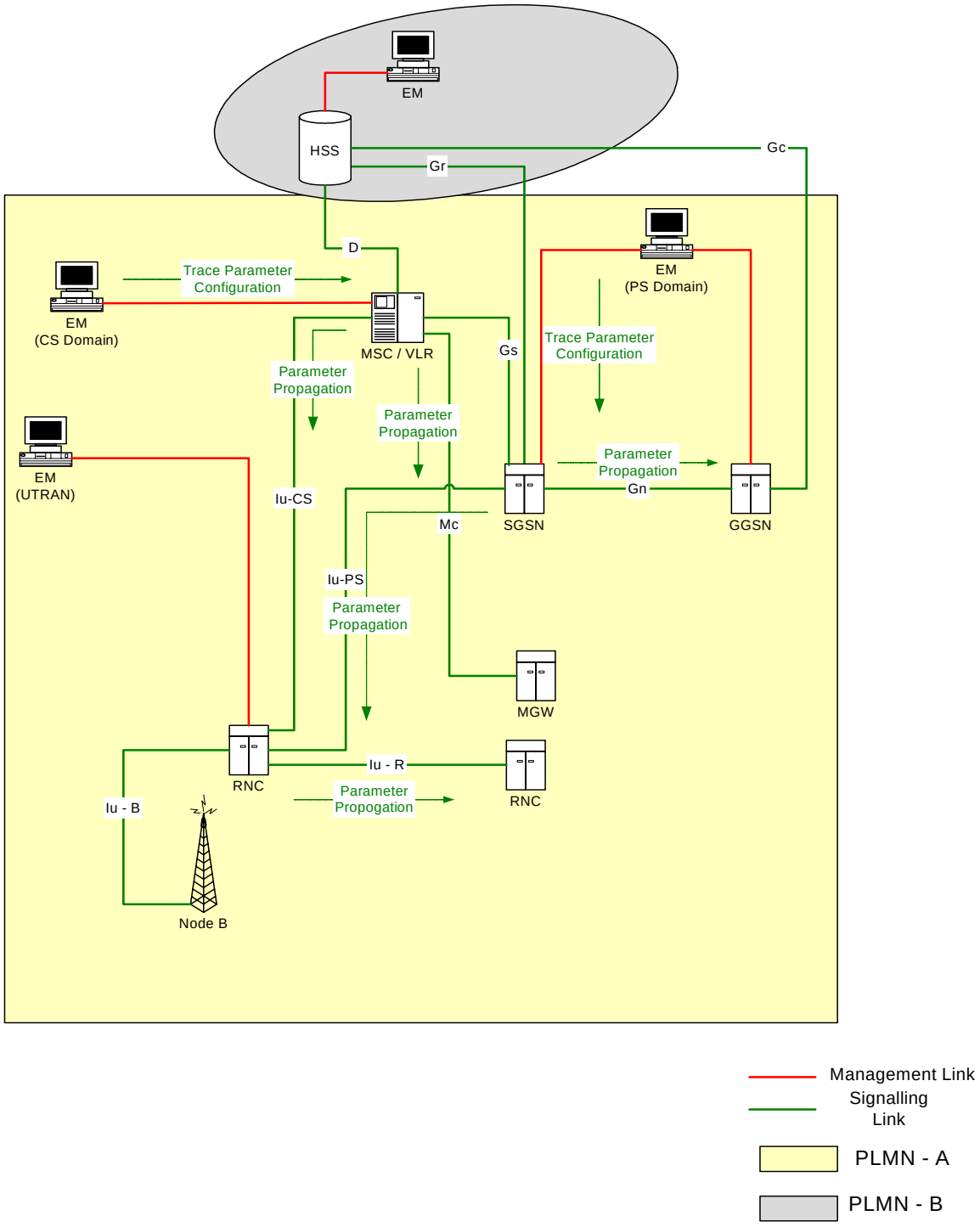


Figure 4.1.4: Overview of Inter-PLMN Signalling Activation

4.1.3.7 Void~~IP Multimedia Subsystem activation mechanisms~~

~~Editor's Note: Awaiting contributions.~~

4.1.5.1 General

In Signalling deactivation, the Trace Deactivation shall always be carried out from the Core Network EM only [EM (PS), EM (CS), and EM (HSS) are generally considered to be in the Core N~~W~~etwork. A Core Network EM can be any of these or their combinations]. In case of home subscriber trace (i.e. in the HPLMN) the Trace Session deactivation

shall go to the HSS, MSC Server/VLR, or SGSN. In case of foreign subscriber trace (i.e. the HPLMN operator wishes to deactivate tracing on foreign subscribers roaming in his PLMN) the Trace Session deactivation shall go the MSC Server/VLR or SGSN. The Management System shall deactivate the Trace Session in the same NE where it activated the Trace Session.

When an HSS receives a Trace Session deactivation from its Management system, it shall deactivate the active Trace Session corresponding to the Trace Reference received in the deactivation message. The HSS shall delete all trace control and configuration parameters associated with this Trace Session. If a Trace Recording Session is active at the time of receiving a Trace Session deactivation message from the EM, the HSS may choose to continue the Trace Recording Session till it ends gracefully or may stop it immediately. In all cases, the HSS shall deactivate the requested Trace Session immediately at the end of the Trace Recording Session.

