3GPP TSG CN Plenary **Tdoc NP-000654**
Meeting #10, Bangkok, Thailand
6th – 8th December 2000

Source: **TSG CN WG 4**

Title: **All LSs send from CN4 since TSG CN#9**

Agenda item: **6.4.1**

Document for: **Information**

Introduction:

The following LSs have been sent by CN4 since the last CN Plenary.
These are forwarded to TSG CN Plenary meeting #10 for information only.

TDOC N4-00xxxx	Subject	To	Cc	Attachment	Sent
N4-001050	LS on GGSN address selection mechanism in SGSN in case of network requested PDP context activation procedure	S2			14/11/2000
N4-000840	LS on issues related to Session/Transport separation	S2			14/10/2000
N4-000844	LS on positive authentication reporting	S3	S1 S2		14/10/2000
N4-000846	LS on access protocol supporting LCS for PS Domain	N1		N4-000807	14/10/2000
N4-000847	LS on IP Security	S3			14/10/2000
N4-001066	LS on the Work Item "Cx Interface specification"	S2		N4-001065	20/11/2000
N4-001045	LS on GERAN impacts on overall system architecture	S2	GERAN, CN1, CN2		20/11/2000
N4-001080	LS on Operator Determined Barring of Packet Oriented	S1	S2		15/11/2000
N4-001062	LS on Clarifications to the Security Mode usage, and error cases	S2	S3	N4-001063	20/11/2000
N4-001077	LS providing comments to LS from CN3 on intersystem handover problem	N1	N3		20/11/2000
N4-001082	LS on Security for MAP over IP	S3			20/11/2000
N4-001119	LS on Size of RANAP messages over the MAP E-interface	R3	N1, S2	N4-001079	20/11/2000
N4-001120	LS on R99 Lossless Relocation for UMTS to TSG_CN	CN	S2, R3	N4-000943, N4-000959, N4-001022, N4-001044, N4-001054	20/11/2000
N4-001121	Answer to RAN 3 LS on Real Time SRNS Relocation for PS Domain RABs	R3	S2	N4-000943, N4-001022	20/11/2000
N4-001090	LS to GERAN2 and SA2 on the status of splitted A interface	S2, GERAN		N4-000982, N4-001008	30/11/2000

3GPP TSG-CN4 **Tdoc N4-000807**
R00 ad hoc Meeting , Stockholm, SWEDEN
10th October – 12th October 2000

Source: **FUJITSU**

Title: **The air interface protocol supporting LCS R00 for PS-domain**

Agenda item: **6.5 Location Services**

Document for: **Discussion and Approval**

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1. Introduction

The LCS support in PS domain is one of the key items for Release 4 and its target date is March, 2001. This contribution studies how the feature is supported over the air interface for PS domain.

Although stage 1 and stage 2 aspect of PS domain LCS needs some more discussion, the basic protocol framework can be discussed since stage 1 and stage 2 have some impacts on the operations between MS and network, but not on the protocol stack.

2. LCS protocol for PS domain

For CS domain the LCS procedures that appear over the air interface are defined in 24.030, and the detailed operation and parameter descriptions are found in 24.080. The SS protocol is used to transfer the LCS operations defined in 24.080.

There are three possible alternatives on how to convey the LCS operations in PS domain. They are shown in figure 1.

Alt.1: SS protocol is also applied to PS domain with necessary enhancements (if any).

Alt.2: New protocol that is similar to SS protocol in CS domain is created to carry LCS operations for PS domain.

Alt.3: New protocol specific to LCS for PS domain is created.

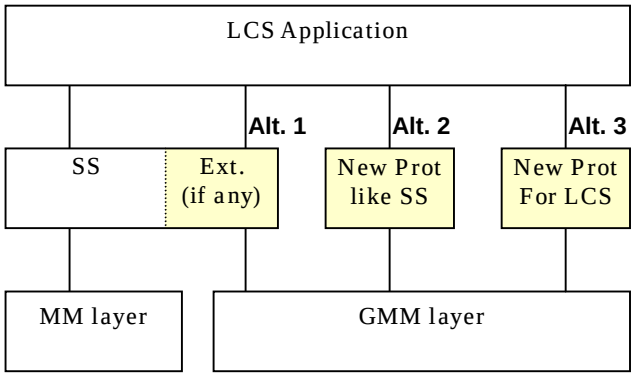

Figure 1 Air IF Protocol conveying LCS operations for PS domain

Evaluation:

The approach of Alt.3 is not either extensible or future proof since whenever a new supplementary service is added to PS domain in the future, new protocol needs to be created. On the other hand, according to the current LCS stage2 specification TS 23.271, the required functionality for PS domain air interface protocol is almost the same as the one for CS domain. This means that most of SS operations for LCS defined in 24.080 can be common for both CS and PS domain. Considering the fact creating a new protocol [Alt.2] does not seems an efficient way.

Alt.1 seems the most appropriate way because of following reasons;

- This approach does not require any additional specification.
- 24.080 has already covered necessary functionality, i.e. the operation defined for CS domain can be reused for PS domain with some necessary extensions.
- This approach gives us general means to provide future services for PS domain other than LCS. (e.g., AoC for PS domain).
- Applying same mechanism as in CS domain can reduce the amount of software logic. It is beneficial especially to a mobile station supporting both PS and CS capability.

2. Conclusion

It is proposed that CN4 decide to share SS protocol between CS and PS domain for support of LCS. And it is also proposed to inform the relevant Working Groups (CN1, SA2) of this decision.

3GPP TSG CN WG4 **Tdoc N4-000840**
Stockholm, Sweden
10-12 October 2000

TITLE: LS, ISSUE OF IDENTIFYING RESPONSIBILITY FOR SELECTION OF THE PROTOCOL OVER THE Mp INTERFACE

TO: SA WG2

FROM: CN WG4

Contact: jmenard@lucent.com

One of the issues that the SA2 Ad-Hoc on "Transport and Control Separation in the PS CN domain" has raised is the selection of the protocol to be used between the SGSN Server and the PS Media Gateway (identified in TR 23.873 V0.2.0 as the Mp interface). The SA2 Ad-Hoc has identified two possibilities:

- H.248 plus possible extensions
- GTP-C plus possible extensions

After the editor of TR 23.873 V0.2.0 ("Transport and Control Separation in the PS CN domain") presented this TR to the CN4 delegates, the CN4 delegates reached a consensus opinion that the selection of the protocol over the Mp interface should be assigned by SA2 to CN4 since the selection of the protocol over the Mp interface does not affect the architecture. It did not appear to the CN4 delegates that the protocol selection was necessary for SA2 to complete its Feasibility Study on this topic. CN4 delegates also noted that since a stage 2 document should identify message sequences without reference to any particular protocol, there should be no need for SA2 to make the protocol selection at this time. CN4 recognizes that in some similar situations SA2 has made the protocol selection (e.g., the selection of the SIP protocol rather than H.323 for the IP MM core network). It is the consensus of the CN4 delegates that where the selection of a protocol has no architectural impact, that selection should be the responsibility of the appropriate working group of TSG-CN.

A reply from SA2 on this issue will be appreciated. Our next meeting is scheduled for November 13-17, 2000 in Paris, France.

3GPP TSG-CN WG4 **Tdoc N4-000844**
R'00 ad hoc Meeting , Stockholm, SWEDEN
10th October – 12th October 2000

Source: **TSG CN WG4**[1]

Title: **LS on positive authentication reporting**

To: **TSG-SA WG3**

cc: **TSG-SA WG1; TSG-SA WG2**

TSG-CN WG4 thank TSG-SA WG3 for their liaison statement (S3-000605) with answers to CN WG4's questions on positive authentication reporting.

We believe that it would be possible to draft the changes to specifications in TSG-CN4's remit for the functional enhancements and MAP protocol enhancements which are required to support positive authentication reporting, in time for approval at the March 2001 TSG plenary meetings.

However the ability to support positive authentication reporting for 3GPP2 subscribers who roam to a 3GPP network is only a small part of a major work item to provide support for roaming between 3GPP2 and 3GPP networks. In our understanding, the Release 2000 project plan does not show this work item, and to start the work at this stage would not allow it to be completed in time for the March 2001 TSG. This casts doubt on the usefulness of hurrying to provide the changes for positive authentication reporting for approval at the TSG plenary meetings in March 2001.

Our working assumption is that in the absence of any service requirement to support roaming between 3GPP2 and 3GPP networks we will not proceed with the specification work for positive authentication reporting.

S3 may wish to note that the next meeting of TSG-CN WG4 is 13 – 17 November in Paris, France.

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[1] Contact: Ian Park, tel +44 1635 673 527, email ian.park@vf.vodafone.co.uk

3GPP TSG-CN WG4 R00 AdHoc **Tdoc 3GPP N4-000846**
Stockholm, Sweden
10 –12 October 2000

Source: TSG-CN WG4[1]

Title: LS on access protocol selection for LCS R00 PS-domain

To: TSG-CN WG1

TSG CN WG4 has reviewed the attached contribution (N4-000807) from Fujitsu on the air interface protocol supporting LCS R00 for PS-domain.

CN4 feels that it does not have the mobile station signalling expertise needed to make a decision on an access protocol for the LCS R00 PS-domain and believes that CN1 is the correct group to make the decision.

If CN1 decides that the protocol will be enhanced SS protocol, then CN4 is prepared to do the necessary work as CN4 is responsible for SS protocol.

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1 Contact: Teemu Mäkinen, email: teemu.makinen@nokia.com

3GPP TSG WG CN4 R'00 Ad hoc meeting **N4-000847**
10-12 October, 2000
Stockholm, Sweden

Title: **Protection of GTP Messages using IPSec**

Source: **TSG CN WG4**

TO: **TSG SA WG3**

Contact Person:

Name: Michael Young

EMail: michael.young@motorola.com

CN4 thanks SA3 for their hard work and updating on the recent progress on IP-based network security.

CN4 agrees that the ablility to use IPsec for GTP-C message protection is a requirement for R´00, but has concerns on mandating the use. The use of IPsec depends on bilateral agreement between the operators concerned. The same policies as for MAP security should apply for GTP-C security.

To be more specific, the following sentence in your LS (S3-000607) caused concern in CN4.

"GTP-C protection should be mandatory for TS 29.060 R00, and all releases going forward."

CN4 would like to get further comments from SA3 before proceding updating TS 29.060; the next CN4 meeting will be from Nov. 13 – 17 in Paris, France.

3GPP TSG-CN4
CN#05 Meeting , Paris, FRANCE
13th November – 17th November 2000

Document N4-000942
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

29.060	**CR**	**150**	Current Version:	3.6.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#10	for approval	X	strategic		(for SMG use only)
list expected approval meeting # here ↑	for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: NEC, Fujitsu **Date:** 13th Nov. 2000

Subject: Correction to the PDU Notification Request message

Work item: GTP enhancements

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

In all messages when the TEID-C IE is included it is accompanied by the Associated IP address. This CR fixes the PDU Notification request message so that this general rule is met.

This is an in line correction with the approved CR N4-000729.

This correction is not to fix a critical issue. However, this CR has approved by a consensus by CN4.

Clauses affected: 7.3.8

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

7.3.8 PDU Notification Request

When receiving a T-PDU the GGSN checks if a PDP context is established for that PDP address. If no PDP context has been previously established, the GGSN may try to deliver the T-PDU by initiating the Network-Requested PDP Context Activation procedure. The criteria, used by the GGSN to determine whether trying to deliver the T-PDU to the MS or not, may be based on subscription information in the GGSN and are outside the scope of GPRS standardisation.

As part of the Network-Requested PDP Context Activation procedure the GGSN sends a PDU Notification Request message to the SGSN indicated by the HLR. If the GGSN has an active PDP context with different SGSN from the one indicated by the HLR, then the SGSN information shall be obtained from an active PDP context. When receiving this message, the SGSN shall be responsible for requesting the MS to activate the indicated PDP Context.

The IMSI is inserted in the IMSI information element in the PDU Notification Request message.

The End User Address information element contains the PDP type and PDP address that the SGSN shall request the MS to activate.

The Access Point Name information element identifies the access point of packet data network that wishes to connect to the MS.

The GGSN shall include a GGSN Address for control plane. The SGSN shall store this GGSN Address and use it when sending control plane messages to the GGSN.

The Tunnel Endpoint Identifier Control Plane information element shall be a tunnel endpoint identifier Control Plane selected by the GGSN and shall be used by the SGSN in the GTP header of the corresponding PDU Notification Response or PDU Notification Request Reject message.

If the GGSN receives a Create PDP Context Request before the PDU Notification Response, the GGSN shall handle the Create PDP Context Request as normal context activation and ignore the following PDU Notification Response.

If the SGSN receives a PDU Notification Request after a Create PDP Context Request has been sent but before a Create PDP Context Response has been received, the SGSN shall:

1. send a PDU Notification Response with Cause ‘Request accepted’ without any further processing and then
2. wait for the Create PDP Context Response.

The optional Private Extension contains vendor or operator specific information.

Table 14: Information Elements in a PDU Notification Request

Information element	Presence requirement	Reference
IMSI	Mandatory	7.7.2
GGSN Address for Control Plane	Mandatory	7.7.32
Tunnel Endpoint Identifier Control Plane	Mandatory	7.7.14
End User Address	Mandatory	7.7.27
Access Point Name	Mandatory	7.7.30
Private Extension	Optional	7.7.44

T-doc N4-000943

3GPP TSG-CN4
Paris, France
13th Nov. – 17th Nov. 2000

Title:	**Proposed LS back to RAN3 on R99 Lossless Relocation for UMTS**
From:	**NEC (will be CN4)**
To:	**RAN3**
Cc:	**SA2**

Contact Person:

Name: **NEC, Toshiyuki Tamura (+81-471-85-6901)**
E-mail Address: **tamurato@nsf.ncos.nec.co.jp**

CN4 would like to inform RAN3 of our decision on R99 Lossless Relocation for UMTS that has been identified by the LS R3-(00)2874.

Issue 1

N4 recognised the problem that described in the LS R3-(00)2874.
N4 prefers to modify the current rule in GTP in order to allow the scenario stated in the LS. The expected modification to the 29.060 is shown below. The reason to choose this approach is to minimise the impact to the current R99 specifications.

> The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities in a way that allows multiplexing of different users, different packet protocols and different QoS levels. Therefore no two remote GTP-U endpoints shall send traffic to a GTP-U protocol entity using the same TEID value **except the data forwarding in SRNS relocation and Routing Area Update procedures.**
>
> **Note: The RED COLORED WORDS may be added.**

CN4 will wait a LS from RAN3 to inform us a final decision on this issue. Thereafter, CN4 will start an appropriate CR work to the 29.060.

Issue 2

CN4 also believes that SA2 is an appropriate WG to make a decision on this issue. Please inform us whenever a decision will have been made.

T-doc N4-000943

3GPP TSG-CN4
Paris, France
13th Nov. – 17th Nov. 2000

Title:	**Proposed LS back to RAN3 on R99 Lossless Relocation for UMTS**
From:	**NEC (will be CN4)**
To:	**RAN3**
Cc:	**SA2**

Contact Person:

Name: **NEC, Toshiyuki Tamura (+81-471-85-6901)**
E-mail Address: **tamurato@nsf.ncos.nec.co.jp**

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N4 recognised the problem that described in the LS R3-(00)2874.
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> The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities in a way that allows multiplexing of different users, different packet protocols and different QoS levels. Therefore no two remote GTP-U endpoints shall send traffic to a GTP-U protocol entity using the same TEID value **except the data forwarding in SRNS relocation and Routing Area Update procedures.**
>
> **Note: The RED COLORED WORDS may be added.**

CN4 will wait a LS from RAN3 to inform us a final decision on this issue. Thereafter, CN4 will start an appropriate CR work to the 29.060.

Issue 2

CN4 also believes that SA2 is an appropriate WG to make a decision on this issue. Please inform us whenever a decision will have been made.

TSG-RAN Working Group 3 meeting #16 ***N4-000959***

Windsor, UK 16-20 October 2000 ***(TSGR3#16(00)2874)***

Agenda Item: xx

Source: BT

Title: Proposed LS to N4 and S2 on R99 Lossless Relocation for UMTS

Document for: Approval

To: **TSG CN WG4, TSG SA WG2**

From: **TSG RAN WG3**

Subject: **R99 Lossless Relocation for UMTS**

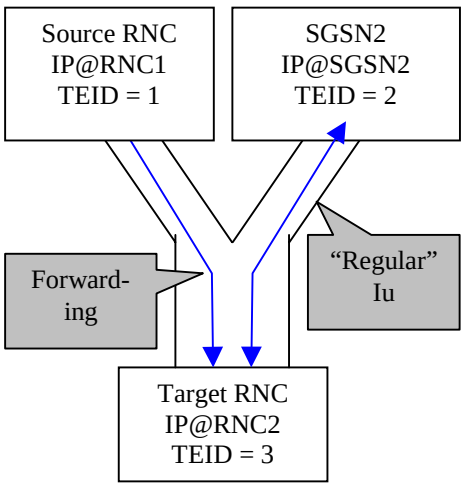
Contact: richard.townend@bt.com

RAN3 respectfully asks N4 and S2 to consider the following issues and provide some clarification:

Issue 1:

During a discussion on the Release 99 lossless SRNS Relocation mechanism, an apparent contradiction between 23.060 and 29.060 was identified, leading to some confusion in RAN3.

In the current specifications for the R99 packet-forwarding scheme for lossless relocation (i.e. RANAP (25.413) and 23.060), it appears that, from the perspective of the target RNC, a single tunnel is used for "regular" Iu traffic and for data forwarding from the source RNC. In other words, there is a tunnel with three terminations, as shown below:



In 29.060, this appears to be strictly forbidden, when it is stated that (in v.3.3.0):

"The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities in a way that allows multiplexing of different users,

different packet protocols and different QoS levels. Therefore ***no two remote GTP-U endpoints shall send traffic to a GTP-U protocol entity using the same TEID value****."*

R3 believes that there will be no duplication of PDUs between the two sources, although the PDUs may not arrive in sequence.

R3 has identified two possible solutions:

- use a totally separate tunnel for forwarding and "regular" Iu (would need new IE in RANAP, and changes to 23.060)
- modify the rule in GTP, to allow this scenario in the case of data forwarding

R3 asks S2 and N4 to confirm that the contradiction exists, and to make a decision as to which solution is preferred.

Issue 2:

During the same discussion, it was also raised that it is currently unclear which node is responsible for deciding which RABs are "subject to data forwarding" and which can sustain data loss.

It appears (from the RRC specification, 25.331) that the Source RNC indicates whether each RAB is to be handled as lossless to the Target RNC in the RRC transparent container (in the PDCP Info IE).

The Target SGSN sends "one or more" "RNC Tunnel Endpoint Identifiers and RNC IP address for data forwarding" to the Source SGSN.

The Source SGSN sends TEID/IP addresses to the Source RNC for "RABs subject to data fowarding".

It is not clear to R3 whether the decision to perform data forwarding should be made in the RAN or the CN, and how this information is shared with **all** necessary nodes.

For example, if the SGSN makes the decision, this needs to be communicated to the Source RNC and the Target SGSN (the Target RNC already receives the information from the Source RNC). Similarly, if the Source RNC makes the decision, this needs to be communicated to both SGSNs.

R3 asks for guidance from S2 as to where the decision to perform data forwarding should occur (CN or RAN) and how the information should be shared between all concerned nodes. Changes may be needed to 23.060, 25.413 and/or 29.060 to reflect the decision.

3GPP TSG-CN4 Tdoc N4-000982
CN#05 Meeting, Paris, FRANCE
13th November – 17th November 2000

Source:	**Ericsson L.M.**
Title:	**Proposed additions to 3G TS 23.205 "Bearer Independent CS CN – Stage 2" related to Inter-system Handover**
Agenda item:	**Bearer Independent CS Core Network**
Document for:	**Information and Approval**

This contribution contains additions to the section 8, Handover, of the 3G TS 23.205 version 0.2.0.

It covers sections on inter-system handover.

******First Modifed Section ******

~~8.5~~Intra-MSC UMTS to GSM Handover

~~FFS~~

The following handling shall be applied for a call that started as UMTS call. The procedures specified in TS 23.009 for 'Intra-3G_MSC Handover from UMTS to GSM' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

Relocation Required:

When Relocation Required message is received, the bearer is established between the MSC and the MGW. (Bullet 1 in figure 8.8.)

Relocation Command/Handover Detect:

At sending of Relocation Command message or alternatively at receiving of Handover Detect message the MSC uses the Change Flow Direction procedure to requests the MGW to set the Handover Device to intermediate state. (Bullet 2 in figure 8.8.)

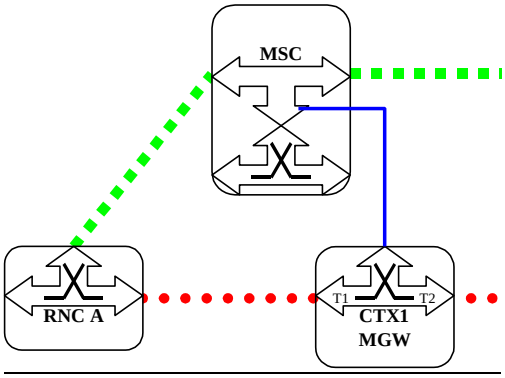
Handover Complete:

At receiving of Handover Complete message the MSC requests the RNC-A to release the IU and requests the MGW to set the Handover Device to its final state by removing the bearer termination towards the RNC-A, using the Release Termination procedure. (Bullet 3 in figure 8.8.)

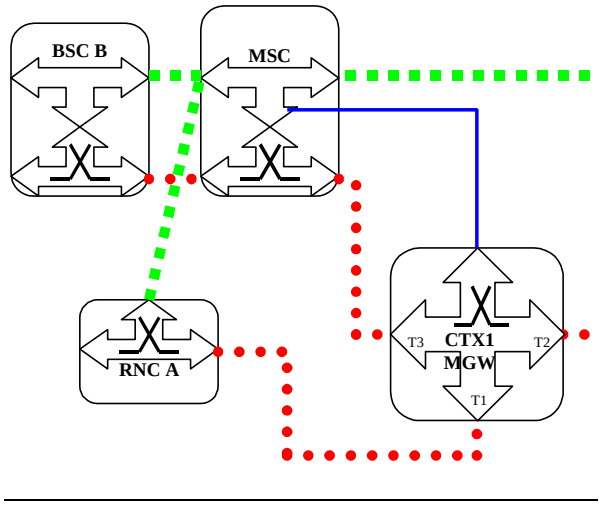
Example

The figure 8.7 below shows the network model for the Intra-MSC UMTS to GSM Handover. The 'squared' line represents the call control signalling. The 'dotted' line represents the bearer control signalling and the bearer. The bearer termination T1 is used for the bearer towards the RNC-A, bearer termination T3 is used for the bearer towards the BSC-B (connected through the MSC) and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Before UMTS to GSM Handover:



During UMTS to GSM Handover:



After UMTS to GSM Handover

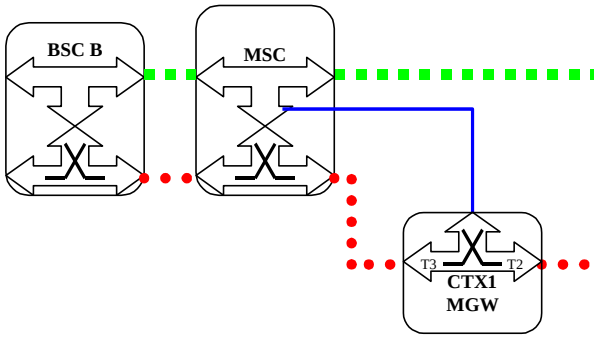
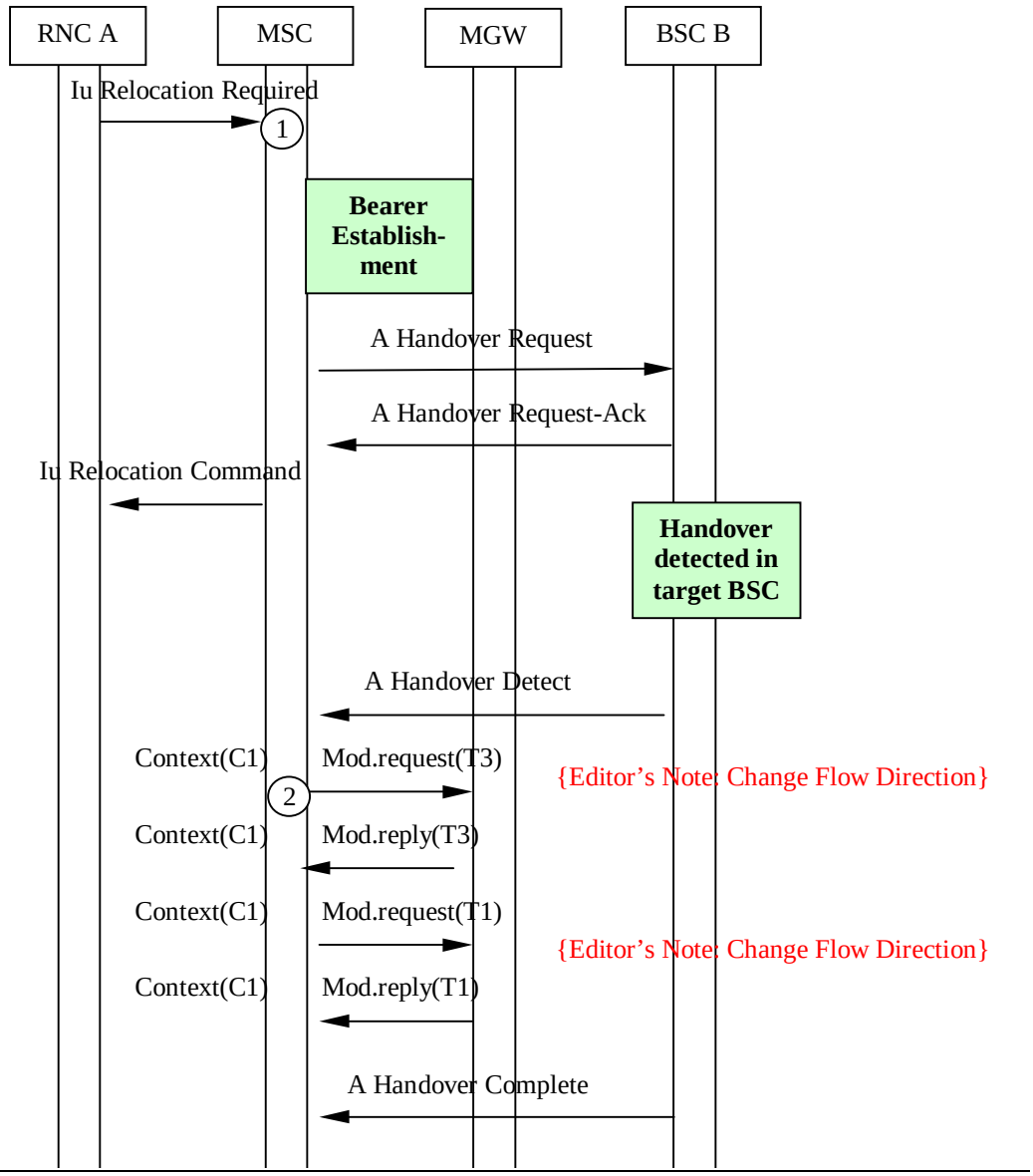


Figure 8.7 Intra-MSC UMTS to GSM Handover (network model)

The figure 8.8 below shows the message sequence example for the Intra-MSC UMTS to GSM Handover.
It is assumed that the Handover Device is located in the MGW selected for the call establishment by the MSC which controls the call and the mobility management. Also assumed that only one bearer has been established towards the RNC-A.
In the example when Relocation Required is received, the bearer is established between the MGW and the MSC. When the handover is detected in the BSC-B the MSC requests to change the flow directions between the terminations within the context. When MSC receives Handover Complete indication from the BSC-B it orders the RNC-A to release the IU. This action causes release of the bearer between the RNC and the MGW. Finally the MSC requests the MGW to release the RNC-A side bearer termination.



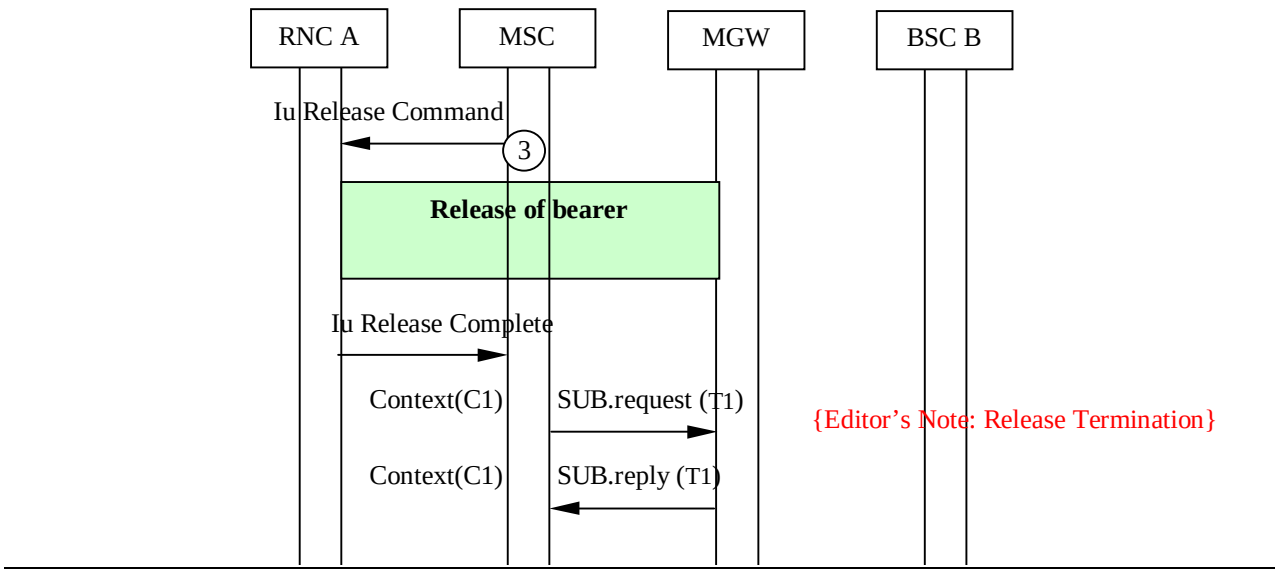


Figure 8.8 Intra-MSC UMTS to GSM Handover (message sequence chart)

~~8.6~~Intra-MSC GSM to UMTS Handover

~~FFS~~

The following handling shall be applied for a call that started as UMTS call. The procedures specified in TS 23.009 for 'Intra-3G_MSC GSM to UMTS Handover' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

Handover Required:

When Handover Required message is received, the MSC requests the MGW to provide a binding reference and a bearer address using the Prepare Bearer procedure. The MSC sends the Relocation Request message to the RNC-B containing the bearer address and binding reference. (Bullet 1 in figure 8.10.)

Handover Command/Relocation Detect:

At sending of Handover Command message or alternatively at receiving of Relocation Detect message the MSC uses the Change Flow Direction procedure to requests the MGW to set the Handover Device to intermediate state. (Bullet 2 in figure 8.10.)

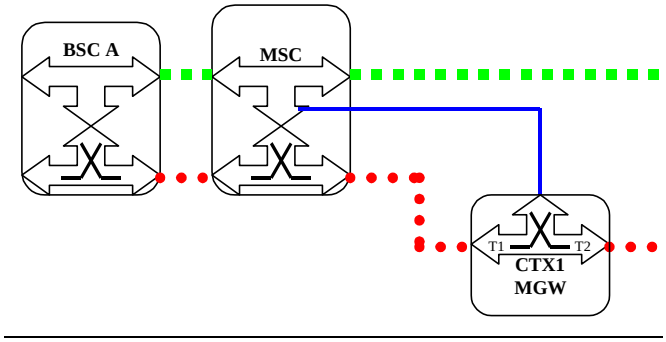
Relocation Complete:

At receiving of Relocation Complete message the MSC releases the A-interface line towards the BSC-A and requests the MGW to set the Handover Device to its final state by releasing the bearer between the MSC and the MGW. (Bullet 3 in figure 8.10.)

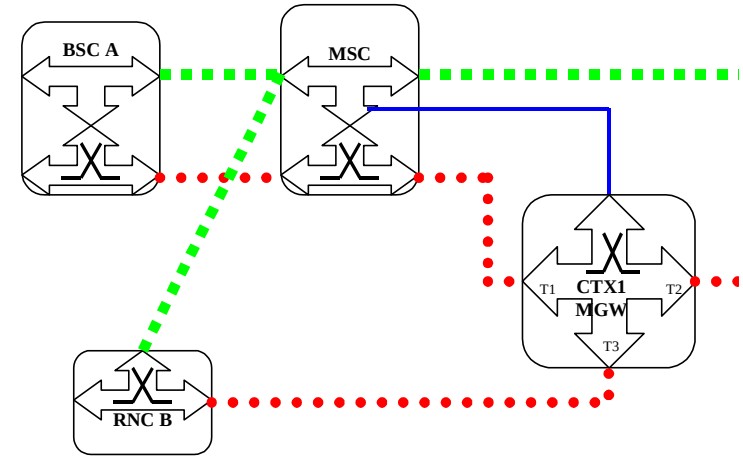
Example

The figure 8.9 below shows the network model for the Intra-3G_MSC GSM to UMTS Handover. The 'squared' line represents the call control signalling. The 'dotted' line represents the bearer control signalling and the bearer. The bearer termination T1 is used for the bearer towards the BSC-A (connected through the MSC), the bearer termination T3 is used for the bearer towards the RNC-B and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Before GSM to UMTS Handover:



During GSM to UMTS Handover:



After GSM to UMTS Handover:

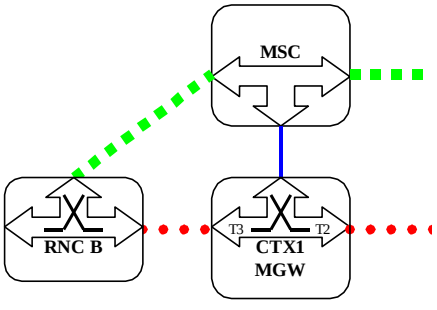
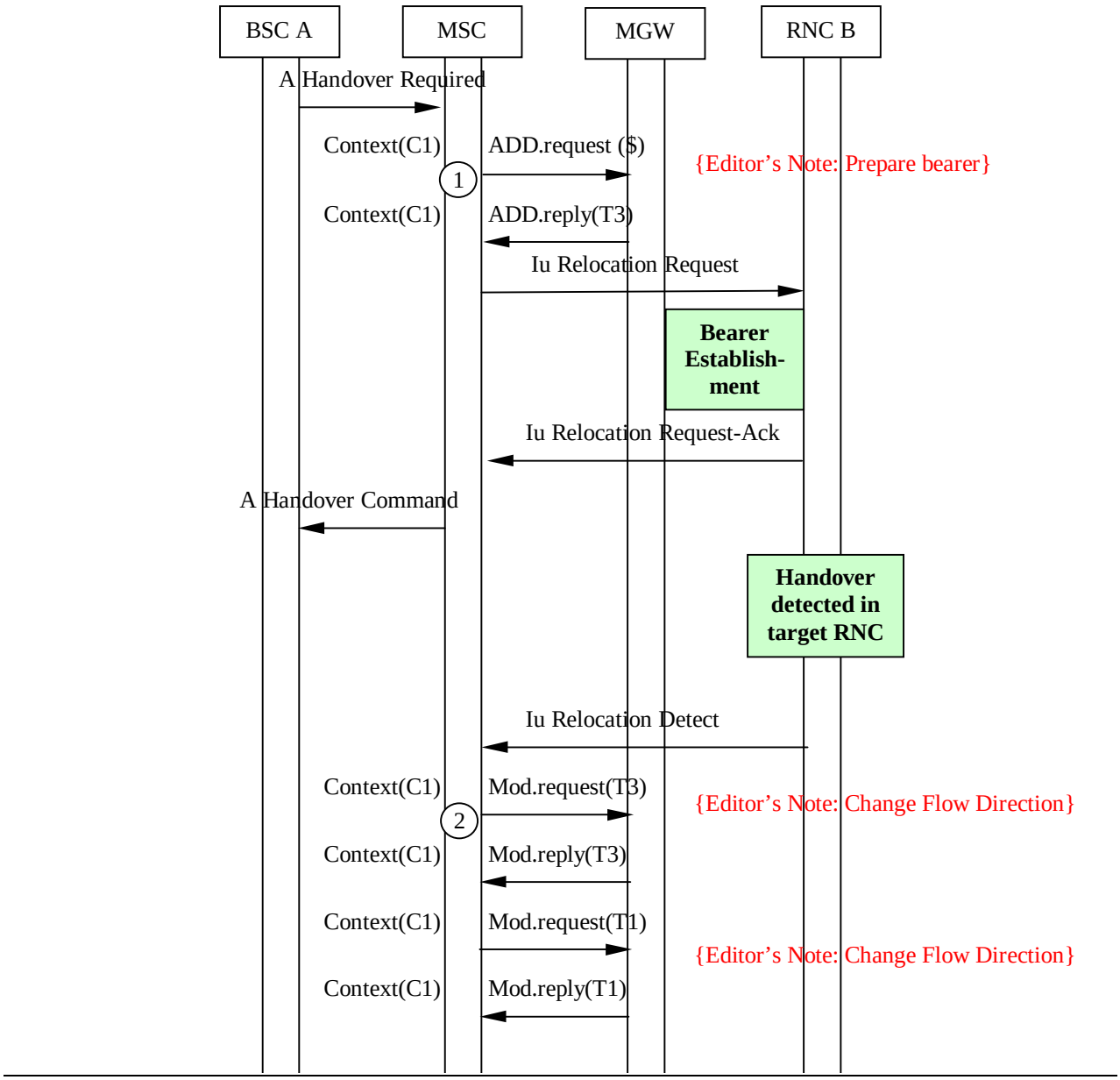


Figure 8.9 Intra-3G_MSC GSM to UMTS Handover (network model)

The figure 8.10 below shows the message sequence example for the Intra-3G_MSC GSM to UMTS Handover.
It is assumed that the Handover Device is located in the MGW selected for the call establishment by the MSC which controls the call and the mobility management.
In the example the MSC requests seizure of the RNC-B side bearer termination with specific flow directions. The MSC orders the establishment of the bearer towards the RNC-B by sending Relocation Request. When the relocation is detected in the RNC-B the MSC requests to change the flow directions between the terminations within the context. When the MSC receives Relocation Complete indication from the RNC-B it releases the A-interface line towards the BSC-A. Finally the bearer between the MSC and the MGW is released.



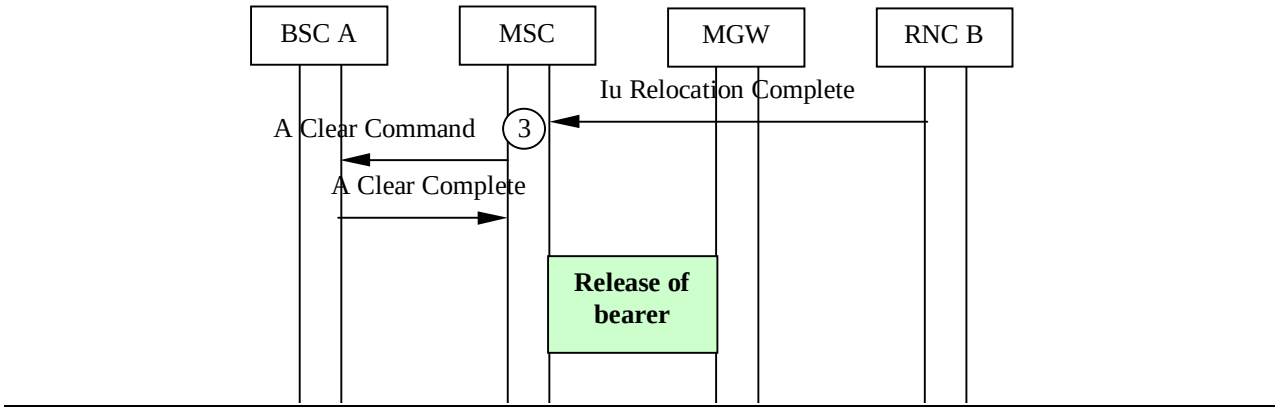


Figure 8.10 Intra-3G_MSC GSM to UMTS Handover (message sequence chart)

~~8.7~~Basic Inter-MSC UMTS to GSM Handover

~~FFS~~

The following handling shall be applied for a call that started as UMTS call. The procedures specified in TS 23.009 for 'Basic Handover Procedure Requiring a Circuit Connection between 3G_MSC-A and MSC-B' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

MSC-A

Relocation Required:

When Relocation Required message is received, the bearer is established between the MSC-A and the MGW. (Bullet 1 in figure 8.12.)

Relocation Command/Handover Detect:

At sending of Relocation Command message or alternatively at receiving of Handover Detect message the MSC-A uses the Change Flow Direction procedure to requests the MGW to set the Handover Device to intermediate state. (Bullet 2 in figure 8.12.)

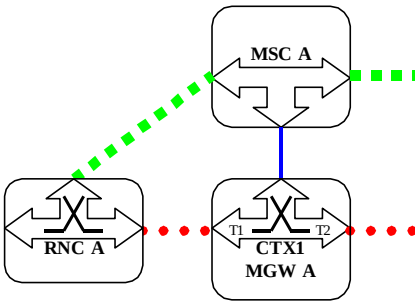
Handover Complete:

At receiving of Relocation Complete message, the MSC-A requests the RNC-A to release the IU and requests the MGW to set the Handover Device to its final state by removing the bearer termination towards the RNC-A, using the Release Termination procedure. (Bullet 3 in figure 8.12.)

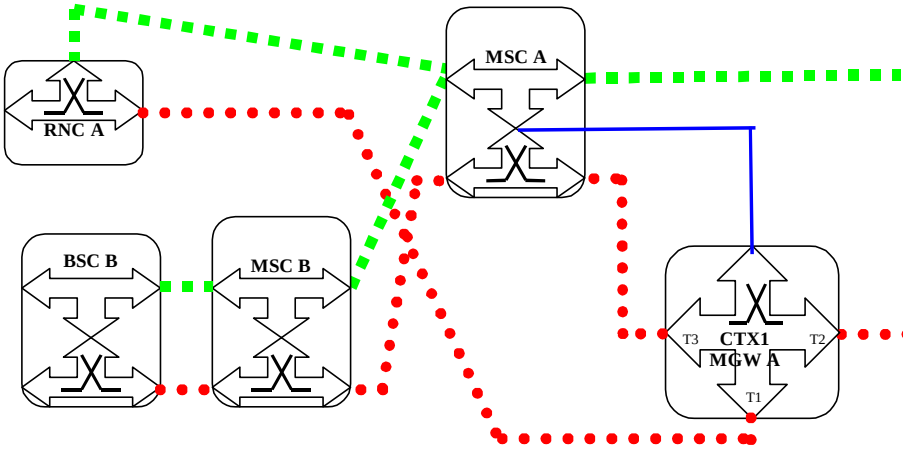
Example

The figure 8.11 below shows the network model for the Basic Inter-MSC UMTS to GSM Handover. The 'squared' line represents the call control signalling. The 'dotted' line represents the bearer control signalling and the bearer. In MGW the bearer termination T1 is used for the bearer towards RNC-A, bearer termination T3 is used for the bearer towards MSC-B (connected through MSC-A), and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Before UMTS to GSM Handover:



During UMTS to GSM Handover:



After UMTS to GSM Handover:

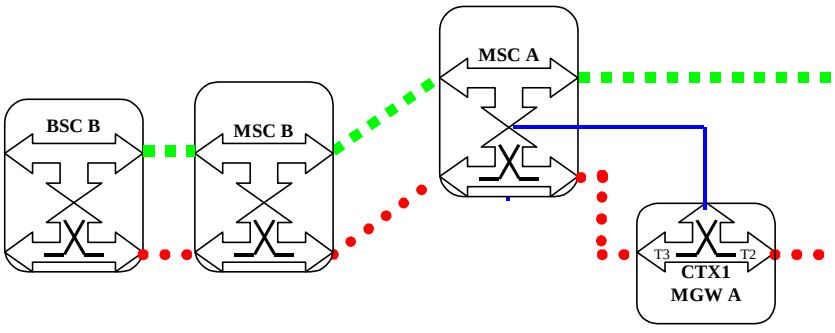
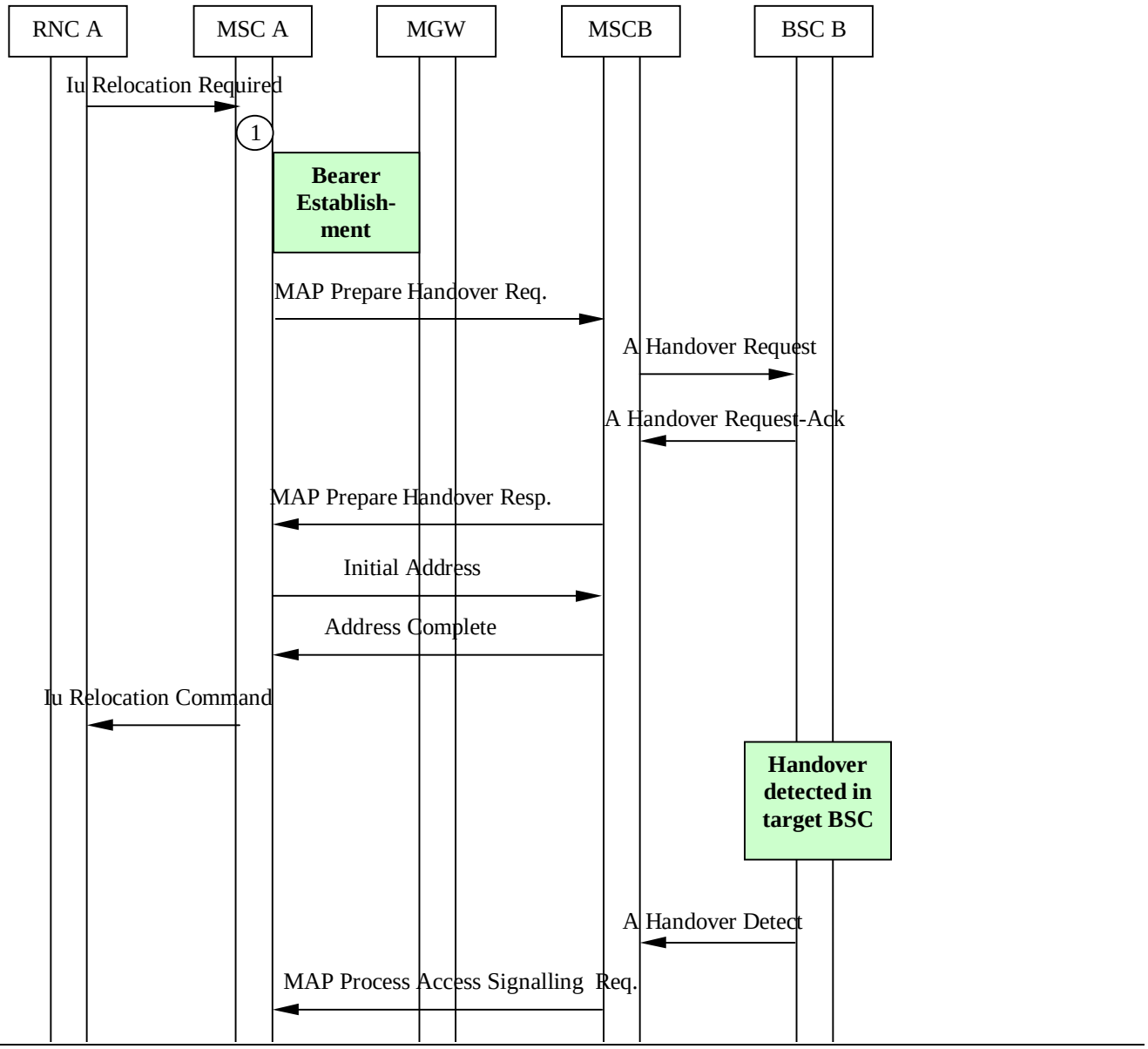


Figure 8.11 Basic Inter-MSC UMTS to GSM Handover (network model)

The figure 8.12 below shows the message sequence example for the Basic Inter-MSC UMTS to GSM Handover.
It is assumed that the Handover Device is located in the MGW selected for the call establishment by the MSC-A, which controls the call and the mobility management. Also assumed that only one bearer has been established towards the RNC-A.
In the example when the Iu Relocation Required is received, the bearer is established between the MSC-A and the

MGW. When the handover is detected in the BSC-B the MSC-A requests to change the flow directions between the terminations within the context in MGW. When the MSC-A receives Handover Complete indication from the MSC-B it orders the RNC-A to release the IU. This action causes release of the bearer between the RNC-A and the MGW. Finally MSC-A requests the MGW to remove the RNC-A side bearer termination.



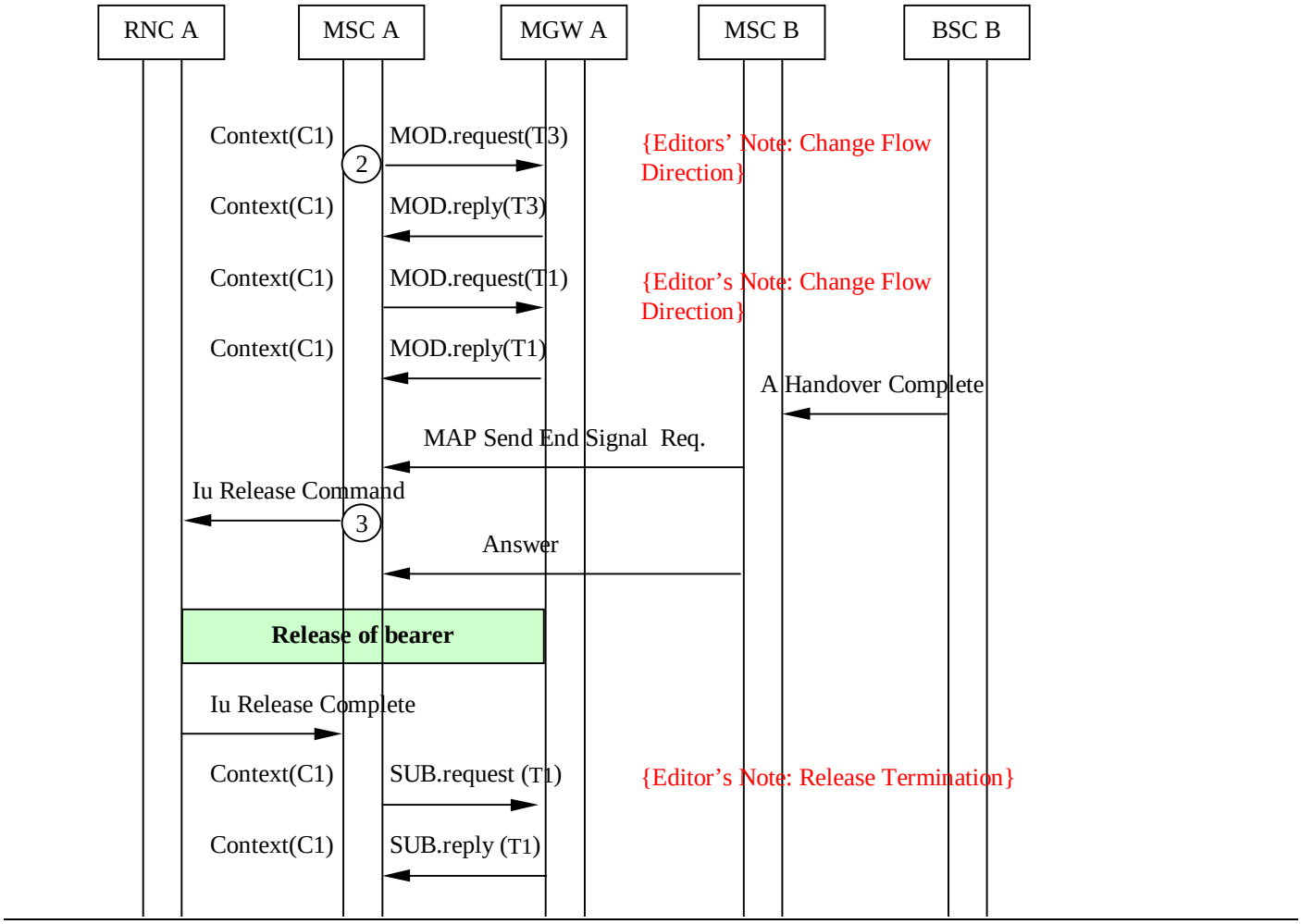


Figure 8.12 Basic Inter-MSC UMTS to GSM Handover (message sequence chart)

~~8.8~~Basic Inter-MSC GSM to UMTS Handover

~~FFS~~

The following handling shall be applied for a call that started as UMTS call. The procedures specified in TS 23.009 for 'Basic Handover Procedure Requiring a Circuit Connection between MSC-A and 3G_MSC-B' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

MSC-A

Bearer establishment between MGW-A and MGW-B:

The bearer establishment is handled as described at Mobile Originating Call, using either forward or backward bearer establishment.