4.1.5.5 VoidIP Multimedia Subsystem deactivation mechanisms

Editor's Note: For further study.

4.2.3.4 VoidIP Multimedia Subsystem starting mechanisms

Editor's Note: For further study.

4.2.5.4 VoidIP Multimedia Subsystem stopping mechanisms

Editor's Note: For further study.

End of change in Clause 4

Change in Clause 5.3

5.3 List of NE types (M)

This mandatory parameter defines the Network Element types where Trace Session activation is needed. This parameter has meaning only in the signalling based activation mechanism and it is used to determined whether the Trace Session Activation shall be propagated further to other Network Elements. In management based activation mechanism this parameter is not needed.

The following list contains the Network Element types:

- MSC Server
- MGW
- RNC
- SGSN
- GGSN
- S-CSCF
- P-CSCF

Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1
P-CSCFspare	S-CSCFspare	spare	RNC	GGSN	SGSN	MGW	MSC-S
Spare							

If a bit is set to 1, Trace Session to that Network Element shall be activated.

If a bit is set to 0, Trace Session is not needed in that Network Element.

End of change in Clause 5.3

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CHANGE REQUEST

⌘	32.422	CR	002	⌘	rev	-	⌘	Current version:	6.0.0	⌘

*For **HELP** on using this form, see bottom of this page or look at the pop-up text over the ⌘ symbols.*

Proposed change affects: | UICC apps⌘ ☐ ME ☐ Radio Access Network X Core Network X

Title:	⌘	Align Management Based Activation for Trace with RAN3's 25.413 (UTRAN Iu interface RANAP signalling)
Source:	⌘	**SA5** (robert.petersen@ericsson.com)
Work item code:	⌘	OAM-Trace
Date:	⌘	19/11/2004
Category:	⌘	**F**
Release:	⌘	Rel-6

Use one of the following categories:
F *(correction)*
A *(corresponds to a correction in an earlier release)*
B *(addition of feature),*
C *(functional modification of feature)*
D *(editorial modification)*
Detailed explanations of the above categories can be found in 3GPP TR 21.900.

Use one of the following releases:

2	*(GSM Phase 2)*
R96	*(Release 1996)*
R97	*(Release 1997)*
R98	*(Release 1998)*
R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*

Reason for change:	⌘	The actions in CN are not described for Management Based Activation.
Summary of change:	⌘	The solution for Management Based Activation in CN is described.
Consequences if not approved:	⌘	The actions within CN would not be standardised, which could result this part of the function to NOT work.

Clauses affected:	⌘	4.1.2.2 and 4.1.4.1

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

Change in Clause 4.1.2.2

4.1.2.2 UTRAN activation mechanisms

When an RNC receives Trace Session activation from the EM it shall start a Trace Session. The trace control and configuration parameters of the Trace Session are received in Trace Session activation from the EM. The RNC shall not forward these trace control and configuration parameters to other nodes. The received trace control and configuration parameters shall be saved and used to determine when and how to start a Trace Recording Session. (Starting a Trace Recording Session is described in subclause 4.2.2.1). A Trace Session may be requested for a limited geographical area.

When the Trace session is requested for an IMEI(SV) or a list of IMEI(SV), the RNC shall send the requested IMEI(SV)/list of IMEI(SV)s in Uplink Information Transfer Indication to the interacting MSC Server(s) and SGSN(s). The MSC Servers and SGSNs shall store the requested IMEI(SV)s per RNC. For each subscriber/MS activity the MSC Servers and SGSNs shall request IMEI(SV), if it is not already provided. For each subscriber/MS activity the MSC server/SGSN shall check whether a trace request is active in an RNC for the IMEI(SV). If a match is found, the MSC Server/SGSN shall inform the RNC about the IMEI(SV) in CN Invoke Trace, so that the RNC can trace the control signalling according to the trace control and configuration parameters that are received from its EM.

If an Inter-MSC SRNS Relocation or an Inter-SGSN SRNS relocation occurs, the anchor MSC Server or source SGSN shall transfer the IMSI and IMEI(SV) for the subscriber/MS activity to the non anchor MSC Server or target SGSN. The non anchor MSC Server/target SGSN shall check whether it has received a trace request from the target RNC for the transferred IMEI(SV). If a match is found on the IMEI(SV) in the non anchor MSC Server/target SGSN, the MSC Server/SGSN shall inform the RNC about the IMEI(SV) in the CN Invoke Trace. The IMSI shall be transferred from the non anchor MSC Server/target SGSN to the target RNC in Relocation Request. The RNC can then trace the subscriber/MS activity according to the trace control and configuration parameters that are received from its EM.

End of Change in Clause 4.1.2.2

Change in Clause 4.1.4.1

4.1.4.1 UTRAN deactivation mechanisms

~~Editor's Note: Awaiting contributions based on RAN3 solution.~~

When last Trace session is requested to be ended for an IMEI(SV) or a list of IMEI(SV), the RNC shall send the requested IMEI(SV)/list of IMEI(SV)s in Uplink Information Transfer Indication to the interacting MSC Server(s) and SGSN(s). The MSC Servers and SGSNs shall remove the requested IMEI(SV)s for the RNC in question.

End of Change in Clause 4.1.4.1
End of Document