Handover Command/Handover Detect:

At sending of Handover Command message or alternatively at receiving of Handover Detect message the MSC-A uses the Change Flow Direction procedure to requests the MGW-A to set the Handover Device to intermediate state. (Bullet 3 in figure 8.14.)

Handover Complete:

At receiving of Handover Complete message, the MSC-A releases the A-interface line towards BSC-A and requests the MGW-A to set the Handover Device to its final state by releasing the bearer between the MSC-A and the MGW-A. (Bullet 3 in figure 8.14.)

MSC-B

MGW selection:

The MSC-B selects a MGW when it receives Prepare Handover Request message. (Bullet 1 in figure 8.14.)

Bearer establishment towards RNC-B:

When the MSC-B has selected the MGW-B it requests the MGW-B to provide a binding reference and a bearer address using the Prepare Bearer procedure. . The MSC-B sends the Relocation Request message to the RNC-B containing the bearer address and binding reference. (Bullet 1 in figure 8.14.)

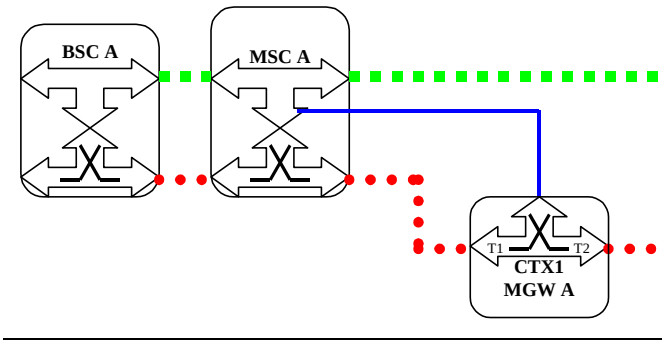
Bearer establishment between MGW-A and MGW-B:

The bearer establishment is handled as described at Mobile Terminating Call, using either forward or backward bearer establishment.

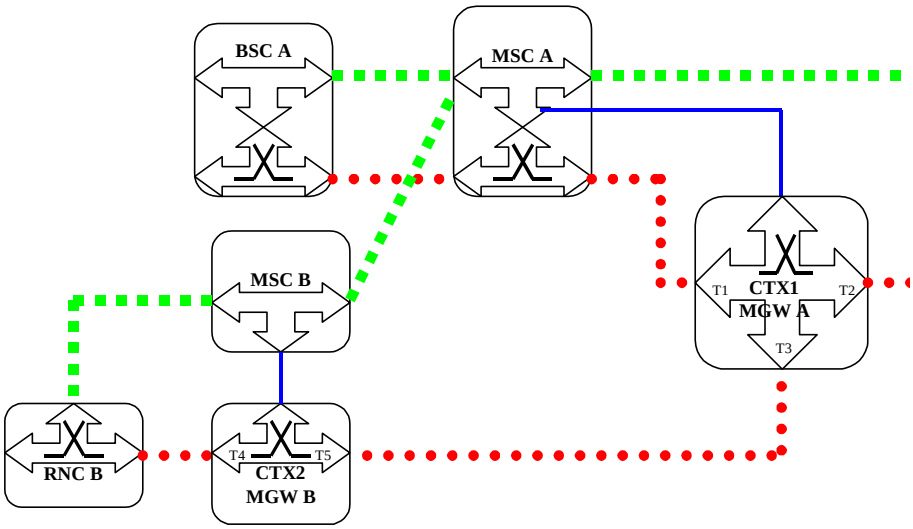
Example

The figure 8.13 below shows the network model for the Basic Inter-MSC GSM to UMTS Handover. The 'squared' line represents the call control signalling. The 'dotted' line represents the bearer control signalling and the bearer. In MGW-A the bearer termination T1 is used for the bearer towards BSC-A (connected through MSC-A), bearer termination T3 is used for the bearer towards MGW-B, and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW. In MGW-B the bearer termination T4 is used for the bearer towards RNC-B, bearer termination T5 is used for the bearer towards MGW-A.

Before GSM to UMTS Handover:



During GSM to UMTS Handover:



After GSM to UMTS Handover:

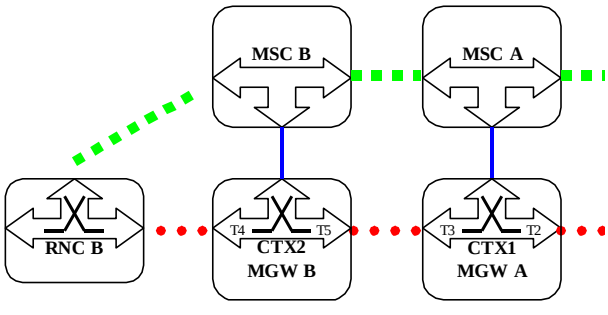
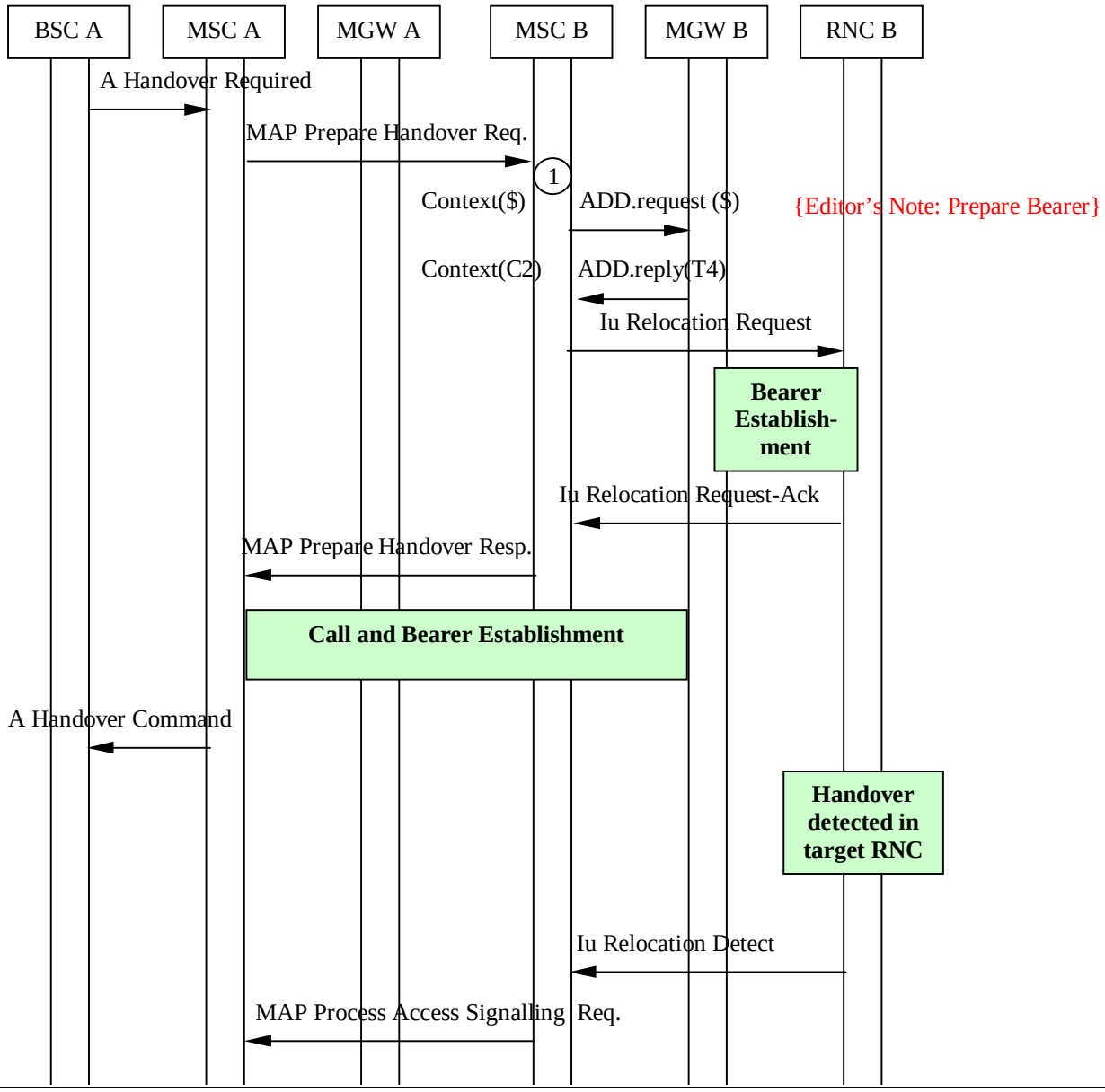


Figure 8.13 Basic Inter-MSC GSM to UMTS Handover (network model)

The figure 8.14 below shows the message sequence example for the Basic Inter-MSC GSM to UMTS Handover.
It is assumed that the Handover Device is located in the MGW-A selected for the call establishment by the MSC-A which controls the call and the mobility management.
In the example the MSC-B requests MGW-B to seize the RNC-B side bearer termination. The MSC orders the

establishment of the bearer towards the RNC-B by sending Relocation Request. After receiving of Relocation Request Acknowledge from the RNC-B the call istablished between the MSC-A and the MSC-B, the bearer is established between the MGW-A and the MGW-B. When the relocation is detected in the RNC-B the MSC-A requests to change the flow directions between the terminations within the context in the MGW-A. When the MSC-A receives Handover Complete indication from the MSC-B it releases the A-interface line towards the BSC-A. Finally the bearer between the MSC-A and the MGW-A is released.



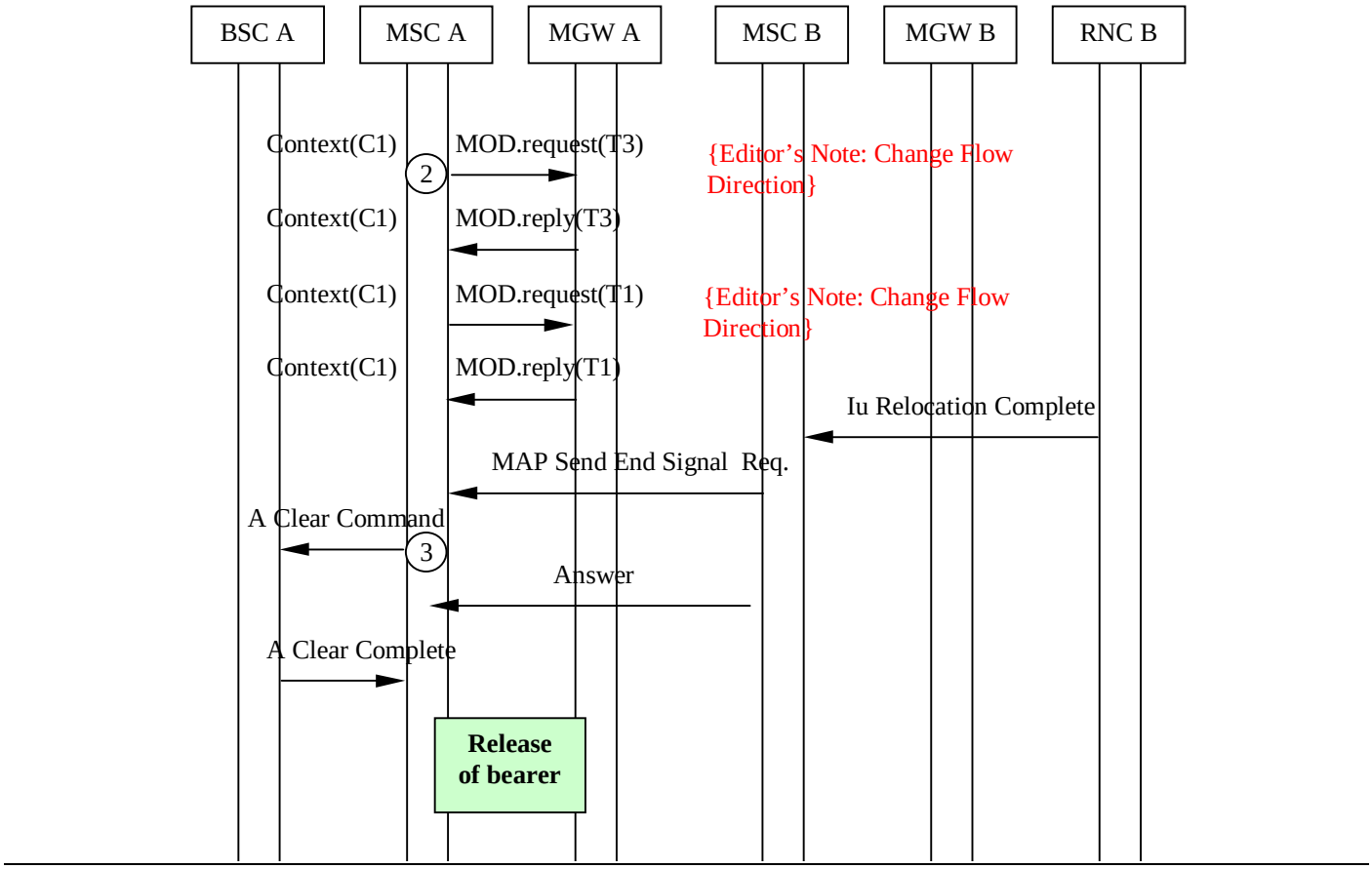


Figure 8.14 Basic Inter-MSC GSM to UMTS Handover (message sequence chart)

~~8.9~~Subsequent Inter-MSC UMTS to GSM Handover back to the Anchor MSC

~~FFS~~

The following handling shall be applied for a call that started as UMTS call. The procedures specified in TS 23.009 for 'Subsequent UMTS to GSM handover requiring a Circuit Connection between 3G_MSC-A and 3G_MSC-B, 3G_MSC-B to MSC-A' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

MSC-A

Relocation Required:

When Relocation Required message is received from the RNC-A (via MSC-B), a bearer is established between MSC-A and MGW-A. (Bullet 1 in figure 8.16.)

Handover Command/Handover Detect:

At sending of Relocation Command message or alternatively at receiving of Handover Detect message the MSC-A uses the Change Flow Direction procedure to requests the MGW-A to set the Handover Device to intermediate state. (Bullet 2 in figure 8.16.)

Handover Complete:

At receiving of Handover Complete message the MSC-A informs the MSC-B about reception of this message (bullet 3 in figure 8.16), then the MSC-A initiates call clearing towards the MSC-B as described at Call Clearing.

MSC-B

Handover Complete:

At receiving of Handover Complete message, the MSC-B requests the RNC-A to release the IU and requests the MGW-B to remove the bearer termination towards the RNC-A using the Release Termination procedure. (Bullet 4 in figure 8.16.)

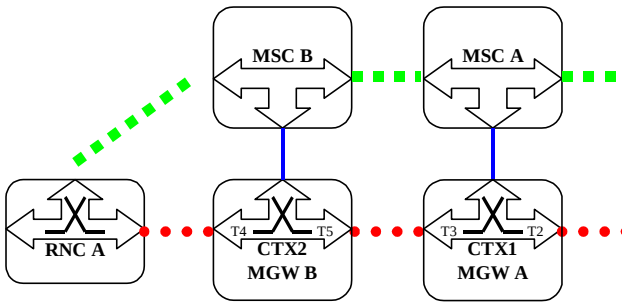
Release of bearer towards MGW-A:

When the MSC-B receives call clearing indication from the MSC-A, the MSC-B handles it as described at Call Clearing.

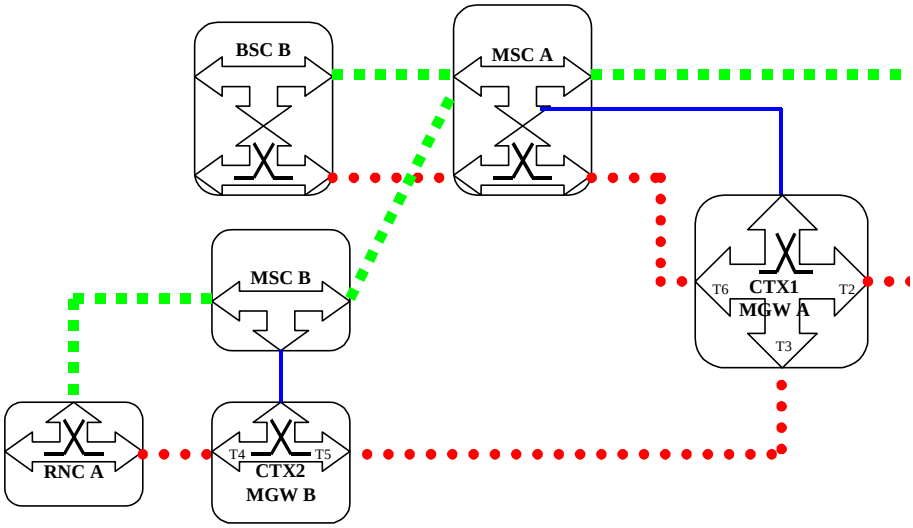
Example

The figure 8.15 below shows the network model for the Subsequent Inter-MSC UMTS to GSM Handover back to the Anchor MSC. The 'squared' line represents the call control signalling. The 'dotted' line represents the bearer control signalling and the bearer. In MGW-A the bearer termination T6 is used for the bearer towards BSC-B (connected through MSC-A), the bearer termination T3 is used for the bearer towards the MGW-B, and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW. In MGW-B the bearer termination T4 is used for the bearer towards the RNC-A, the bearer termination T5 is used for the bearer towards the MGW-A.

Before UMTS to GSM Handover:



During UMTS to GSM Handover:



After UMTS to GSM Handover:

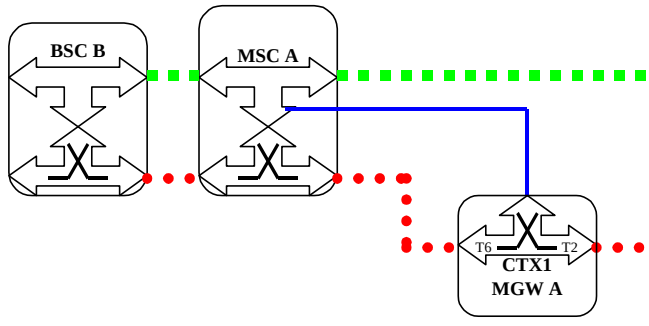
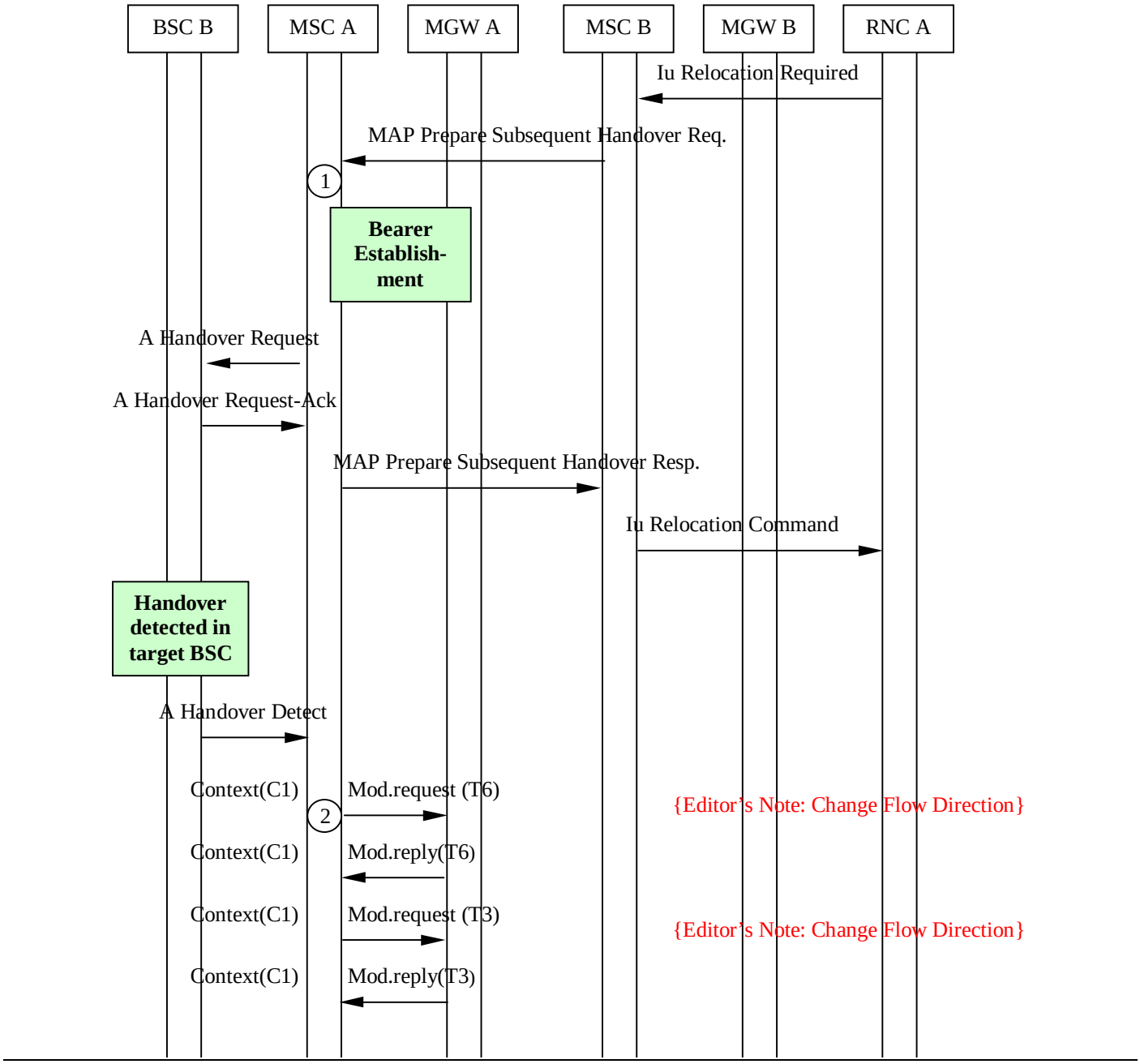


Figure 8.15 Subsequent Inter-MSC UMTS to GSM Handover back to the Anchor MSC (network model)

The figure 8.16 below shows the message sequence example for the Subsequent Inter-MSC UMTS to GSM Handover back to the Anchor MSC.

It is assumed that the Handover Device is located in the MGW-A selected for the call establishment by the MSC-A which controls the call and the mobility management. Also assumed that only one bearer has been established towards the RNC-A.
In the example at reception of Relocation Required from the RNC-A the bearer is established between MSC-A and MGW-A. When the handover is detected in the BSC-B, the MSC-A requests to change the flow directions between the terminations within the context in the MGW-A. When the MSC-A receives Handover Complete indication from the BSC-B it transfers this indication to the MSC-B. The MSC-B orders the RNC-A to release the IU. This action causes release of the bearer between the RNC-A and the MGW-B. The MSC-A initiates call clearing towards the MSC-B.



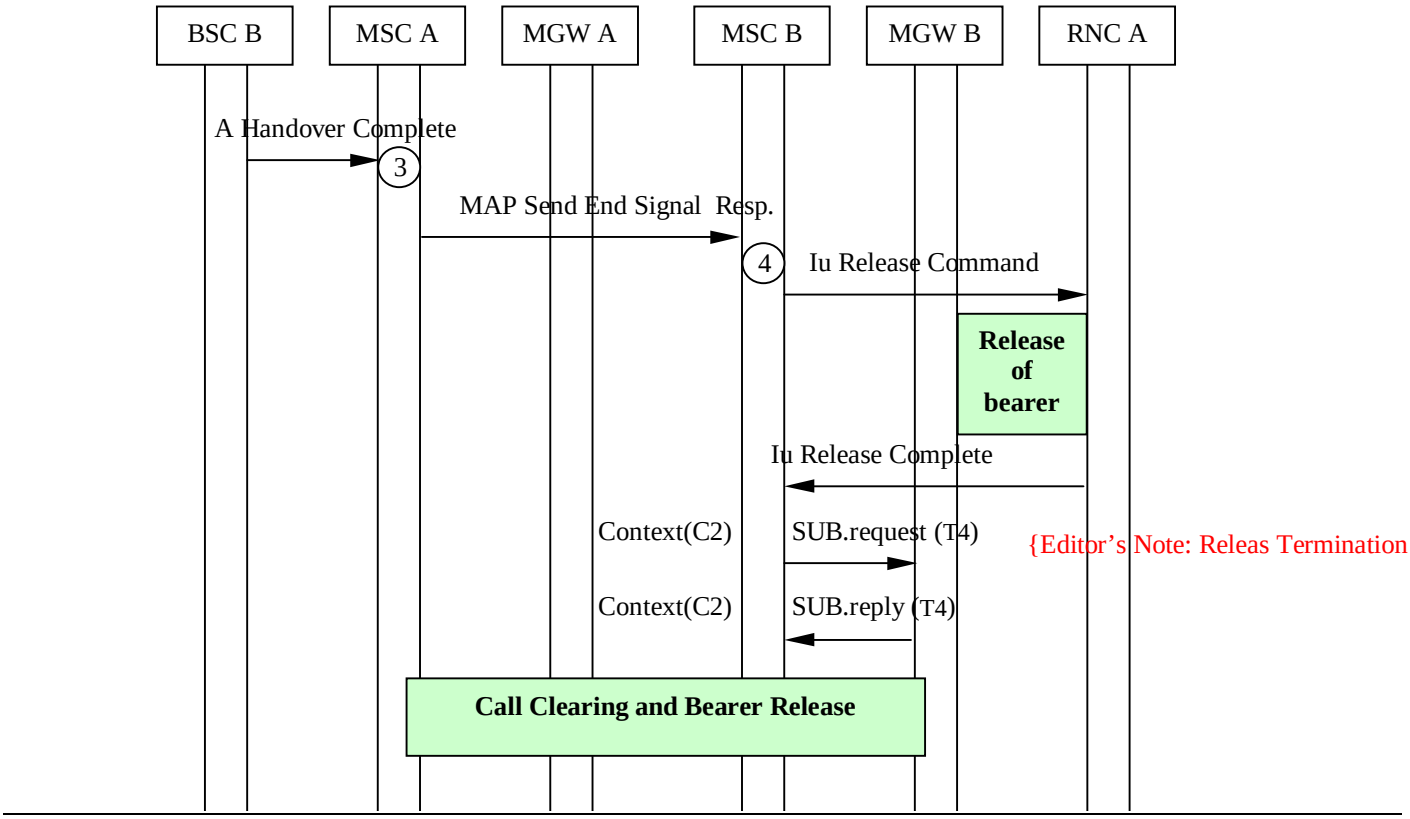


Figure 8.16 Subsequent Inter-MSC UMTS to GSM Handover back to the Anchor MSC (message sequence chart)

~~8.10~~Subsequent Inter-MSC GSM to UMTS Handover back to the Anchor MSC

~~FFS~~

The following handling shall be applied for a call that started as UMTS call. The procedures specified in TS 23.009 for 'Subsequent Inter-MSC GSM to UMTS Handover back to the Anchor MSC' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

MSC-A

Handover Required:

When Handover Required message is received from BSC-A (via MSC-B), the MSC-A requests the MGW to provide a binding reference and a bearer address using the Prepare Bearer procedure. The MSC sends the Relocation Request message to the RNC-B containing the bearer address and binding reference. (Bullet 1 in figure 8.18.)

Handover Command/Relocation Detect:

At sending of Handover Command message or alternatively at receiving of Relocation Detect message the MSC-A uses the Change Flow Direction procedure to requests the MGW to set the Handover Device to intermediate state. (Bullet 2 in figure 8.18.)

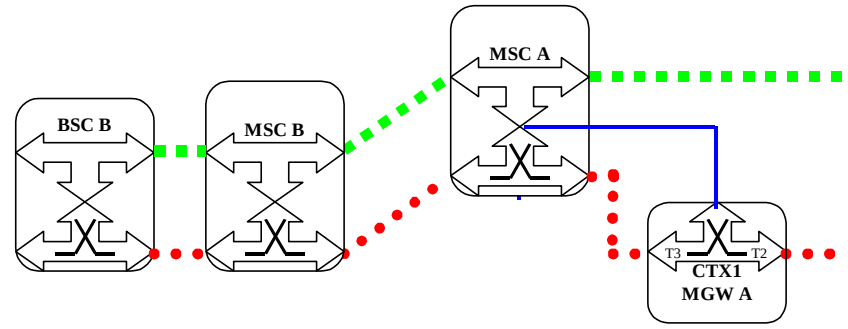
Relocation Complete:

At receiving of Relocation Complete message the MSC-A requests the MGW to set the Handover Device to its final state by releasing the bearer between the MSC-A and the MGW (bullet 3 in figure 8.18).

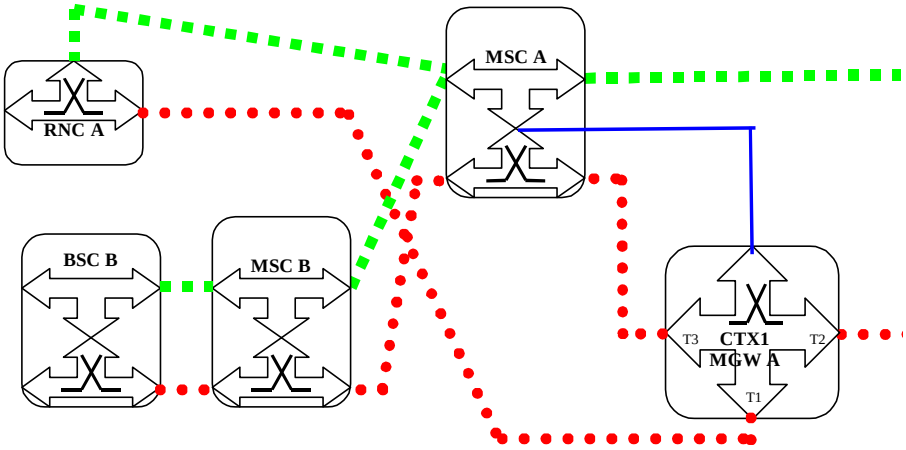
Example

The figure 8.17 below shows the network model for Subsequent Inter-MSC GSM to UMTS Handover back to the Anchor MSC. The 'squared' line represents the call control signalling. The 'dotted' line represents the bearer control signalling and the bearer. In MGW the bearer termination T1 is used for the bearer towards RNC-B, the bearer termination T3 is used for the bearer towards MSC-A, and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Before GSM to UMTS Handover:



During GSM to UMTS Handover:



After GSM to UMTS Handover:

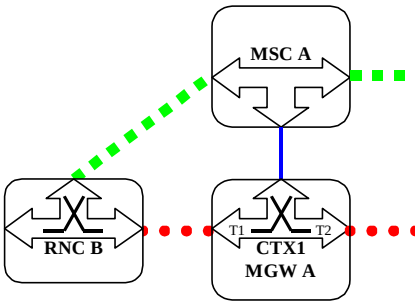
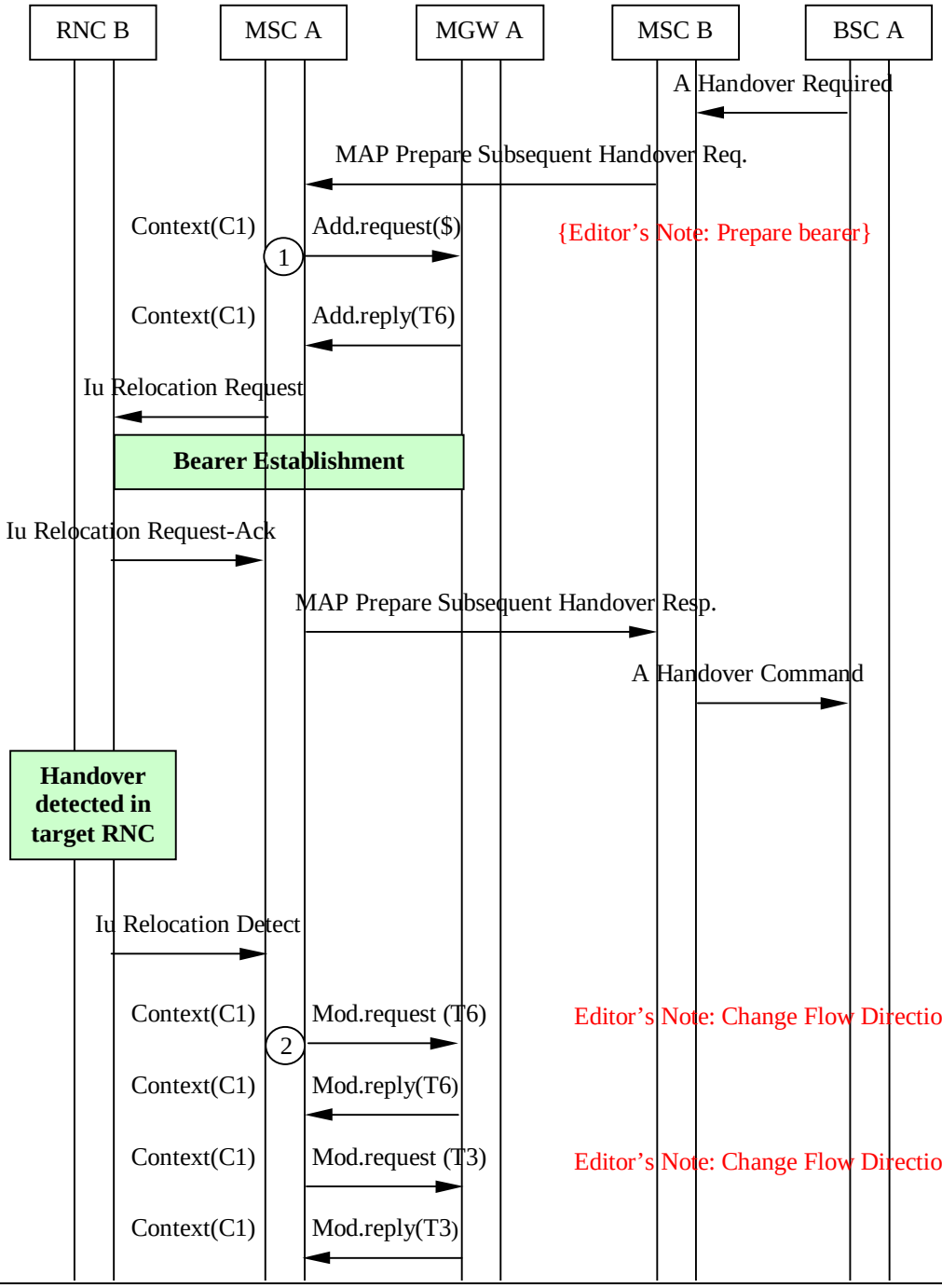


Figure 8.17 Subsequent Inter-MSC GSM to UMTS Handover back to the Anchor MSC (network model)

The figure 8.18 below shows the message sequence example for Subsequent Inter-MSC GSM to UMTS Handover back to the Anchor MSC.
It is assumed that the Handover Device is located in the MGW selected for the call establishment by the MSC-A which controls the call and the mobility management.
In the example the MSC-A requests MGW to seize the RNC-B side bearer termination with specific flow directions. The MSC orders the establishment of the bearer towards the RNC-B by sending Relocation Request. When the relocation is detected in the RNC-B the MSC-A requests to change the flow directions between the terminations within the context in the MGW. When the MSC-A receives Relocation Complete indication from the RNC-B the bearer between MGW and MSC-A is released.



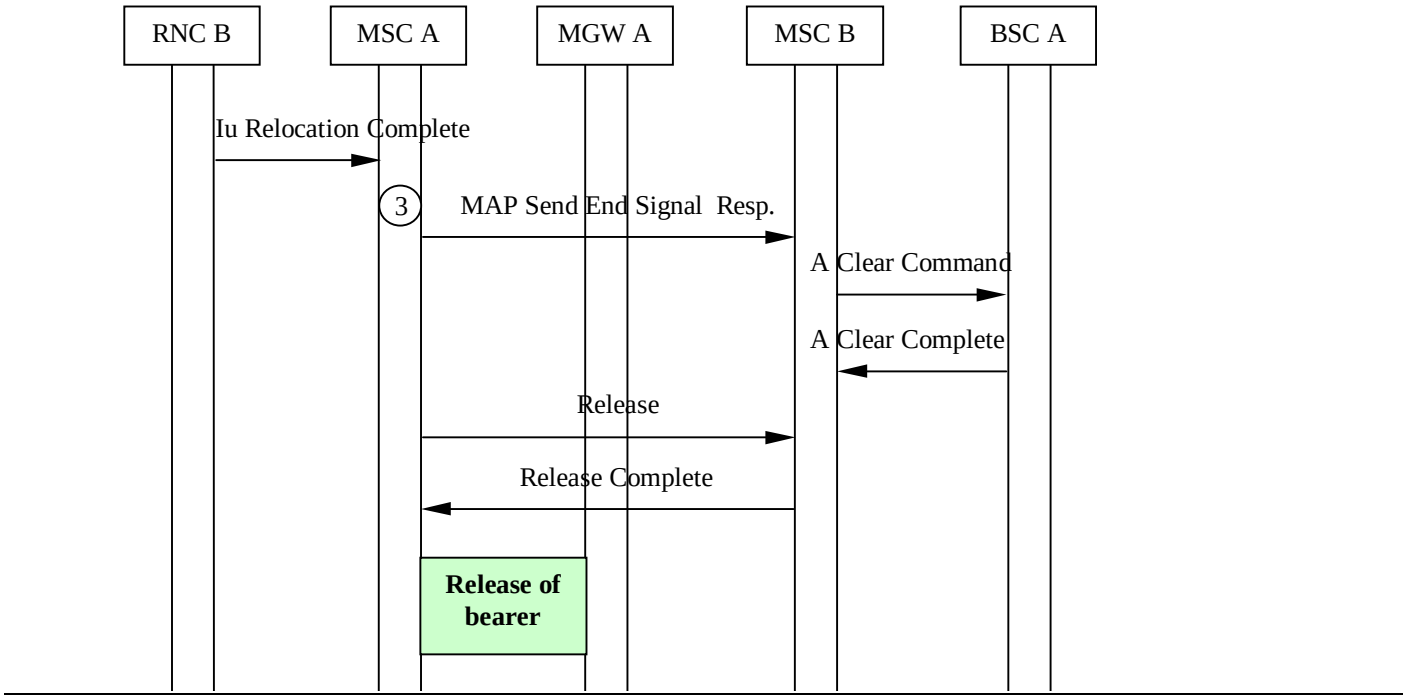


Figure 8.18 Subsequent Inter-MSC GSM to UMTS Handover back to the Anchor MSC (message sequence chart)

******End of document ******

3GPP TSG-CN4 **Tdoc N4-001008**
Meeting #5 Meeting , Paris, France
13th October – 17th October 2000

Source: **Siemens AG**

Title: **Input for TS 23.205, inter system HO chapters**

Agenda item: **7.2.1**

Document for: **Discussion and Approval**

Introduction

Chapter 8.5 to 8.8 is missing in current version of TS 23.205 " Bearer Independent CS Core Network , stage 2". This document proposes input for these vacant chapters.

Discussion

8.5 Intra-MSC UMTS to GSM Handover

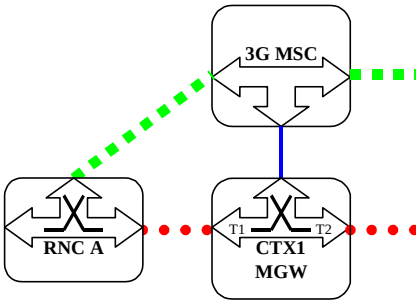
The procedures specified in [TS 23.009] for 'Intra 3G_MSC Handover from UMTS to GSM' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

Example

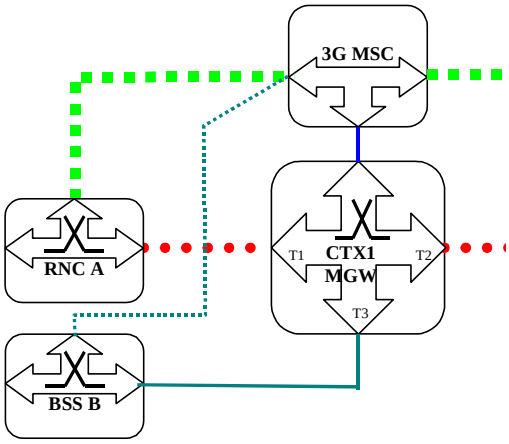
Figure 8.v below shows the network model for the Basic Intra-MSC UMTS to GSM handover. The 'bold, squared' line represents the call control signalling. The 'bold, dotted' line represents the bearer control signalling and the bearer. The 'thin, continuous' line represents the circuit connection between the 3G_MSC and the BSC, the 'thin, dotted' line represents the BSSMAP control signalling. [Note: for further details results from TS GERAN needed]. Within the MGW the bearer termination T1 is used for the bearer towards RNC-A, bearer termination T3 is used for the bearer towards BSS-B, and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Note: Towards BSS-B no separation of bearer and control plane applies.

Before Handover:



During Handover:



After Handover:

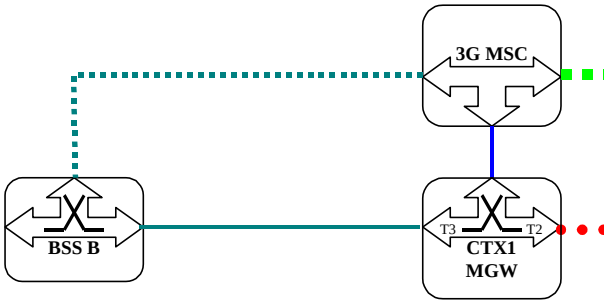


Figure 8.v Intra-3G_MSC UMTS to GSM Handover (network model)

Figure 8.w below shows the message sequence example for the Intra-3G_MSC UMTS to GSM handover.
It is assumed that the Handover Device is located in the MGW selected for the call establishment by the 3G_MSC. Further, it is assumed that only one bearer has been established towards RNC-A.
The 3G_MSC orders the establishment of the bearer towards BSS-B by sending Handover Request. When the handover is detected in BSS-B the 3G_MSC requests to change the flow directions between the terminations within the context in the MGW. When 3G_MSC receives Handover Complete indication from BSS-B, it orders RNC-A to release the Iu connection. This action causes release of the bearer between RNC-A and the MGW. Finally the 3G_MSC requests the MGW to remove the RNC-A side bearer termination.

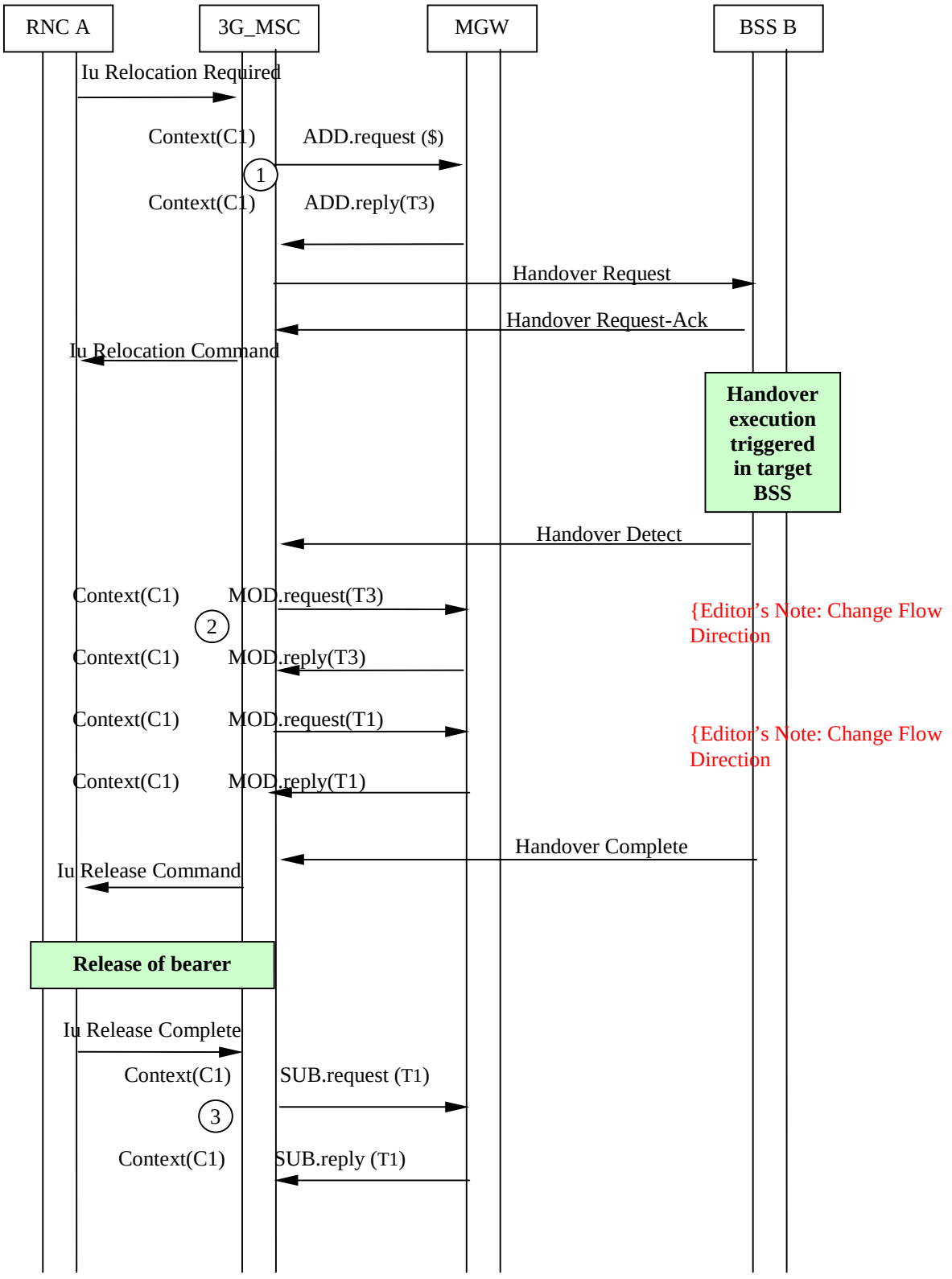


Figure 8.w Information flow for Intra-3G_MSC UMTS to GSM Handover (message sequence chart)

8.6 Intra-MSC GSM to UMTS Handover

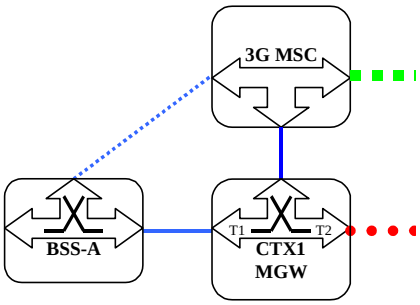
The procedures specified in [TS 23.009] for ‘Intra 3G_MSC Handover GSM to UMTS’ shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

Example

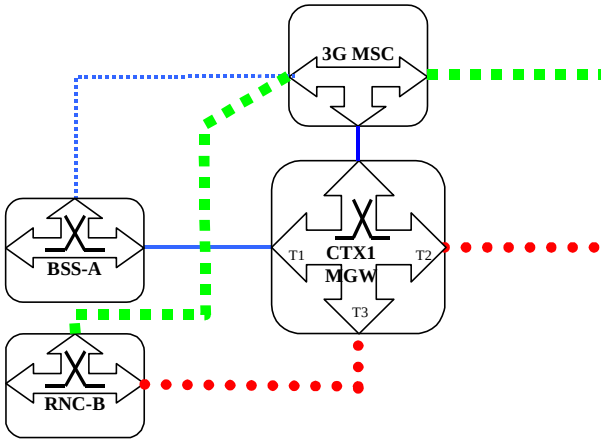
The figure 8.v1 below shows the network model for the Basic Intra-MSC GSM to UMTS handover. The ‘bold, squared' line represents the call control signalling. The ‘bold, dotted' line represents the bearer control signalling and the bearer. The ‘thin, continuous’ line represents the circuit connection between 3G_MSC and the BSC, the ‘thin, dotted’ line represents the BSSMAP control signalling. [Note: results from TS GERAN required]. Within the MGW the bearer termination T1 is used for the bearer towards BSS-A, bearer termination T3 is used for the bearer towards RNC-B and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Note: Towards BSS-A no separation of bearer and control plane applies.

Before Handover:



During Handover:



After Handover:

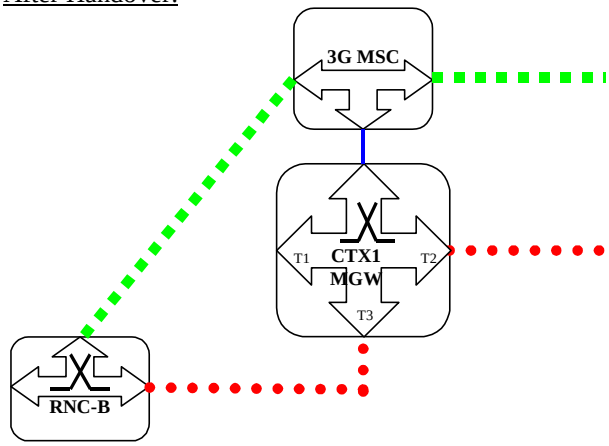


Figure 8.v1 Basic Inter-MSC GSM to UMTS Handover (network model)

The figure 8.w1 below shows the message sequence example for the Intra-3G_MSC GSM to UMTS handover.
It is assumed that the Handover Device is located in the 3G_MSC selected for the call establishment by the 3G_MSC. the example the 3G_MSC orders the establishment of the bearer towards RNC-B by sending Relocation Request. When the relocation is detected in RNC-B the 3G_MSC requests to change the flow directions between the terminations within the context in the MGW. When the 3G_MSC receives Relocation Complete indication from RNC-B it orders BSS-A to release the resources.

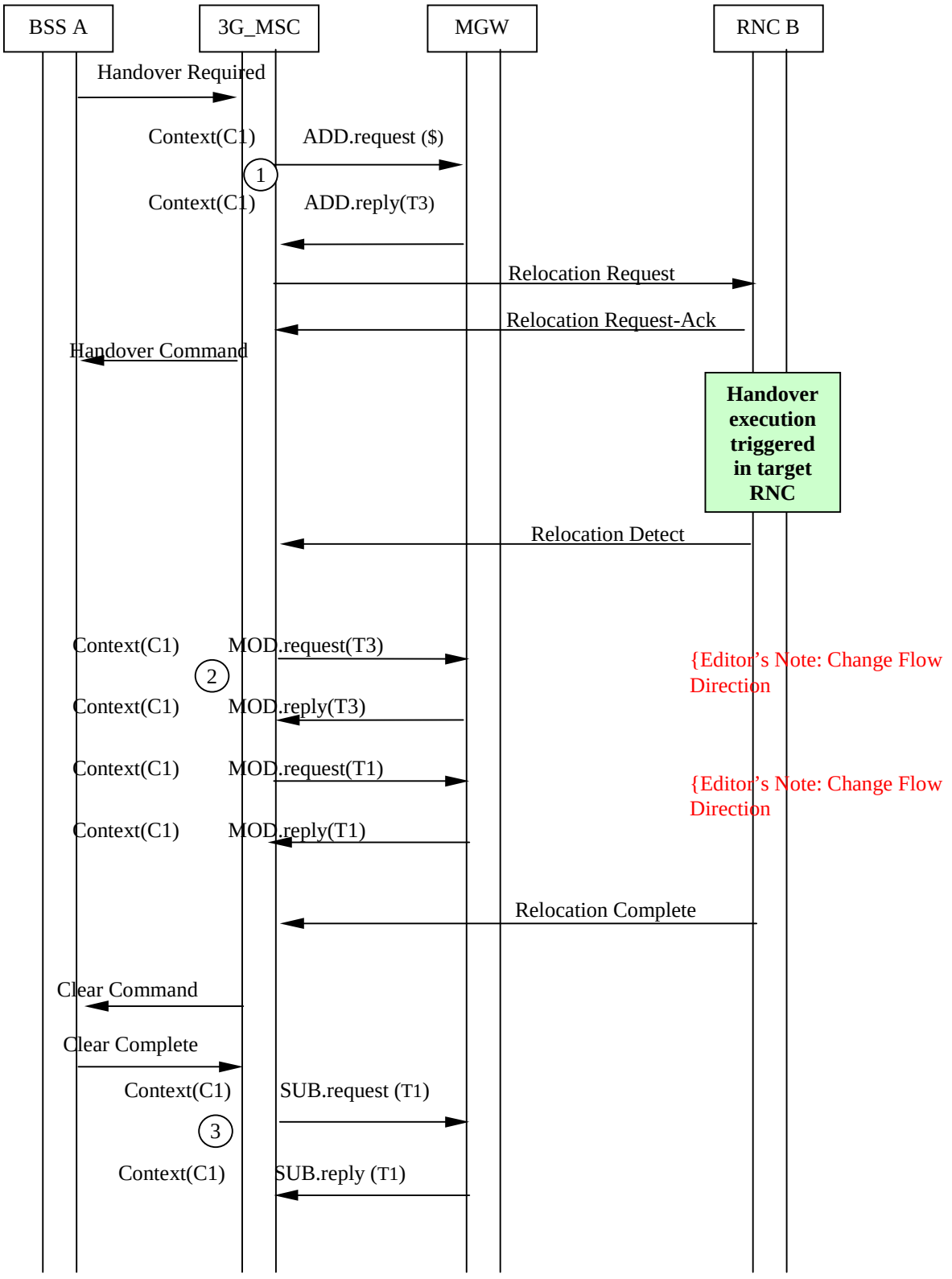


Figure 8.w1 Information flow for Intra-MSC GSM to UMTS Handover (message sequence chart)

8.7 Inter-MSC UMTS to GSM Handover

The procedures specified in [TS 23.009] for ‘ Basic 3G_MSC UMTS to GSM Handover Procedure Requiring a Circuit Connection between 3G_MSC-A and MSC-B’ shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

8.7.1 MSC-A

MSC-A should act as a normal 3G_MSC_A, towards MSC-B, supporting inter-MSC signalling as required for R’99, i.e. establishing a circuit between MSC-A and MSC-B is done by channel associated signalling procedures supported by the network.

Initial addressing and Bearer establishment towards MSC-B:

MSC-A requests MGW-A to add a new bearer termination towards MSC-B, providing the bearer information for allocation of a circuit to MSC-B. (Bullet 1 in figure 8.x.). MSC-A sends the initial address message for circuit establishment MSC-A (Bullet 2 in figure 8.x.) and also indicates that the continuity message will follow from the preceding node to indicate established bearer.

Relocation Command/Relocation Detect:

At sending Relocation Command message or alternatively at receiving Relocation Detect, MSC-A requests MGW-A to set the Device to an intermediate state by changing the flow directions between the bearer terminations. (Bullet 3 in figure 8.x.)

Relocation Complete:

At receiving Relocation Complete message, MSC-A requests MGW-A to set the Handover Device to its final state. MSC-A requests RNC-A to release the IU and requests MGW-A to remove the bearer termination towards RNC-A. (Bullet 4 in figure 8.x.)

8.7.2 MSC-B

MSC-B follows the procedure of MSC-B as described in the procedures for Intersystem handover from UMTS to GSM in [TS 23.009].

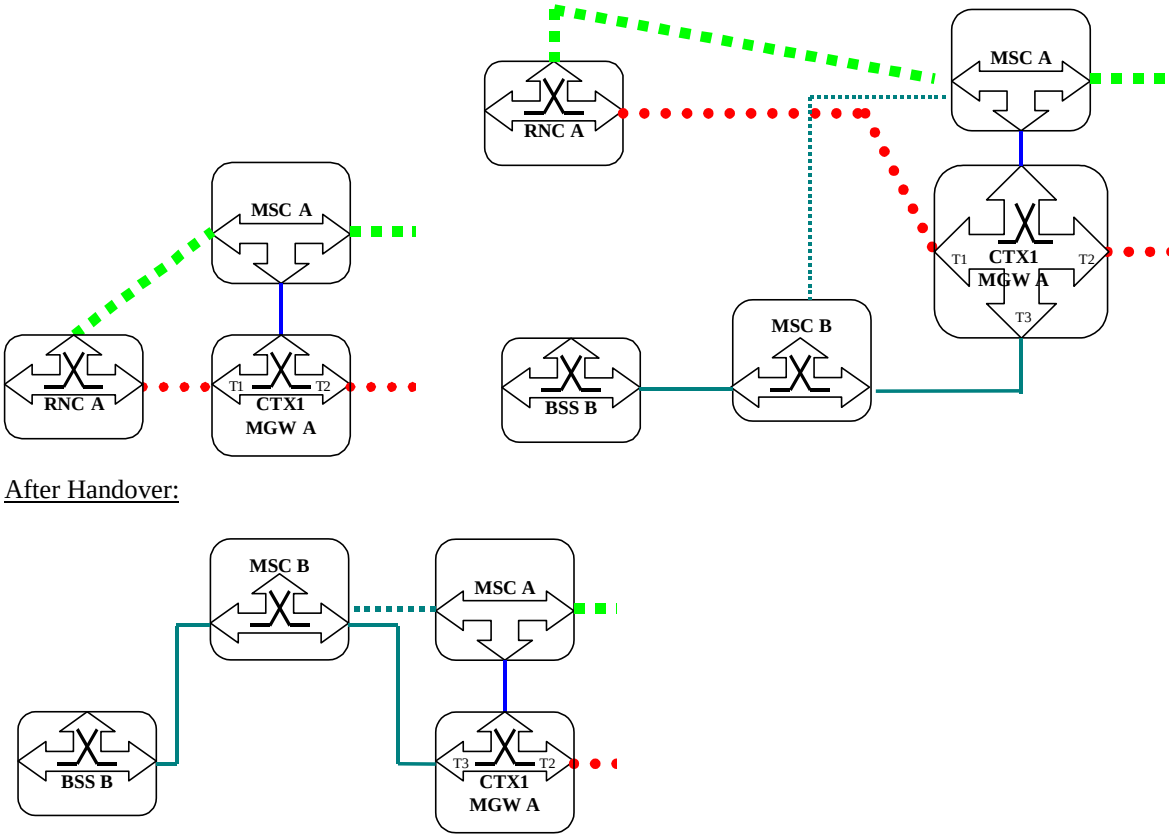
Example

The figure 8.x below shows the network model for the Basic Inter-MSC UMTS to GSM handover. The ‘bold, squared' line represents the call control signalling. The ‘bold, dotted’ line represents the bearer control signalling and the bearer. The ‘thin, continuous’ line represents the circuit connection to MSC-B, the ‘thin, dotted’ line represents the handover control signalling. In MGW-A the bearer termination T1 is used for the bearer towards RNC-A, bearer termination T3 is used for the bearer towards MSC-B, and the bearer termination T2 is used for the bearer towards the succeeding/preceding MGW.

Note: Towards MSC-B no separation of bearer and control plane applies.

Before Handover:

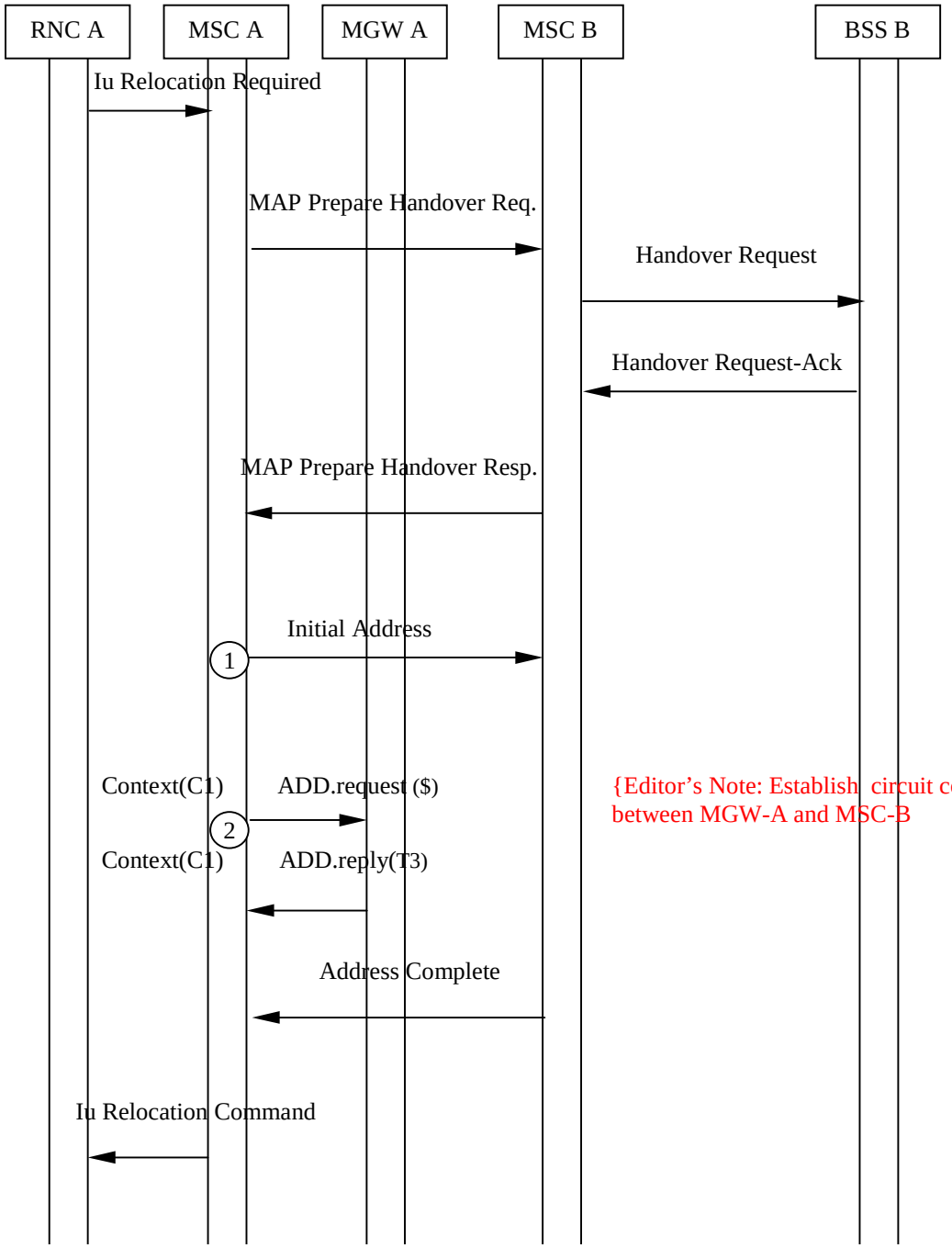
During Handover:



After Handover:

Figure 8.x Basic Inter-MSC UMTS to GSM Handover (network model)

Figure 8.y below shows the message sequence example for the Inter-MSC UMTS to GSM handover.
It is assumed that the Handover Device is located in the MGW (MGW-A) selected for the call establishment by the MSC (MSC-A) which controls the call, the mobility management and the radio resources. Furhter, it is assumed that only one bearer has been established towards RNC-A.
In the example the MSC-B orders the establishment of the bearer towards BSS-B by sending Handover Request. The circuit connection towards MSC-B is established by sending the initial address message from MSC-A to MSC-B. MSC-A requests MGW-A to seize the bearer towards MGW-B. When the relocation is detected in BSS-B the MSC-A requests to change the flow directions between the terminations within the context in MGW-A. When MSC-A receives Relocation Complete indication from MSC-B it orders RNC-A to release the Iu connection. This action causes release of the bearer between RNC-A and the MGW-A. Finally MSC-A requests MGW-A to remove RNC-A side bearer termination.


RNC A
MSC A
MGW A
MSC B
BSS B
Iu Relocation Required
MAP Prepare Handover Req.
Handover Request
Handover Request-Ack
MAP Prepare Handover Resp.
Initial Address
1
Context(C1)
ADD.request ($)
2
Context(C1)
ADD.reply(T3)
{Editor's Note: Establish circuit connection between MGW-A and MSC-B
Address Complete
Iu Relocation Command

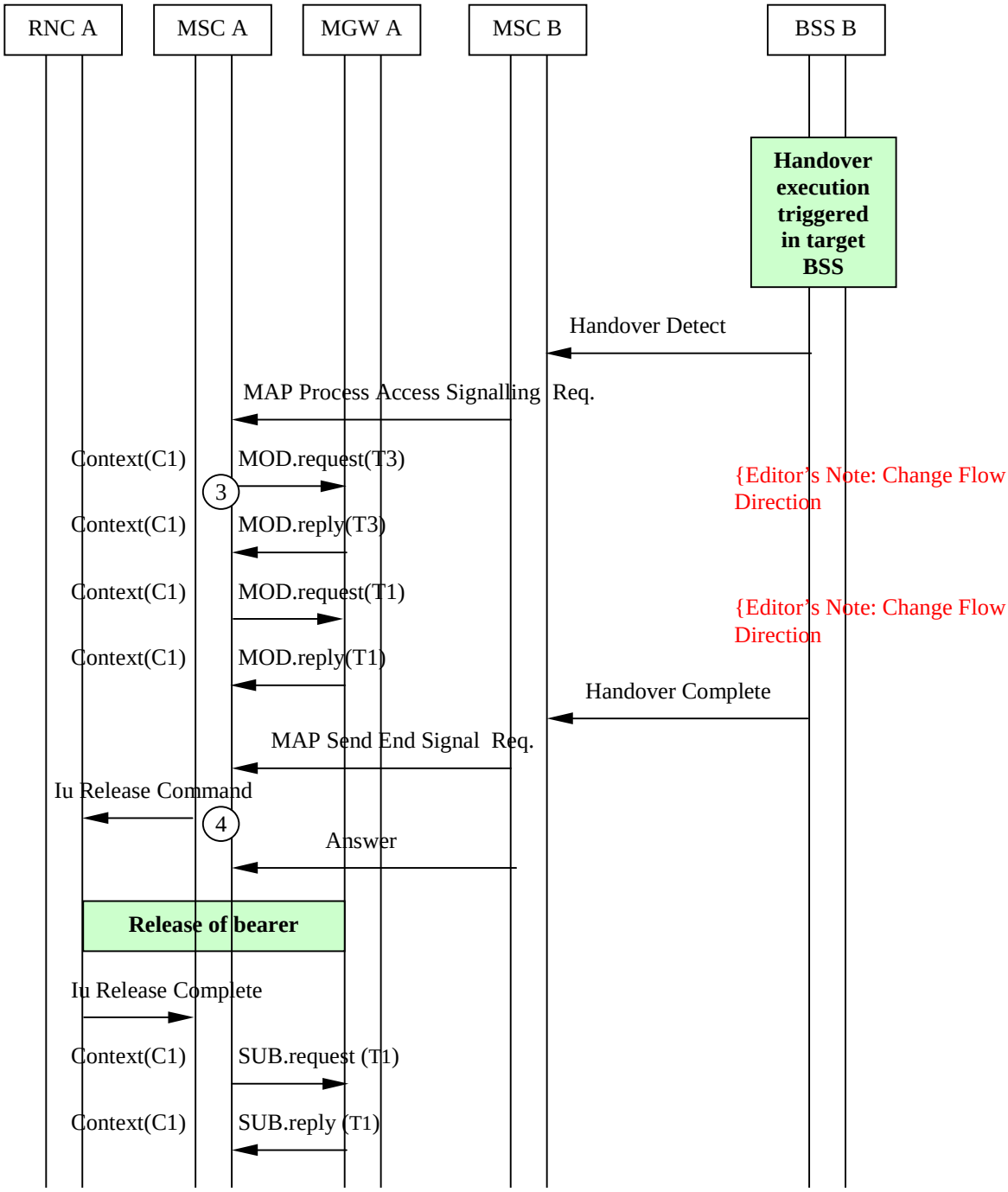


Figure 8.y Information flow for Inter-MSC UMTS to GSM Handover (message sequence chart)

8.8 Inter-MSC GSM to UMTS Handover

The procedures specified in [TS 23.009] for 'Basic GSM to UMTS Handover Procedure Requiring a Circuit Connection between MSC-A and 3G_MSC-B' shall be followed. The following paragraphs describe the additional requirements for the bearer independent CS core network.

8.8.1 MSC-A

MSC-A should act towards MSC-B, as a normal GSM MSC-A, supporting inter-MSC signalling as required for R'99, i.e. establishing a circuit between MSC-A and MSC-B is done by channel associated signalling procedures supported by the network.

Initial addressing and Bearer establishment towards MSC-B:

At receiving of Relocation Request ACK, MSC-A sends the initial address message for circuit establishment and also indicates that the continuity message will follow from the preceding node to indicate established bearer. (Bullet 1 in figure 8.x1.)

8.8.2 MSC-B

MGW selection:

MSC-B selects MGW-B when it receives Prepare Handover Request message.

Bearer establishment towards RNC-B:

When MSC-B selected MGW-B, it requests MGW-B to seize RNC-B side bearer termination. MSC-B also requests a binding reference and a bearer address. MSC-B requests establishment of bearer towards RNC-B by sending Relocation Request containing the bearer address and binding reference. (Bullet 1 in figure 8.x1.)

Provision of bearer information:

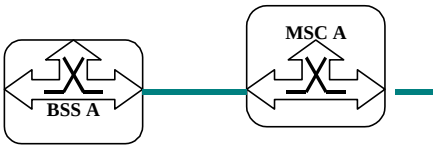
When receiving initial address message from MSC-A, MSC-B request MGW-B to seize MSC-A side termination and to seize bearer towards MSC-A. (Bullet 2 in figure 8.x1.) Both terminations are through connected, no additional request at MGW-B when relocation complete needed.

Relocation Complete

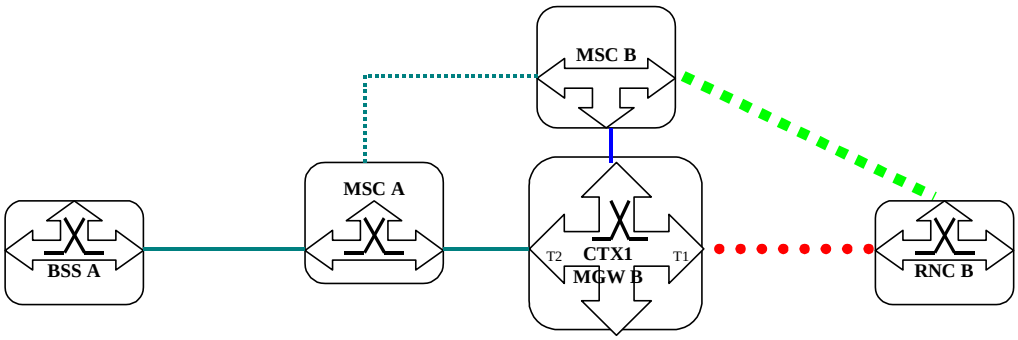
Example

The figure 8.x1 below shows the network model for the Basic Inter-MSC GSM to UMTS handover. The 'bold, squared' line represents the call control signalling. The 'bold, dotted' line represents the bearer control signalling and the bearer. The 'thin, continuous' line represents the circuit connection between MSC-A and MSC-B, the "violet dotted" line represents the handover control signalling between MSC-A and MSC-B. In MGW-B the bearer termination T1 is used for the bearer towards RNC-B, bearer termination T2 is used for the bearer towards MSC-A.

Before Handover:



During Handover:



After Handover:

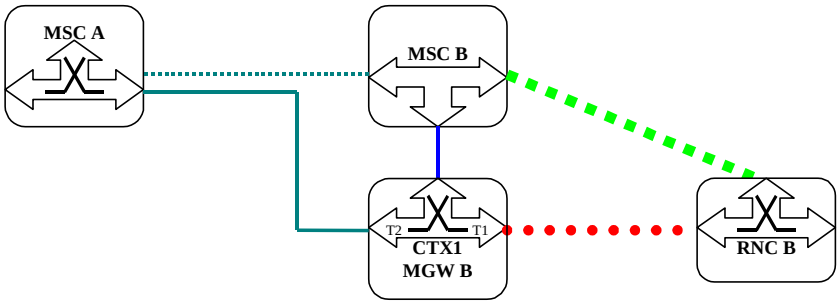
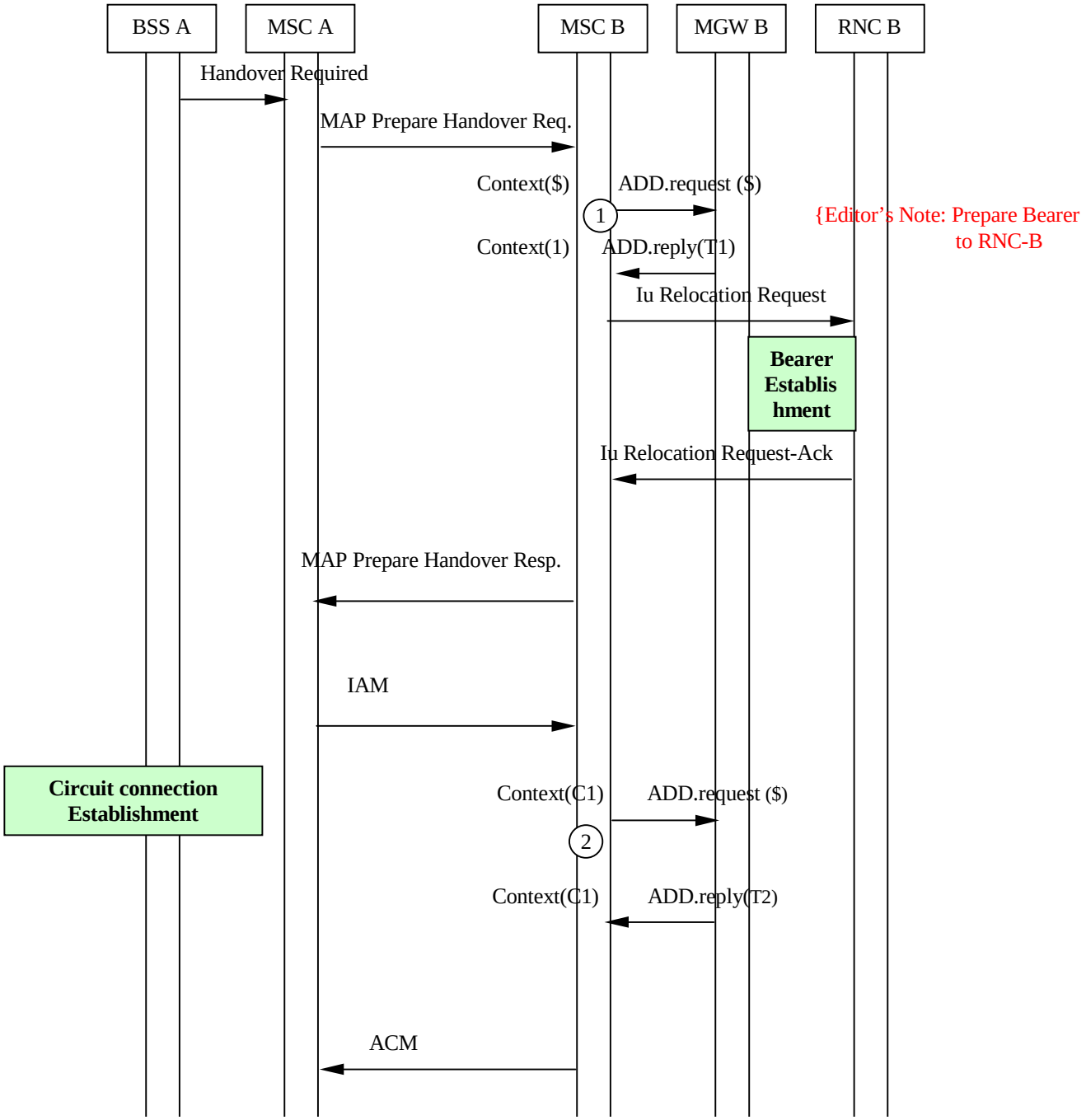


Figure 8.x1 Basic Inter-MSC GSM to UMTS Handover (network model)

The figure 8.y1 below shows the message sequence example for the Inter-MSC UMTS to GSM handover.
It is assumed that the Handover Device is located in the MSC-A selected for the call establishment by the MSC (MSC-A) which controls the call, the mobility management and the radio resources.
In the example the MSC-B orders the establishment of the bearer towards RNC-B by sending Relocation Request. The circuit connection towards MGW-B is established by sending the initial address message from MSC-A to MSC-B. MSC-B requests MGW-B to seize MGW-B side bearer with specific flow directions, and also requests establishment of the circuit connection towards MSC-A. When the relocation is detected in RNC-B the MSC-B requests to change the flow directions between the terminations within the context in MGW-B. When MSC-A receives Relocation Complete indication from MSC-B it orders BSS-A to release the resources towards BSS-A.


BSS A
MSC A
MSC B
MGW B
RNC B
Handover Required
MAP Prepare Handover Req.
Context($)
ADD.request ($)
1
{Editor's Note: Prepare Bearer to RNC-B
Context(1)
ADD.reply(T1)
Iu Relocation Request
Bearer Establis hment
Iu Relocation Request-Ack
MAP Prepare Handover Resp.
IAM
Circuit connection Establishment
Context(C1)
ADD.request ($)
2
Context(C1)
ADD.reply(T2)
ACM

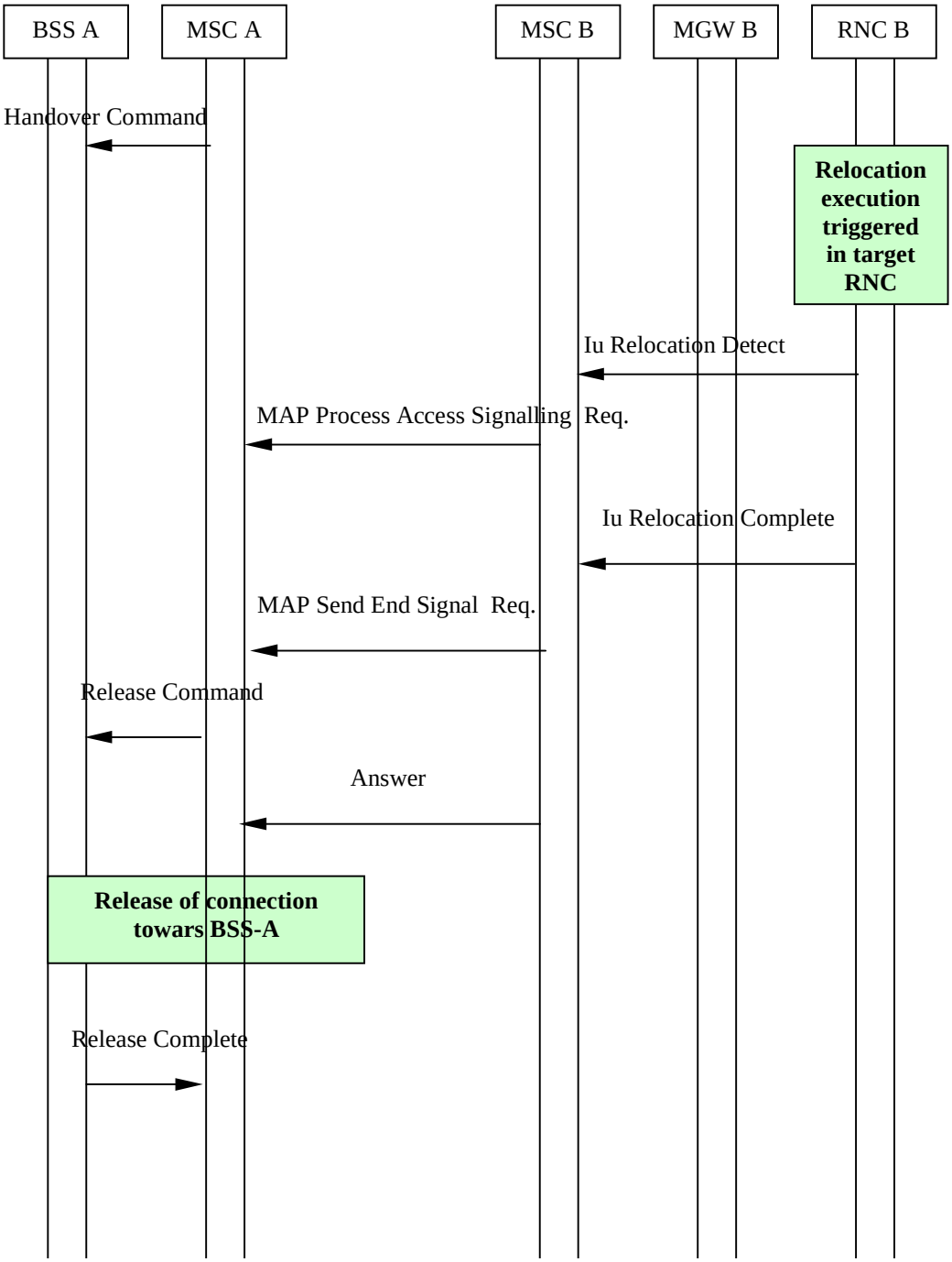


Figure 8.y1 Information flow for Inter-MSC GSM to UMTS Handover (message sequence chart)

Proposal

It is proposed to include the whole content of the “Discussion - chapter” into TS 23.205

3GPP-CN4 Meeting # 5
Paris, France 13-17 November 2000

Document N4-001022
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

29.060	**CR**	**155r1**	Current Version:	3.6.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#10	for approval	X	Strategic		*(for SMG use only)*
list expected approval meeting # here ↑	for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: Nokia, Alcatel, Siemens **Date:** 9 November 2000

Subject: Adding Uplink TEID for Data I and user plane GGSN address to PDP Context IE

Work item: GTP enhancement

Category: *(only one category shall be marked with an X)*				**Release:**	
F	Correction	X		Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

Once a SRNS Relocation procedure is underway when MS in PMM-CONNECTED state, the MS may send uplink user data to the new RNC before the new SGSN has updated PDP context(s) with GGSN.

At this point, the new RNC forwards the uplink user data to the new SGSN. According to 23.121 there is no buffering of data in 3G-SGSN. Therefore, the new SGSN has to forward the uplink user packets immediately to GGSN. For that purpose the new SGSN needs to know the GGSN's user plane address and value of appropriate TEID for Data I in GGSN. Note, this would be the same TEID as the old SGSN is still using to forward the user uplink data to GGSN. However, for this moment of time the new SGSN has not received these IEs yet. Hence, the new SGSN shall drop the packets. As long as packet discarding must not take place, there is a problem that must be solved.

This CR solves the problem by adding the Uplink TEID for Data I and GGSN user plane address to the PDP Context IE. In such case, the old SGSN shall send Uplink TEID for Data I and GGSN user plane address to the new SGSN at the early stage of the SRNS Relocation Procedure. Namely, these IEs shall be carried by PDP Context IE in the Forward Relocation Request message. With this solution the packets shall not be dropped.

This change would align 29.060 with 23.121.

However, this kind of solution requires another modification to 29.060 that is discussed below.

Once new SGSN gets Uplink TEID for Data I and GGSN user plane address at the early stage of the SRNS Relocation Procedure, it shall forward uplink user data to GGSN before PDP context has been updated with GGSN. Delays in packet delivery may result in a situation when GGSN shall receive user data with the same TEID value both from the old and the new SGSNs.

However, currently spec requires, that no two remote GTP-U endpoints should send traffic to a GTP-U protocol entity using the same TEID value. In all the cases, but a short period of time during the SRNS Relocation Procedure, this shall hold without an explicit statement in the specification.

The CR proposes to lift the restriction and solve this new problem as well.

Clauses affected: 7.7.29; 9.1.

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:


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<--------- double-click here for help and instructions on how to create a CR.

7.7.29 PDP Context

The PDP Context information element contains the Session Management parameters, defined for an external packet data network address, that are necessary to transfer between SGSNs at the Inter SGSN Routeing Area Update procedure.

NSAPI is an integer value in the range [0; 15].

The NSAPI points out the affected PDP context.

The SAPI indicates the LLC SAPI that is associated with the NSAPI.

The Transaction Identifier is the 4 or 12 bit Transaction Identifier used in the 3G TS 24.008 Session Management messages which control this PDP Context. If the length of the Transaction Identifier is 4 bit, the second octet shall be set to all zeros. The encoding is defined in 3G TS 24.007. The latest Transaction Identifier sent from SGSN to MS is stored in the PDP context IE.

Reordering Required (Order) indicates whether the SGSN shall reorder T-PDUs before delivering the T-PDUs to the MS. When the Quality of Service Negotiated (QoS Neg) is Release 99, the Reordering Required (Order) shall be ignored by receiving entity.

The VPLMN Address Allowed (VAA) indicates whether the MS is allowed to use the APN in the domain of the HPLMN only or additionally the APN in the domain of the VPLMN.

The QoS Sub Length, QoS Req Length and QoS Neg Length represent respectively the lengths of the QoS Sub, QoS Req and QoS Neg fields, excluding the QoS Length octet.

The Quality of Service Subscribed (QoS Sub), Quality of Service Requested (QoS Req) and Quality of Service Negotiated (QoS Neg) are encoded as described in section ‘Quality of Service (QoS) Profile’. Their minimum length is 4 octets; their maximum length may be 255 octets.

The Sequence Number Down is the number of the next T-PDU that shall be sent from the new SGSN to the MS. The number is associated to the Sequence Number from the GTP Header of an encapsulated T-PDU.

The Sequence Number Up is the number that new SGSN shall use as the Sequence Number in the GTP Header for the next encapsulated T-PDU from the MS to the GGSN.

The Send N-PDU Number is used only when acknowledged peer-to-peer LLC operation is used for the PDP context. Send N-PDU Number is the N-PDU number to be assigned by SNDCP to the next down link N-PDU received from the GGSN. It shall be set to 255 if unacknowledged peer-to-peer LLC operation is used for the PDP context.

The Receive N-PDU Number is used only when acknowledged peer-to-peer LLC operation is used for the PDP context. The Receive N-PDU Number is the N-PDU number expected by SNDCP from the next up link N-PDU to be received from the MS. It shall be set to 255 if unacknowledged peer-to-peer LLC operation is used for the PDP context.

The Up link Tunnel Endpoint Identifier Control Plane is the Tunnel Endpoint Identifier used between the old SGSN and the GGSN in up link direction for control plane purpose. It shall be used by the new SGSN within the GTP header of the Update PDP Context Request message.

The GGSN address for user traffic and the Up-link Tunnel Endpoint Identifier User Plane are the GGSN address and the Tunnel Endpoint Identifier used between the old SGSN and the GGSN in up-link direction for user plane traffic on a PDP context. They shall be used by the new SGSN to send uplink user plane PDU (until possibly superseded by a new value received in Update PDP Context Response message from GGSN).

The PDP Context Identifier is used to identify a PDP context for the subscriber.

The PDP Type Organisation and PDP Type Number are encoded as in the End User Address information element.

The PDP Address Length represents the length of the PDP Address field, excluding the PDP Address Length octet.

The PDP Address is an octet array with a format dependent on the PDP Type. The PDP Address is encoded as in the End User Address information element if the PDP Type is IPv4 or IPv6.

The GGSN Address Length represents the length of the GGSN Address field, excluding the GGSN Address Length octet.

The old SGSN includes the GGSN Address for control plane that it has received from GGSN at PDP context activation or update.

The APN is the Access Point Name in use in the old SGSN. I.e. the APN sent in the Create PDP Context request message.

The spare bits x indicate unused bits that shall be set to 0 by the sending side and which shall not be evaluated by the receiving side.

1	Type = 130 (Decimal)				
2-3	Length				
4	Res-erved	VAA	Res-erved	Order	NSAPI
5	X	X	X	X	SAPI
6	QoS Sub Length				
7 - (q+6)	QoS Sub [4..255]				
q+7	QoS Req Length				
(q+8)-(2q+7)	QoS Req [4..255]				
2q+8	QoS Neg. Length				
(2q+9)-(3q+8)	QoS Neg [4..255]				
(3q+9)-(3q+10)	Sequence Number Down (SND) [1)]				
(3q+11)-(3q+12)	Sequence Number Up (SNU) [1)]				
3q+13	Send N-PDU Number [1)]				
3q+14	Receive N-PDU Number [1)]				
(3q+15)-(3q+18)	Uplink Tunnel Endpoint Identifier Control Plane				
(3q+19)-(3q+22)	Uplink Tunnel Endpoint Identifier for Data I				
3q+23~~19~~	PDP Context Identifier				
3q+24~~0~~	Spare 1 1 1 1				PDP Type Organisation
3q+25~~1~~	PDP Type Number				
3q+26~~2~~	PDP Address Length				
(3q+27~~3~~)-m	PDP Address [1..63]				
m+1	GGSN Address for control plane Length				
(m+2)-n	GGSN Address for control plane [4..16]				
n+1	GGSN Address for user plane Length				
(n+2)-o	GGSN Address for user plane [4..16]				
~~n~~o+1	APN length				
(~~n~~o+2)-p~~o~~	APN				
~~o~~p+1	Spare (sent as 0 0 0 0)				Transaction Identifier
~~O~~p+2	Transaction Identifier				

Figure 43: PDP Context Information Element

1) This field shall not be evaluated when the PDP context is received during UMTS intra system handover/relocation.

Table 48: Reordering Required Values

Reordering Required	Value (Decimal)
No	0
Yes	1

Table 49: VPLMN Address Allowed Values

VPLMN Address Allowed	Value (Decimal)
No	0
Yes	1

*** *Next Modification* ***

9 GTP-U

GTP-U Tunnels are used to carry encapsulated T-PDUs between a given pair of GTP-U Tunnel Endpoints. The Tunnel Endpoint ID (TEID) which is present in the GTP header shall indicate which tunnel a particular T-PDU belongs to. In this manner, packets are multiplexed and de-multiplexed by GTP-U between a given pair of Tunnel Endpoints. The TEID value to be used in the TEID field shall be negotiated for instance during the GTP-C Create PDP Context and the RAB assignment procedures that take place on the control plane.

The maximum size of a T-PDU that may be transmitted without fragmentation by GGSN or the MS is defined in UMTS 23.060. The GGSN shall fragment, reject or discard T-PDUs, depending on the PDP type and implementation decisions, directed to the MS if the T-PDU size exceeds the maximum size. The decision if the T-PDUs shall be fragmented or discarded is dependent on the external packet data network protocol.

9.1 GTP-U Protocol Entity

The GTP-U protocol entity provides packet transmission and reception services to user plane entities in the GGSN, in the SGSN and, in UMTS systems, in the RNC. The GTP-U protocol entity receives traffic from a number of GTP-U tunnel endpoints and transmits traffic to a number of GTP-U tunnel endpoints. There is a GTP-U protocol entity per IP address.

The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities in a way that allows multiplexing of different users, different packet protocols and different QoS levels. ~~Therefore~~

In a handover or relocation phase, ~~no~~ two different remote GTP-U endpoints ~~shall~~ may send traffic to a GTP-U protocol entity at the GGSN using the same TEID value. The traffic from both GTP-U endpoints belongs to only one bearer service of the same user.

3GPP-CN4 Meeting # 5
Paris, France 13-17 November 2000

Document N4-001022
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

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29.060	**CR**	**155r1**	Current Version:	3.6.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to: CN#10	for approval	X	Strategic		*(for SMG use only)*
list expected approval meeting # here ↑	for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: Nokia, Alcatel, Siemens **Date:** 9 November 2000

Subject: Adding Uplink TEID for Data I and user plane GGSN address to PDP Context IE

Work item: GTP enhancement

Category: *(only one category shall be marked with an X)*				**Release:**	
F	Correction	X		Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

Once a SRNS Relocation procedure is underway when MS in PMM-CONNECTED state, the MS may send uplink user data to the new RNC before the new SGSN has updated PDP context(s) with GGSN.

At this point, the new RNC forwards the uplink user data to the new SGSN. According to 23.121 there is no buffering of data in 3G-SGSN. Therefore, the new SGSN has to forward the uplink user packets immediately to GGSN. For that purpose the new SGSN needs to know the GGSN's user plane address and value of appropriate TEID for Data I in GGSN. Note, this would be the same TEID as the old SGSN is still using to forward the user uplink data to GGSN. However, for this moment of time the new SGSN has not received these IEs yet. Hence, the new SGSN shall drop the packets. As long as packet discarding must not take place, there is a problem that must be solved.

This CR solves the problem by adding the Uplink TEID for Data I and GGSN user plane address to the PDP Context IE. In such case, the old SGSN shall send Uplink TEID for Data I and GGSN user plane address to the new SGSN at the early stage of the SRNS Relocation Procedure. Namely, these IEs shall be carried by PDP Context IE in the Forward Relocation Request message. With this solution the packets shall not be dropped.

This change would align 29.060 with 23.121.

However, this kind of solution requires another modification to 29.060 that is discussed below.

Once new SGSN gets Uplink TEID for Data I and GGSN user plane address at the early stage of the SRNS Relocation Procedure, it shall forward uplink user data to GGSN before PDP context has been updated with GGSN. Delays in packet delivery may result in a situation when GGSN shall receive user data with the same TEID value both from the old and the new SGSNs.

However, currently spec requires, that no two remote GTP-U endpoints should send traffic to a GTP-U protocol entity using the same TEID value. In all the cases, but a short period of time during the SRNS Relocation Procedure, this shall hold without an explicit statement in the specification.

The CR proposes to lift the restriction and solve this new problem as well.

Clauses affected: 7.7.29; 9.1.

Other specs affected:

Other 3G core specifications		→ List of CRs:
Other GSM core specifications		→ List of CRs:
MS test specifications		→ List of CRs:
BSS test specifications		→ List of CRs:
O&M specifications		→ List of CRs:

Other comments:


help.doc

<--------- double-click here for help and instructions on how to create a CR.

7.7.29 PDP Context

The PDP Context information element contains the Session Management parameters, defined for an external packet data network address, that are necessary to transfer between SGSNs at the Inter SGSN Routeing Area Update procedure.

NSAPI is an integer value in the range [0; 15].

The NSAPI points out the affected PDP context.

The SAPI indicates the LLC SAPI that is associated with the NSAPI.

The Transaction Identifier is the 4 or 12 bit Transaction Identifier used in the 3G TS 24.008 Session Management messages which control this PDP Context. If the length of the Transaction Identifier is 4 bit, the second octet shall be set to all zeros. The encoding is defined in 3G TS 24.007. The latest Transaction Identifier sent from SGSN to MS is stored in the PDP context IE.

Reordering Required (Order) indicates whether the SGSN shall reorder T-PDUs before delivering the T-PDUs to the MS. When the Quality of Service Negotiated (QoS Neg) is Release 99, the Reordering Required (Order) shall be ignored by receiving entity.

The VPLMN Address Allowed (VAA) indicates whether the MS is allowed to use the APN in the domain of the HPLMN only or additionally the APN in the domain of the VPLMN.

The QoS Sub Length, QoS Req Length and QoS Neg Length represent respectively the lengths of the QoS Sub, QoS Req and QoS Neg fields, excluding the QoS Length octet.

The Quality of Service Subscribed (QoS Sub), Quality of Service Requested (QoS Req) and Quality of Service Negotiated (QoS Neg) are encoded as described in section ‘Quality of Service (QoS) Profile’. Their minimum length is 4 octets; their maximum length may be 255 octets.

The Sequence Number Down is the number of the next T-PDU that shall be sent from the new SGSN to the MS. The number is associated to the Sequence Number from the GTP Header of an encapsulated T-PDU.

The Sequence Number Up is the number that new SGSN shall use as the Sequence Number in the GTP Header for the next encapsulated T-PDU from the MS to the GGSN.

The Send N-PDU Number is used only when acknowledged peer-to-peer LLC operation is used for the PDP context. Send N-PDU Number is the N-PDU number to be assigned by SNDCP to the next down link N-PDU received from the GGSN. It shall be set to 255 if unacknowledged peer-to-peer LLC operation is used for the PDP context.

The Receive N-PDU Number is used only when acknowledged peer-to-peer LLC operation is used for the PDP context. The Receive N-PDU Number is the N-PDU number expected by SNDCP from the next up link N-PDU to be received from the MS. It shall be set to 255 if unacknowledged peer-to-peer LLC operation is used for the PDP context.

The Up link Tunnel Endpoint Identifier Control Plane is the Tunnel Endpoint Identifier used between the old SGSN and the GGSN in up link direction for control plane purpose. It shall be used by the new SGSN within the GTP header of the Update PDP Context Request message.

The GGSN address for user traffic and the Up-link Tunnel Endpoint Identifier User Plane are the GGSN address and the Tunnel Endpoint Identifier used between the old SGSN and the GGSN in up-link direction for user plane traffic on a PDP context. They shall be used by the new SGSN to send uplink user plane PDU (until possibly superseded by a new value received in Update PDP Context Response message from GGSN).

The PDP Context Identifier is used to identify a PDP context for the subscriber.

The PDP Type Organisation and PDP Type Number are encoded as in the End User Address information element.

The PDP Address Length represents the length of the PDP Address field, excluding the PDP Address Length octet.

The PDP Address is an octet array with a format dependent on the PDP Type. The PDP Address is encoded as in the End User Address information element if the PDP Type is IPv4 or IPv6.

The GGSN Address Length represents the length of the GGSN Address field, excluding the GGSN Address Length octet.

The old SGSN includes the GGSN Address for control plane that it has received from GGSN at PDP context activation or update.

The APN is the Access Point Name in use in the old SGSN. I.e. the APN sent in the Create PDP Context request message.

The spare bits x indicate unused bits that shall be set to 0 by the sending side and which shall not be evaluated by the receiving side.

1	Type = 130 (Decimal)				
2-3	Length				
4	Res-erved	VAA	Res-erved	Order	NSAPI
5	X	X	X	X	SAPI
6	QoS Sub Length				
7 - (q+6)	QoS Sub [4..255]				
q+7	QoS Req Length				
(q+8)-(2q+7)	QoS Req [4..255]				
2q+8	QoS Neg. Length				
(2q+9)-(3q+8)	QoS Neg [4..255]				
(3q+9)-(3q+10)	Sequence Number Down (SND) [1)]				
(3q+11)-(3q+12)	Sequence Number Up (SNU) [1)]				
3q+13	Send N-PDU Number [1)]				
3q+14	Receive N-PDU Number [1)]				
(3q+15)-(3q+18)	Uplink Tunnel Endpoint Identifier Control Plane				
(3q+19)-(3q+22)	Uplink Tunnel Endpoint Identifier for Data I				
3q+23~~19~~	PDP Context Identifier				
3q+24~~0~~	Spare 1 1 1 1				PDP Type Organisation
3q+25~~1~~	PDP Type Number				
3q+26~~2~~	PDP Address Length				
(3q+27~~3~~)-m	PDP Address [1..63]				
m+1	GGSN Address for control plane Length				
(m+2)-n	GGSN Address for control plane [4..16]				
n+1	GGSN Address for user plane Length				
(n+2)-o	GGSN Address for user plane [4..16]				
~~n~~o+1	APN length				
(~~n~~o+2)-p~~o~~	APN				
~~o~~p+1	Spare (sent as 0 0 0 0)				Transaction Identifier
~~O~~p+2	Transaction Identifier				

Figure 43: PDP Context Information Element

1) This field shall not be evaluated when the PDP context is received during UMTS intra system handover/relocation.

Table 48: Reordering Required Values

Reordering Required	Value (Decimal)
No	0
Yes	1

Table 49: VPLMN Address Allowed Values

VPLMN Address Allowed	Value (Decimal)
No	0
Yes	1

*** *Next Modification* ***

9 GTP-U

GTP-U Tunnels are used to carry encapsulated T-PDUs between a given pair of GTP-U Tunnel Endpoints. The Tunnel Endpoint ID (TEID) which is present in the GTP header shall indicate which tunnel a particular T-PDU belongs to. In this manner, packets are multiplexed and de-multiplexed by GTP-U between a given pair of Tunnel Endpoints. The TEID value to be used in the TEID field shall be negotiated for instance during the GTP-C Create PDP Context and the RAB assignment procedures that take place on the control plane.

The maximum size of a T-PDU that may be transmitted without fragmentation by GGSN or the MS is defined in UMTS 23.060. The GGSN shall fragment, reject or discard T-PDUs, depending on the PDP type and implementation decisions, directed to the MS if the T-PDU size exceeds the maximum size. The decision if the T-PDUs shall be fragmented or discarded is dependent on the external packet data network protocol.

9.1 GTP-U Protocol Entity

The GTP-U protocol entity provides packet transmission and reception services to user plane entities in the GGSN, in the SGSN and, in UMTS systems, in the RNC. The GTP-U protocol entity receives traffic from a number of GTP-U tunnel endpoints and transmits traffic to a number of GTP-U tunnel endpoints. There is a GTP-U protocol entity per IP address.

The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities in a way that allows multiplexing of different users, different packet protocols and different QoS levels. ~~Therefore~~

In a handover or relocation phase, ~~no~~ two different remote GTP-U endpoints ~~shall~~ may send traffic to a GTP-U protocol entity at the GGSN using the same TEID value. The traffic from both GTP-U endpoints belongs to only one bearer service of the same user.

3GPP-CN4 Meeting # 5 **Document N4-001044**
Paris, France 13-17 November 2000

Source: **Nortel Networks**

Title: **Handling of GTP-U packets in the UL direction during relocation**

Document for: **Discussion**

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1. Introduction and Background

This document discusses the proposal made in the contribution in Tdoc 1022 Uplink TEID for Data I and user plane GGSN address to PDP Context IE (GTP Enhancement).

As explained in this updated version of the proposal after Tdoc 970, the proposal to add a TEID inside the PDP context IE can result in a Y shape configuration at the GGSN. Therefore to introduce this change would mean that GTP implementations in particular at the GGSN and at the RNC would be changed from the current design.

The implications of enabling this Y shape configuration in GTP should be carefully analysed before making such a change.

There is a liaison on this subject that was sent from RAN3 to SA2 and CN4. Therefore a decision can not be made without discussing the liaison, seeking SA2's opinion and exploring other ways of fixing the R99 problem, if there is indeed one. Note that there is no request from any other group to fix a potential problem with the uplink packets in R99.

2. Possible handlings of uplink packets

Here are some possible ways that the uplink buffering can be handled with the current R99 data forwarding mechanism mechanism (it should be noted that these are not all considered to be equally sensible!):

1. Buffer the UL packets at the 3G-SGSN. This is not prevented by the current text in 23.121 because the current text only applies to downlink. It says: "Since the 3G-SGSN does not buffer downstream data, the source RNC may have to buffer ..."
Also the title of the whole paragraphs related to data forwarding refer to "downstream data". It can therefore be argued that there is no problem with the UL handling today.
Indeed it was the understanding in the RAN3 group when the UL handling was discussed, that there is no issue with the UL handling today, because buffering is acceptable for non real-time services and therefore for R99. This is why the problem highlighted by RAN3 on this subject, only applies to release 4, not to release 99.

2. Use the procedure as defined today and agree that there can be some packet loss UL.

3. Forward the TEID from SGSN1 to SGSN2. However this will result in the Y shape configuration at the GGSN, since the same TEID will be used at the GGSN for the old and the new path. Also the failure cases when there is an error in the GGSN, need to be studied.

4. Use separate Update PDP context request messages from SGSN to GGSN, the first one to update the UL path (at the beginning of the relocation), and the second one to update the DL path

at the end of the procedure. Doing this does not require to hold up the Handover command over the radio more than today, since the update PDP messages can be sent from the SGSN2 to the GGSN while in parallel sending the Relocation Request over the Iu to the target RNC.

5. Use a bi-directional tunnel between the 2 RNCs. The forwarding tunnel would be used for both UL and DL packets.

6. Buffer the UL packets at the target RNC. This will require a new RANAP procedure for the SGSN to indicate to the RNC that it can now send UL packets to it.

7. Buffer the UL packets at the UE. This will require a new RANAP/RRC procedure or a new MM message for the SGSN to indicate to the UE that it can now send UL packets to it.

8. Buffer the DL and UL packets at the SGSNs. Potentially add some forwarding from source to target SGSNs. In this case, the forwarding tunnel between RNCs is not used.

Considering that enabling the Y shape configuration (a result of solution 3):

- Would restrict the current implementations which may have put hooks in place to prevent this to happen at the GGSN (or at the RNC).
- May create new error cases if the GGSN detects any GTP-U errors in UL packets.
- Would prevent to have the GTP-U tunnel SGSN1-GGSN and the GTP-U tunnel SGSN2-GGSN on separate VPNs.
- Is likely to cause an error in the GGSN because the GTP sequence numbers received on the same TEID at the GGSN would be reset to 0 when the target SGSN takes over
- Can not be decided before SA2 has answered the liaison on this very subject
- Is not required for Rel99

It is not a decision that should be made unless other solutions have been explored. Using different TEIDs at the GGSN as done today and as has been done so far in GRPS, is a much cleaner solution.

3. Proposal

Therefore it is proposed to discuss the other options. It should be demonstrated first that there is indeed a problem in Release 99 rather than in Release 4.
If there is indeed an issue, this has to be agreed with other groups and clarified in other specifications. CN4 could fix the problem by using solution 4 above. Other solutions would require other groups' input. In any case appropriate co-ordination and agreements with other groups is needed.

3GPP TSG-CN4 **Tdoc N4-001045**
CN4#05 Meeting , Paris, FRANCE
13th November – 17th November 2000

Title: ***LS on GERAN impacts on overall system architecture***

Source: **TSG_CN WG4**

To: **TSG_SA WG2**

Cc: **GERAN, TSG_CN1, TSG_CN2**

Contact Person:

Name: **Michael Young**
E-mail Address: **michael.young@motorola.com**

CN4 thanks SA2 update the information of GERAN impact to overall system architecture especially the core network (S2-001615).

CN4 generally agree with SA2's analysis on this issue, please see CN4's comments one by one as below.

1. Support of physically separate '2G' and '3G' SGSNs

This requires further investigation on inter-SGSN (2G-SGSN and 3G-SGSN) RAU procedures and message flows, CN4 believe both stage 2 and stage 3 documents will be impacted.

CN4 would like SA2 identify what's the "**other**" reasons mentioned in this section.

2. Support of combined '2G' and '3G' SGSNs

Now CN4 can see this only impacts the functionality of SGSN product , no protocol impact which is taken care by CN4. Hence, this should remain in SA2's remit.

3. Dual Transfer Mode

CN4 agree and believe this has no impact to CN4.

4. Class A UMTS mobiles which are class B and support Iu-ps in GERAN

CN4 agree and believe this has no impact to CN4.

Note: Please be informed that the next CN4 meeting will be held on 15-19 January 2001 in Beijing, China.

3GPP TSG-CN4 **Tdoc N4-001050**
#05 Meeting, Paris, FRANCE
13th November – 17th November 2000

Title: **LS on GGSN address selection mechanism in SGSN in case of network requested PDP context activation procedure**

Source: **TSG_CN WG4**

To: **TSG_SA WG2**

Cc:

Contact Person:
Name: **Toshiyuki Tamura**
E-mail Address: **tamurato@nsf.ncos.nec.co.jp**
Tel. Number: +81 471-85-6901

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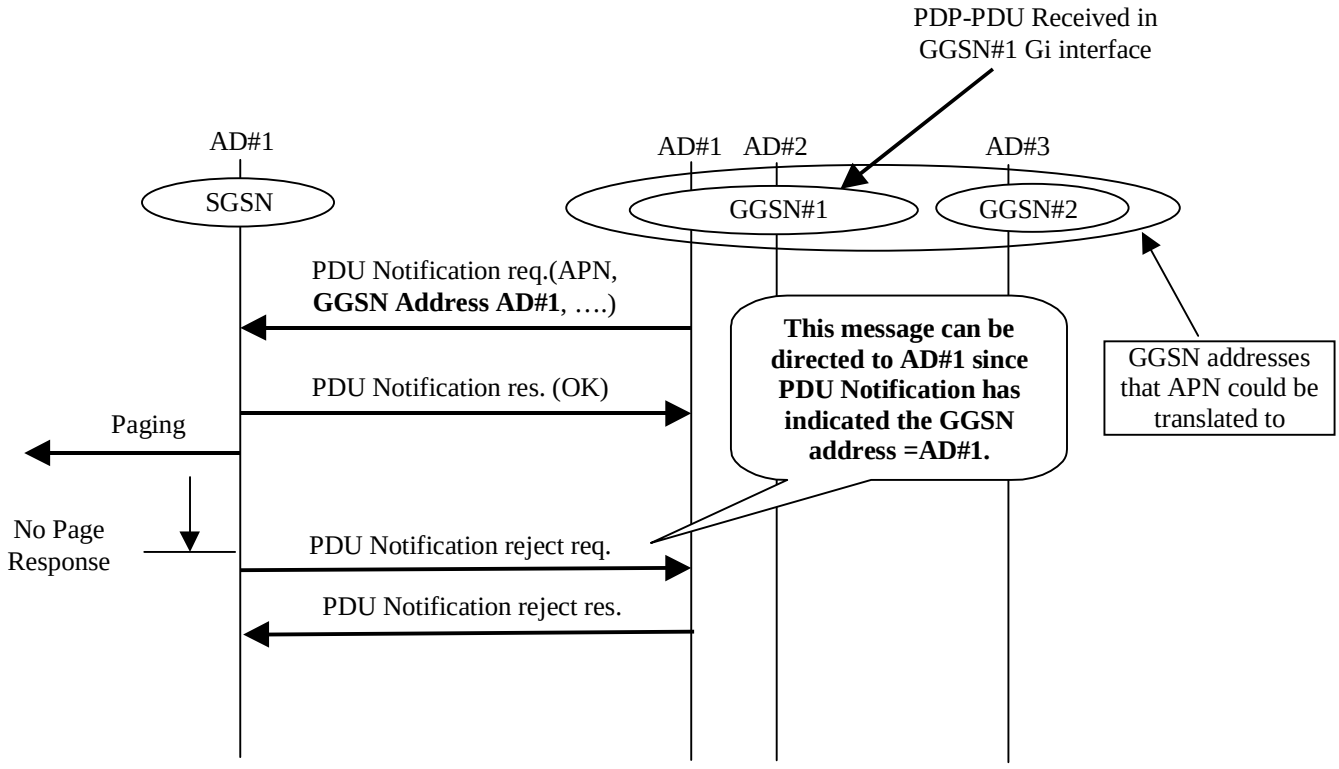
1. Overall Description:

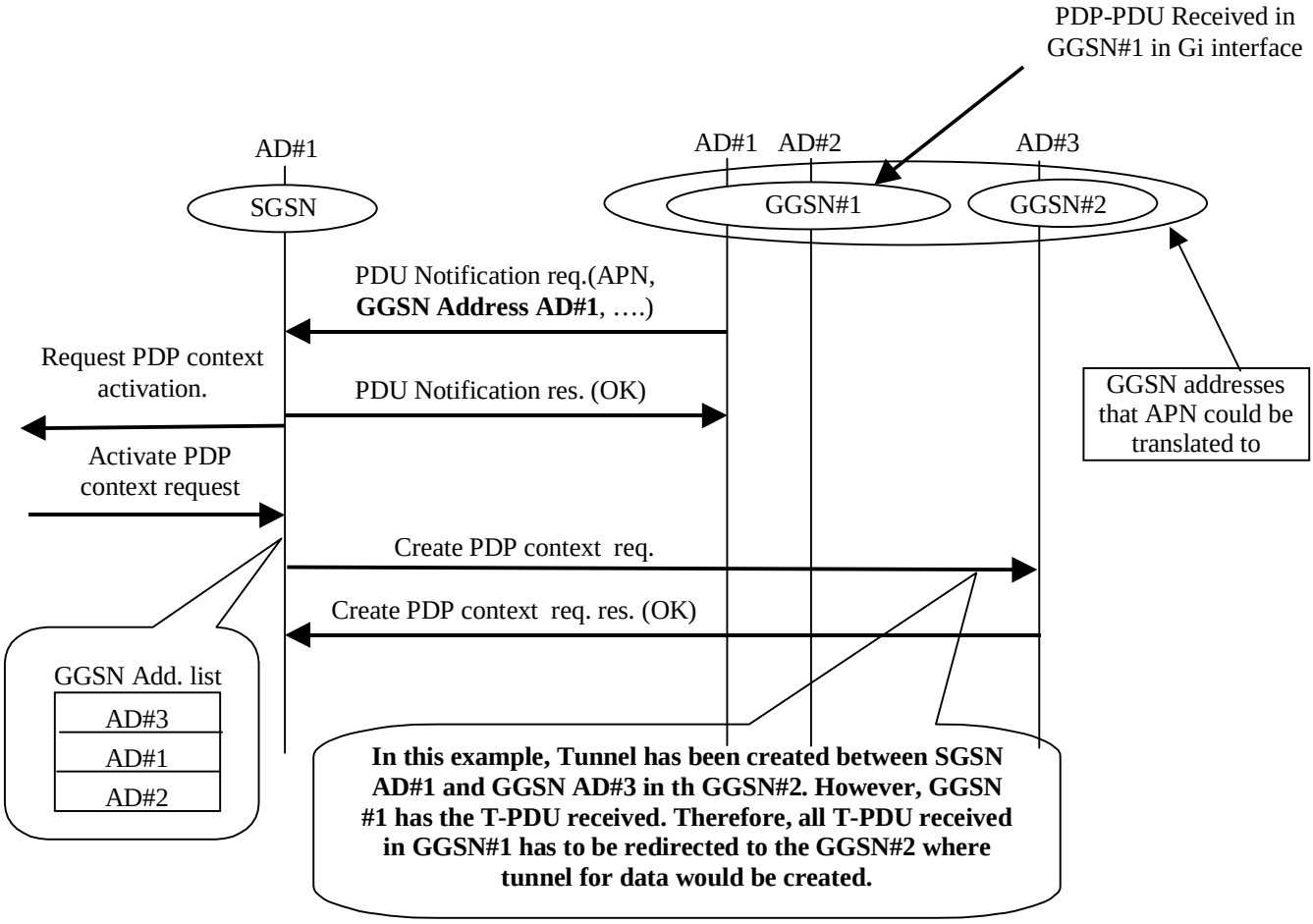
The attached CR for R99 (N4-000942) has been approved in CN4 Paris meeting in order to solve the following problem. During the review of this CR, the other issue has been raised. CN4 agreed that the identified issue has to be clarified by having some guidance from SA2.

[Problem to be solved by CR.]
In case that the PDU Notification reject message needs to be sent from SGSN to GGSN, The TEID of the GTP header is clearly defied in the current 29.060 specification. However, the GGSN address as the direction of PDU Notification reject message is ambiguous.

[Approved solution in CN4.]
Add GGSN address IE in the PDU Notification request message. The following picture illustrates how GGSN address is used.



[Problem identified in CN4.]
During the review of this CR, The question was raised that whether or not the informed GGSN address in the PDU Notification request message shall be used as the direction of the Create PDP context message.
According to the current 29.060, The GGSN IP address where the SGSN sends the Create PDP Context Request is the first IP address in the list of IP addresses provided by the DNS server.
If the current GGSN address selection mechanism is applied for the network requested PDP Context activation procedure, the following difficulty in the GGSN can be foreseen.



2. Actions:

To TSG SA2:

ACTION: CN4 kindly asks **TSG SA WG2** to provide the guidance for GGSN address selection mechanism in SGSN in case of network requested PDP context activation procedure. In case that the current stage 2 specification needs to be corrected due to the introduction of this issue, Please inform CN4 with the corrective CR that has been approved in SA2 so that CN4 can reflect the stage 3 corrections accordingly.

3. Attachments:

N4-000942.

4. The next CN4 meeting

The next CN4 meeting will be held 15th – 19th January 2001 in Beijing.

3GPP-CN4 Meeting # 5 **Document N4-00xxxx**

Paris, France 13-17 November 2000

Source: **Nortel Networks**

Title: **Handling of GTP-U packets in the UL direction during relocation**

Document for: **Discussion**

---

1. Introduction and Background

This document discusses the proposal made in the contribution in Tdoc 1022 Uplink TEID for Data I and user plane GGSN address to PDP Context IE (GTP Enhancement).

As explained in this updated version of the proposal after Tdoc 970, the proposal to add a TEID inside the PDP context IE can result in a Y shape configuration at the GGSN. Therefore to introduce this change would mean that GTP implementations in particular at the GGSN and at the RNC would be changed from the current design.

The implications of enabling this Y shape configuration in GTP should be carefully analysed before making such a change.

Y shape tunneling may take place in R98- netwok during the RAU. The new SGSN sends the SGSN Context Acknowledge message to the old SGSN and threrafter the new SGSN starts forwarding the buffered packets to the new SGSN. Meanwhile, PDP Cntext may be updated and the GGSN shall start forwarding the packets to the new SGSN as well.

Note: in R99 we have Y shape tunnels over Iu interface to the tagret RNC. The old SRNC starts forwarding the buffered data to the target RNC – first Iu tunnel. While data transfer is underway, target RNC starts to receive DL packets – second Iu tunnel.

There is a liaison on this subject that was sent from RAN3 to SA2 and CN4. Therefore a decision can not be made without discussing the liaison, seeking SA2's opinion and exploring other ways of fixing the R99 problem, if there is indeed one. Note that there is no request from any other group to fix a potential problem with the uplink packets in R99.

2. Possible handlings of uplink packets

Here are some possible ways that the uplink buffering can be handled with the current R99 data forwarding mechanism mechanism (it should be noted that these are not all considered to be equally sensible!):

1. Buffer the UL packets at the 3G-SGSN. This is not prevented by the current text in 23.121 because the current text only applies to downlink. It says: "Since the 3G-SGSN does not buffer downstream data, the source RNC may have to buffer ..."

23.121v3.4.0 reads the following:

4.2.2.1.3 Requirements for data retrieve in UMTS

NOTE: This subclause deals with the case of SRNS relocation and of UMTS hard hand-over (when this hard hand-over involves also the CN i.e. involves a change of Serving RNC).

Since:

- there is no buffering in the 3G-SGSN;
- there is an ARQ mechanism in the Serving RNC (the RLC layer) similar to the LLC layer in the 2G-SGSN;
- the data reliability is ensured by the transfer of non-acknowledged user data from the Source RNC to the Target RNC. This transfer ("data retrieve") can be performed with a mechanism similar to the one used between 2G-SGSNs in GPRS;
- the Data retrieve between two RNCs belonging to the same UTRAN is required for non real-time data services during a SRNS relocation procedure;
- regarding the SRNS Relocation procedure Control Plane, SRNS relocation procedure uses both RANAP signalling over the Iu and RNSAP signalling over the Iur.

Regarding the user plane, some requirements can be listed:

Synchronisation:

Since the 3G-SGSN does not buffer downstream data, the source RNC may have to buffer all GTP frames that are not yet transmitted or acknowledged at RLC layer. It also has to buffer all GTP frames that continue to arrive from the GGSN (the GGSN continues to send them to the source RNC as long as its PDP context has not been updated by the SGSN. Furthermore, data that are sent by the GGSN may take a certain time to get to the source RNC).

This means that:

The target RNC has to start as Serving RNC just after having received SRNS Relocation Commit message from the source RNC even if all downstream data have not been retrieved yet.

The user data retrieve may last a relatively long time. A timer is armed in the Source SRNC at the beginning of the data transfer phase. The contexts related to the UE in the Source SNRC will be released when the timer expires, i.e. when downstream data from GGSN is considered as finished.

Data reliability:

Depending upon the required reliability, there could be a need for a layer 2 protocol or not. In the GPRS, the user data is transfer via GTP/UPD/IP if the user-to-user data is IP-based, and via GTP/TCP/IP if the user-to-user data is X25-based. Here, only GTP/UDP/IP is considered.

Multiplexing of PDP contexts during data retrieve:

Several SRNS Relocation procedures for different users and/or different bearers may be carried out simultaneously and independently. GTP is used to differentiate the data retrieve contexts.

Associated signalling:

Considering signalling, there are two kinds of signalling:

Signalling linked with transmission of CN parameters. This corresponds to signalling exchanged on Gn between 3G-SGSNs during the (first) phase of resources for the SRNS relocation.

Signalling linked with the transmission of the sequence numbers of the acknowledged protocol (RLC) between SRNC and UE. This can be done over Iur when the source SRNC actually hands-over the role of SRNC (when sending the RNSAP "Relocation commit" to the target SRNS).

Also the title of the whole paragraphs related to data forwarding refer to “downstream data”.

The titles of the sub clauses in question read:

4.2.2 Iu User plane

4.2.2.1 Principles of User Data Retrieve in UMTS and at GSM-UMTS Hand-Over for PS Domain

4.2.2.1.1 Requirements for Data retrieve at GPRS/UMTS handover

4.2.2.1.2 Adopted solution for data retrieve at GPRS-UMTS handover

4.2.2.1.3 Requirements for data retrieve in UMTS

4.2.2.1.4 Adopted solution for data retrieve in UMTS

4.2.2.1.6 User plane protocol stacks for data retrieve between UTRAN and 2G-SGSN

4.2.2.2 Packet buffering in SRNC and transmission of not yet acknowledged downstream packets at SRNC relocation

Hence, it is just sub clause 4.2.2.2 which describes the DL data handling with buffering in RNC

It can therefore be argued that there is no problem with the UL handling today.Indeed it was the understanding in the RAN3 group when the UL handling was discussed, that there is no issue with the UL handling today, because buffering is acceptable for non real-time services and therefore for R99. This is why the problem highlighted by RAN3 on this subject, only applies to release 4, not to release 99.

2. Use the procedure as defined today and agree that there can be some packet loss UL.

3. Forward the TEID from SGSN1 to SGSN2. However this will result in the Y shape configuration at the GGSN, since the same TEID will be used at the GGSN for the old and the new path.

Receiving packets from 2 different sources can happen already to R97 SGSN (from old SGSN; and GGSN on downlink)

Also the failure cases when there is an error in the GGSN, need to be studied.

What failure cases?

4. Use separate Update PDP context request messages from SGSN to GGSN, the first one to update the UL path (at the beginning of the relocation), and the second one to update the DL path at the end of the procedure.

Change to stage 2. An uplink path is defined only by GGSN IP address and TEID. It is better to get these parameter from old SGSN as defined in 23.060 than from the GGSN using a procedure not defined in stage 2). GGSN does not need update.

Doing this does not require to hold up the Handover command over the radio more than today, since the update PDP messages can be sent from the SGSN2 to the GGSN while in parallel sending the Relocation Request over the Iu to the target RNC.

5. Use a bi-directional tunnel between the 2 RNCs. The forwarding tunnel would be used for both UL and DL packets.

Change to stage 2.

6. Buffer the UL packets at the target RNC. This will require a new RANAP procedure for the SGSN to indicate to the RNC that it can now send UL packets to it.

7. Buffer the UL packets at the UE. This will require a new RANAP/RRC procedure or a new MM message for the SGSN to indicate to the UE that it can now send UL packets to it.

8. Buffer the DL and UL packets at the SGSNs. Potentially add some forwarding from source to target SGSNs. In this case, the forwarding tunnel between RNCs is not used.

Considering that enabling the Y shape configuration (a result of solution 3):

- Would restrict the current implementations which may have put hooks in place to prevent this to happen at the GGSN (or at the RNC).
- Which spec does requre to check TEID against sourse IP address? No my knowledge – none. Therefore this kind of checking wold be a non-standard implementation, an should be avoided.
- May create new error cases if the GGSN detects any GTP-U errors in UL packets.
- Which error cases?
- Would prevent to have the GTP-U tunnel SGSN1-GGSN and the GTP-U tunnel SGSN2-GGSN on separate VPNs.
- VPN between nodes are not standardised. VPN between sites is a prefered solution. Anyway if VPN between nodes need to be establish the VPN must be set up before sending packets below GTP
- Is likely to cause an error in the GGSN because the GTP sequence numbers received on the same TEID at the GGSN would be reset to 0 when the target SGSN takes over
- 29.060v3.6.0, clause 6 reads:

Optional fields:

- Sequence Number: This field is an optional field in GTP-U T-PDUs. It is used as a transaction identity for signalling messages having a response message defined for a request message and as an increasing

sequence number for T-PDUs, transmitted via GTP-U tunnels, when transmission order must be preserved.

- N-PDU Number: This field is used at the Inter SGSN Routeing Area Update procedure and some inter-system handover procedures (e.g. between 2G and 3G radio access networks). This field is used to co-ordinate the data transmission for acknowledged mode of communication between the MS and the SGSN. The exact meaning of this field depends upon the scenario. (For example, for GSM/GPRS to GSM/GPRS, the SNDCP N-PDU number is present in this field).

- Next Extension Header Type: This field defines the type of Extension Header that follows this field in the G-PDU.

This is in line with 23.060 sections 9.3 and 9.4. In case of losless relocation, an implementation solution for the GGSN to handle the sequenced packets coud be found.

- Can not be decided before SA2 has answered the liaison on this very subject
- SA2 always intended to support the losless relocation, as defined in 23.121
- Is not required for Rel99
- After 23.121, 3G-SGSN should not buffer user data.

It is not a decision that should be made unless other solutions have been explored. Using different TEIDs at the GGSN as done today and as has been done so far in GRPS, is a much cleaner solution.

3. Proposal

Therefore it is proposed to discuss the other options. It should be demonstrated first that there is indeed a problem in Release 99 rather than in Release 4.

If there is indeed an issue, this has to be agreed with other groups and clarified in other specifications. CN4 could fix the problem by using solution 4 above. Other solutions would require other groups' input. In any case appropriate co-ordination and agreements with other groups is needed.

Solution 3 is compliant with the current R99 specs. Besides, it is simple to introduce, doesn't require any relevant changes to the current GSN functionality, provides for losless SRNS relocation and does not require buffering in SGSN. In fact, the buffering in SGSN implyes a need of extra Gigabytes of memory and increases the data exchange delays.

Hence the solution is the best amongst the others.

3GPP TSG-CN4 **Tdoc N4-001062**
#05 Meeting, Paris, FRANCE
13th November – 17th November 2000

Title: LS on Clarifications to the Security Mode usage, and error cases

Source: TSG_CN WG4

To: TSG_SA WG2

Cc: TSG_SA WG3

Contact Person:

Name:	**Ahti Muhonen**
E-mail Address:	**Ahti.Muhonen@nokia.com**
Tel. Number:	+358 (40) 5318469

CN4 kindly asks TSG SA WG2 to consider the attached CR against 23.060 with the subject: Annex to LS to SA2 on clarifications to the security function. The contribution defines selection rules for an old SGSN on the type of MM Context it shall send to a new SGSN in the SGSN Context Response message.

Attachments:

N4-001063

The next CN4 meeting

The next CN4 meeting will be held 15th – 19th January 2001 in Beijing.

3GPP-CN4 Meeting # 5
Paris, France 13-17 November 2000

Document ***N4-001063***

e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

CHANGE REQUEST

Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.

23.060	**CR**		Current Version:	3.5.0

GSM (AA.BB) or 3G (AA.BBB) specification number ↑ *↑ CR number as allocated by MCC support team*

For submission to:	SA#10	for approval	X	Strategic		(for SMG use only)
list expected approval meeting # here ↑		for information		non-strategic		

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from:* ftp://ftp.3gpp.org/Information/CR-Form-v2.doc

Proposed change affects: *(at least one should be marked with an X)* (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]

Source: CN4 **Date:** 14 November 2000

Subject: Annex to LS to SA2 on clarifications to the security function

Work item: Security

Category: *(only one category shall be marked with an X)*

F	Correction	X	**Release:**	Phase 2	
A	Corresponds to a correction in an earlier release			Release 96	
B	Addition of feature			Release 97	
C	Functional modification of feature			Release 98	
D	Editorial modification			Release 99	X
				Release 00	

Reason for change:

"Note: the comments within double quotes are only for discussion in CN4 #5. Please remove these from the version that might be sent to S2.

I have faced a dilemma of either proposing to scatter changes to RAU and intersystem change sub clauses, as one option, or of proposing to limit the changes to section 6.8.1, as another one. For clarity reasons, I have chosen the latter option. However, in case N4 find my choice inappropriate, I'll readily provide the other version of the contribution. Besides, it was not clear for me how to handle the CR number issue. Hence, I left the field blank"

33.102v3.6.0 allows an old SGSN to send one of the security type MM contexts to the new SGSN in the SGSN Context Response message.

It is proposed to clarify what security type MM context a SGSN should consider as a primary option by explicit definition of the rules in line with 33.102v3.6.0.

Clauses affected: 6.8.1

Other specs affected:

Other 3G core specifications	[ ]	→ List of CRs:
Other GSM core specifications	[ ]	→ List of CRs:
MS test specifications	[ ]	→ List of CRs:
BSS test specifications	[ ]	→ List of CRs:
O&M specifications	[ ]	→ List of CRs:

Other comments:

help.doc

<--------- double-click here for help and instructions on how to create a CR.

6.8.1 Authentication

The Authentication function includes two types of authentication: "UMTS authentication" and "GSM authentication".

"UMTS authentication" implies mutual authentication, i.e., authentication of the MS by the network and authentication of the network by the MS. It also implies establishment of a new UMTS ciphering key (CK) and integrity key (IK) agreement between the SGSN and the MS.

"GSM authentication" implies authentication of the MS by the network and establishment of a new GSM ciphering key (Kc) agreement between the SGSN and the MS.

The following rules shall apply for the old SGSN once sending the SGSN Context Response message to the new SGSN.

Security Mode with value 1, or a Security type 1 shall always be used for a GSM subscriber, and never for an UMTS subscriber.

Note: New SGSN determines the type of subscription, by the type of authentication vectors received via SGSN Context Response message. An array of Triplets in MM Context indicate a GSM subscriber, while an array of Quintuplets indicate the UMTS subscriber.

Security types 0, 2 and 3 shall not be used for a GSM subscriber.

For an UMTS subscriber, the primary choice for the old SGSN shall be MM Context with Security Type 0. If the old 3G-SGSN does not have valid value for the Used Cipher, then it shall send MM Context with Security Type 2.

Note: 3G-SGSN marks the Used Cipher as having valid value, if it receives the MM Context with Security Type 0. However, if 3G-SGSN performs AKA, it marks the Used Cipher value as invalid.

Security Type 3 may be used by 2G-SGSN. However, if 3G-SGSNreceives MM Context with Security type 3, AKA shall be performed in order to avoid the second time key conversion.

Note: Sending the SGSN Context Response message with the Security Type 3 MM Context should be avoided. That will decrease the overall number of both local and remote (HLR query) AKA. Besides, there would not be any need in checking the presence of TLLI information element in the SGSN Context Request message.

3GPP TSG-CN4 **Tdoc N4-001065**
CN#05 Meeting, Paris, FRANCE (N4-001049)
13th November – 17th November 2000

Source: BT, Nortel Networks, Ericsson L.M.

Title: Work Item Description: "IP Multimedia CN Subsystem, CSCF-HSS (Cx) interface"

Agenda item: Work Item Management

Document for: APPROVAL

Work Item Description

Title: IP Multimedia CN Subsystem, CSCF-HSS (Cx) interface

1 3GPP Work Area

	Radio Access
X	Core Network
	Services

2 Linked work items

Related WIs are:

1. *Provisioning of IP-based Multimedia services (1273-SA1)*
2. *Call Control and Roaming to support IP-based Multimedia services (1274-SA2)*
3. *CSCF-HSS (Cx) applications and services (SCP) (1282-SA2)*
4. *VHE Enhancements (1376–SA1)*
5. *Evolution of VHE Concepts (1368–SA2)*
6. *Interaction between HSS and gsmSCF features and VHE/OSA (1410-SA2)*
7. *Personal service Environment (PSE), user profiles and user profile management (1381-SA2)*
8. *User Profiles Definition (1383-CN4)*
9. *SIP Call Control protocol for the IM Subsystem (1278-CN1)*

3 Justification

The IP Multimedia (IM) Subsystem identified new Core Network entities and interfaces for the purpose of supporting multimedia sessions and services. TSG CN WG4 has claimed responsibility for the specification of the Cx interface, between the Home Subscriber Server (HSS) and the Call/Session Control Function (CSCF).

The Home Subscriber Server (HSS) is the master database for a given user containing the subscription-related information to support the network entities actually handling calls/sessions.

The HSS consists of the following functionality:

- User control functions required by the IM CN subsystem.
- The subset of the HLR functionality required by the PS-Domain.
- And the CS part of the HLR, if it is desired to enable subscriber access to the CS-Domain or to support roaming to legacy GSM/UMTS CS-Domain networks

The CSCF is essentially a SIP Proxy (as described by RFC 2543) and hosts the execution of SIP media sessions.

4 Objective

The objective of this WI is threefold:

- To specify the data structures and information flows of the Cx interface. The output will be the Technical Specifications containing the Stage 2 and Stage 3 descriptions of procedures relevant to the Cx interface, such as Registration procedures, Session/Call handling procedures, user Authentication/Authorisation procedures, Restoration procedures, Network- or User-initiated subscriber data modifications.
- To perform a comprehensive evaluation of candidate protocols, which provide the identified functionality of the Cx interface, following the requirements from TR 23.821 and TS 23.228. The output should be a recommendation on the most suitable protocol(s) for the Cx interface.
- To describe the subscription data relevant for the provision of IP Multimedia stored in the IM CN Subsystem Network Elements (HSS, CSCF). The output of the Work Item 'User Profile Definition' (see linked WI list) should be input for this part.

5 Service Aspects

3GPP is no longer standardising services, but service capabilities, which has an impact on the contents of the user profile.

6 MMI-Aspects

None

7 Charging Aspects

None

8 Security Aspects

It is assumed that TSG SA WG3 will address the secure transport of messages over the Cx interface.

9 Impacts

Affects:	USIM	ME	AN	CN	Others
Yes				X	
No	X	X	X		X
Don't know					

10 Expected Output and Time scale (to be updated at each plenary)

New specifications						
Spec No.	Title	Prime rsp. WG	2ndary rsp. WG(s)	Presented for information at plenary#	Approved at plenary#	Comments
New TS	CSCF-HSS (Cx) Stage 2	CN4	SA2	CN#11	CN#12	This TS will be finalised by CN#11 to allow the start of stage 3 specification work. The Stage 2 specification could be split in a number of TSs depending on the actual amount of information contained in the original TS
New TS	CSCF-HSS (Cx) Stage 3	CN4	SA2	CN#13	CN#14	The Stage 3 specification could be split in a number of TSs depending on the actual amount of information contained in the original TS

Affected existing specifications				
Spec No.	CR	Subject	Approved at plenary#	Comments
23.008		Organization of subscriber data	CN#11	This specification may need to be extended with the new NEs and the subscription information that they contain, or alternatively subscriber data for the IM domain may be captured elsewhere (decision to be made when stage 2 becomes stable).
-	-	To be determined	CN#11	Other Stage 2 and Stage 3 specifications may be impacted as a result of this Work Item

11 Work item raporteurs

Kevin Gorey, Nortel Networks
Luis López-Soria, Ericsson L.M.

12 Work item leadership

CN4

13 Supporting Companies

BT, Ericsson, Nokia, Motorola, Lucent, Siemens, Nortel Networks, Alcatel, and France Telecom

14 Classification of the WI (if known)

	Feature (go to 14a)
	Building Block (go to 14b)
X	Work Task (go to 14c)

14c The WI is a Work Task: parent Building Block

CSCF – HSS (Cx) applications and Services *(1286-SA2)*

3GPP TSG-CN4 **Tdoc N4-001066**
CN4#05 Meeting , Paris, FRANCE (N4-001058)
13th November – 17th November 2000

Title: **LS on the Work Item "Cx Interface specification"**

Source: **TSG_CN WG4**

To: **TSG_SA WG2**

Cc:

Contact Person:

Name: **Mr Yun Chao Hu**
E-mail Address: **Yun-Chao.Hu@era.ericsson.se**
Tel. Number: +46 8 508 78153

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1. Overall Description:

CN4 would like to raise SA2's attention to the following Work Item on the specification of the Cx interface (N4-001049). Within this Work Item, CN4 agreed to develop the detailed specification of data structures and information flows in the Cx interface. This WI will use the draft TS 23.221 and 23.228 as a basis for this detailed stage 2 specification. In addition to this, CN4 will perform the selection of the protocol to be used on the Cx interface. It is intended to have the stage 2 specifications available in TSG CN#11 for information and TSG CN#12 for approval.

The stage 3 specifications for the Cx interface will be produced as part of this WI once the Stage 2 material is stable, target date for completion is CN#13.

2. Actions:

To TSG SA2:

ACTION: TSG_CN WG4 asks **TSG SA WG2** to take note of the CN4 Work Item on the Cx interface and modify the 3GPP work plan accordingly

CN4 asks further guidance from **TSG SA WG2** to assess the stability of the TS 23.221 and 23.228 as the basis for the detailed stage 2 specification(s) on Cx interface in our next meetings.

3. Attachments:

N4-001065

4. The next CN4 meeting

The next CN4 meeting will be held on 15-19 January 2001 in Beijing, China.

3GPP TSG-CN4 **Tdoc N4-001077**
#05 Meeting , Paris, FRANCE
13th November – 17th November 2000

Title: **LS providing comments to LS from CN3 on intersystem handover problem**

Source: **TSG_CN WG4**

To: **TSG_CN WG1, TSG_CN WG3**

Cc:

Contact Person:

Name: **Jean-Alain Evenou**
E-mail Address: **Jean-Alain.Evenou@alcatel.fr**
Tel. Number: +33 1 30773992

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1. Introduction:

TSG CN WG4 thank TSG CN WG3 for their Liaison Statement (Tdoc N3-000549) on the intersystem handover problem.

TSG CN WG4 have analyzed the problem and is on the opinion that this is already dealt with in the current stage 2 specification TS 23.009 (Handover procedures (Release 1999)) as explained below.

TSG CN WG4 understand from SDLs in TS 23.009 that, after an inter-MSC handover from 3G MSC-A to 3G MSC-B, a BSSMAP Handover Performed message is always sent on MAP-E interface by 3G MSC-B to 3G MSC-A in case of subsequent intersystem intra-MSC handover in 3G MSC-B, even if the previous inter-MSC handover were UMTS to UMTS. Besides, the text of TS 23.009 related to handover scenarios does not indicate that if the inter-MSC handover were performed using RANAP signalling on MAP-E then BSSMAP signalling cannot be used on MAP-E afterwards in case of a subsequent intersystem intra-MSC handover in 3G MSC-B.
The Cell Identifier IE of the BSSMAP Handover Performed message should be used by 3G MSC-A to know whether the handover is to UTRAN (RNC Id given, or SAI if available) or to GSM BSS (Cell identity), and the Chosen Channel IE should be used by the 3G MSC-A to know the channel type in case of handover to GSM BSS.

For 3G MSC-B to inform 3G MSC-A of a subsequent intersystem intra-MSC handover after an UTRAN to UTRAN inter-MSC handover, TSG CN WG4 agreed that it is preferable to use the BSSMAP Handover Performed message over MAP-E rather than to introduce a new MAP message.

2. Actions:

To TSG CN1:

ACTION: TSG CN WG4 ask **TSG CN WG1**

- to confirm their understanding of TS 23.009,
- to include in TS 23.009 the scenarios related to subsequent intersystem intra-MSC handover in 3G MSC-B in accordance with the current SDL description.

3. Attachments:

None.

4. The next CN4 meeting

The next CN WG4 meeting will be held 15 – 19 January 2001 in Beijing, China

3GPP TSG CN4 Meeting #5
Paris, 13th November - 17th November 2000

Document N4-001079

CHANGE REQUEST

29.002	CR	209	Current Version:	3.6.0

For submission to: CN#10 | for approval [X] | for information [ ] | strategic [X] | non-strategic [ ]

Form: CR cover sheet, version 2 for 3GPP and SMG *The latest version of this form is available from: ftp://ftp.3gpp.org/Information/CR-Form-v2.doc*

Proposed change affects: (U)SIM [ ] ME [ ] UTRAN / Radio [ ] Core Network [X]
(at least one should be marked with an X)

Source: Alcatel, Siemens, Vodafone

Date: 16th November 2000

Subject: Transport of long RANAP messages on MAP-E interface

Work item: Handover

Category:

F	Correction	[X]
A	Corresponds to a correction in an earlier release	[ ]
B	Addition of feature	[ ]
C	Functional modification of feature	[ ]
D	Editorial modification	[ ]

Release:

Phase 2	[ ]
Release 96	[ ]
Release 97	[ ]
Release 98	[ ]
Release 99	[X]
Release 00	[ ]

Reason for change:

For signalling over the MAP E-interface to support inter-MSC handover/relocation White Book SCCP has to be supported.

The reference for the internal structure of the AccessNetworkSignalInfo data type is incorrect.

In order to make use of this capability the maximum size of the envelope which can be used to carry RANAP signalling encapsulated in MAP messages has to be increased.

Clauses affected: 6.1, 17.7.8

Other specs affected:

Other 3G core specifications	[X]	→ List of CRs:	R00 29.002-212
Other GSM core specifications	[ ]	→ List of CRs:	
MS test specifications	[ ]	→ List of CRs:	
BSS test specifications	[ ]	→ List of CRs:	
O&M specifications	[ ]	→ List of CRs:	

Other comments:

First Modified Section

6 Requirements concerning the use of SCCP and TC

6.1 Use of SCCP

The Mobile Application Part (MAP) makes use of the services offered by the Signalling Connection Control Part (SCCP).

MAP supports the following SCCP versions:

- Signalling Connection Control Part , Signalling System no. 7 CCITT ('Blue Book SCCP').
- Signalling Connection Control Part, Signalling System no. 7 ITU-T Recommendation (07/96) Q.711 to Q.716 ('White Book SCCP'). Support of White Book SCCP at the receiving side shall be mandated from 00:01hrs, 1st July 2002(UTC). However, for signalling over the MAP E-interface to support inter-MSC handover/relocation, the support of White Book SCCP shall be mandated with immediate effect.

A White Book SCCP message will fail if any signalling point used in the transfer of the message does not support White Book SCCP. Therefore it is recommended that the originator of the White Book SCCP message supports a drop back mechanism or route capability determination mechanism to interwork with signalling points that are beyond the control of GSM/UMTS network operators.

In North America (World Zone 1) the national version of SCCP is used as specified in ANSI T1.112. Interworking between a PLMN in North America and a PLMN outside North America will involve an STP to translate between ANSI SCCP and ITU-T/CCITT SCCP.

6.1.1 SCCP Class

Next Modified Section

17.7.8 Common data types

…….

```
SignalInfo ::= OCTET STRING (SIZE (1..maxSignalInfoLength))
```

```
maxSignalInfoLength  INTEGER ::= 200
     -- This NamedValue represents the theoretical maximum number of octets which is
     -- octets which are available to carry a single instance of the SignalInfo data type,
     -- without requiring segmentation to cope with the network layer service.
     -- service. However, the actual maximum size available for an instance of the data
     -- type may be lower, especially when other information elements
     -- have to be included in the same component.
```

…….

```
AccessNetworkSignalInfo ::= SEQUENCE {
    accessNetworkProtocolId             AccessNetworkProtocolId,
    signalInfo                          LongSignalInfo,
    -- Information about the internal structure is given in subclause 7.6.9.1
    -- subclause 7.6.9.4
    extensionContainer                  ExtensionContainer              OPTIONAL,
    ...}
```

```
LongSignalInfo ::= OCTET STRING (SIZE (1..maxLongSignalInfoLength))
```

```
maxLongSignalInfoLength  INTEGER ::= 2560
    -- This Named Value represents the maximum number of octets which is available
    -- to carry a single instance of the LongSignalInfo data type using
    -- White Book SCCP with the maximum number of segments.
    -- It takes account of the octets used by the lower layers of the protocol, and
    -- other information elements which may be included in the same component.
```

.....

[CR editor's note: this upper bound is subject to check before the CR is presented for approval by TSG-CN]

3GPP TSG-CN4#05 Meeting **Tdoc N4-001080**
Paris, FRANCE
13th November – 17th November 2000

Title: **LS on Operator Determined Barring of Packet Oriented Services**

Source: **TSG CN WG4**

To: **TSG SA WG1**

Cc: **TSG SA WG2**

Contact Person:

Name:	**Ian Park**
E-mail Address:	**ian.park@vf.vodafone.co.uk**
Tel. Number:	+44 1635 673 527

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1. Introduction

CN WG4 have discussed a contribution from NEC on the subject of Operator Determined Barring of packet oriented services. This contribution brought to our attention the fact that the stage 1 for Operator Determined Barring for UMTS Release 99 (TS 22.041 v3.1.0) includes a service requirement for various types of operator determined barring of packet oriented services. Unfortunately CN WG4 (and its predecessor, CN WG2 SWGB) did not receive any contributions to introduce the corresponding enhancements to the stage 2 and stage 3 specifications (TS 23.008, TS 23.015 and TS 29.002); we suspect that neither does TS 23.060, which is in the remit of SA WG2, include any description of the handling of Operator Determined Barring of packet oriented services. The current situation is that the specifications in the remit of CN WG4 define the possibility of Operator Determined Barring of Short Message submission and delivery, whether via an MSC/VLR or via an SGSN, but no other barring of packet oriented services carried by an SGSN.

The resulting misalignment between the stage 1 specification on the one hand and the stage 2 and stage 3 specifications on the other hand clearly needs to be corrected for UMTS Release 99. NEC's proposal was to undertake the specification work in CN WG4 as a matter of urgency, but we could not realistically expect the specification work in CN WG4 to be completed for approval at CN #10 next month, and several manufacturers opposed the introduction of a change which would have significant impact on SGSN implementations at this late stage of the development of UMTS Release 99, so we concluded that it is not reasonable to perform the alignment by updating the stage 2 and stage 3 specifications. The only alternative is to remove the service requirement from TS 22.041 v3.1.0.

If it is accepted that the service requirement for Operator Determined Barring of packet oriented services is removed from TS 22.041 v3.1.0, SA WG1 need to decide whether the requirement should be re-introduced for UMTS Release 4. This is clearly a service issue, and as such it is for SA WG1 to decide.

During the discussion, some delegations expressed concern that the service requirements in TS 22.041 v3.1.0 need clarification before CN WG4 can confidently use them as a basis for the development of the necessary changes to the stage 2 and stage 3 specifications. In particular, the definition of an access point as being within the HPLMN or within the roamed to VPLMN caused some difficulty. If SA WG1 require Operator Determined Barring of packet oriented services to be supported in UMTS Release 4, then CN WG4 believe that further clarification of the service requirement is needed.

2. Actions:

SA WG1 are asked to draft the necessary change request to remove from TS 22.041 the service requirement for Operator Determined Barring of packet oriented services.

SA WG1 are asked to decide whether they require Operator Determined Barring of packet oriented services to be supported in UMTS Release 4, and to advise CN WG4 of their decision.

If SA WG1 require Operator Determined Barring of packet oriented services to be supported in UMTS Release 4, they are asked to provide further clarification of the service requirements.

3. Attachments:

Extract from TS 22.041 v3.1.0: subclause 5.2, "Packet Oriented Services"

4. The next CN4 meeting

The next CN WG4 meeting will be held 15 – 19 January 2001 in Beijing, China

5.2 Packet Oriented Services

Packet Oriented Services, particularly data services, are different in nature to Circuit Oriented Services, and therefore have different requirements for Operator Determined Barring.

As described in the following categories, the Service Provider may at any time activate this feature and this shall terminate any relevant services in progress, and bar future requests for service covered by the barring category:

- It shall be possible to bar subscribers completely from the Packet Oriented Services.
- It shall be possible to bar a subscriber from requesting Packet Oriented Services from access points that are outside the HPLMN whilst the subscriber is in the HPLMN.
- It shall be possible to bar a subscriber from requesting Packet Oriented Services from access points that are within the HPLMN whilst the subscriber is roaming in a VPLMN.
- It shall be possible to bar a subscriber from requesting Packet Oriented Services from access points that are within the roamed to VPLMN.
- Whilst roaming in a VPLMN, it shall be possible to bar a subscriber from requesting Packet Oriented Services from access points that are neither in the HPLMN nor the roamed to VPLMN.

3GPP TSG-CN WG 4 Meeting
Paris, France, 13 – 17 November 2000

Tdoc N4-001088

CR-Form-v3

CHANGE REQUEST

⌘ **29.002** **CR** **210** ⌘ rev **-** ⌘ Current version: **3.6.0** ⌘

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

Proposed change affects: ⌘ (U)SIM ☐ ME/UE ☐ Radio Access Network ☐ Core Network ☒

Title:	⌘	Introduction of GGSN Address
Source:	⌘	T-Mobil
Work item code:	⌘	CAMEL3
Date:	⌘	14-Nov-00
Category:	⌘	**F**
Release:	⌘	R99

Use one of the following categories:
F *(essential 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)*

Reason for change:	⌘	The data type GSN-Address is not available to other modules. However the data type GSN-Address is used by 29.078 CAP modules.
Summary of change:	⌘	The data type GSN-Address is exported from MAP-MS-DataTypes
Consequences if not approved:	⌘	Corresponding changes for introduction of GGSN Address in 29.078 are not possible

Clauses affected:	⌘	17.7.1			
Other specs affected:	⌘	☒ Other core specifications ☐ Test specifications ☐ O&M Specifications	⌘	22.078, 23.078, 29.078	
Other comments:	⌘				

17.7 MAP constants and data types

17.7.1 Mobile Service data types

```
MAP-MS-DataTypes {
   ccitt identified-organization (4) etsi (0) mobileDomain (0)
   gsm-Network (1) modules (3) map-MS-DataTypes (11) version6 (6)}

DEFINITIONS

IMPLICIT TAGS

::=

BEGIN

EXPORTS

   -- location registration types
   UpdateLocationArg,
   UpdateLocationRes,
   CancelLocationArg,
   CancelLocationRes,
   PurgeMS-Arg,
   PurgeMS-Res,
   SendIdentificationArg,
   SendIdentificationRes,
   UpdateGprsLocationArg,
   UpdateGprsLocationRes,
   IST-SupportIndicator,

   -- gprs location registration types
   GSN-Address,

   -- handover types
   ForwardAccessSignalling-Arg,
   PrepareHO-Arg,
   PrepareHO-Res,
   PrepareSubsequentHO-Arg,
   PrepareSubsequentHO-Res,
   ProcessAccessSignalling-Arg,
   SendEndSignal-Arg,
   SendEndSignal-Res,


   -- authentication management types
   SendAuthenticationInfoArg,
   SendAuthenticationInfoRes,
   AuthenticationFailureReportArg,
   AuthenticationFailureReportRes,

   -- security management types
   EquipmentStatus,
   Kc,

   -- subscriber management types
   InsertSubscriberDataArg,
   InsertSubscriberDataRes,
   DeleteSubscriberDataArg,
   DeleteSubscriberDataRes,
   SubscriberData,
   ODB-Data,
   SubscriberStatus,
   ZoneCodeList,
   maxNumOfZoneCodes,
   O-CSI,
   D-CSI,
   O-BcsmCamelTDPCriteriaList,
   T-BCSM-CAMEL-TDP-CriteriaList,
   SS-CSI,
   ServiceKey,
   DefaultCallHandling,
   CamelCapabilityHandling,
   BasicServiceCriteria,
   SupportedCamelPhases,
```

3GPP TSG-CN4 **Tdoc N4-001090**
CN4#05 Meeting , Paris, FRANCE
13th November – 17th November 2000

Title: **LS on connecting a GERAN to a Rel4 cs CN node via A interface**

Source: **TSG_CN WG4**

To: **TSG_SA WG2, TSG GERAN**

Contact Person:

Name: **Alexander Vesely**
E-mail Address: **alexander.vesely@siemens.at**

TSG CN WG 4 is currently discussing scenarios for inter system handover for the WI "Bearer Independent circuit switched Core Network". (See attached contributions N4-000982 and N4-001008 for the respective TS 23.205 " Bearer Independent CS Core Network".)

These contributions try to be in line with the Rel4 reference architecture outlined within 23.002 version 4.0.0 which shows a split of the A-interface into a control- and a transport plane.

However, TSG CN WG4 is aware of the fact that discussions at least within TSG GERAN are still ongoing on that issue that might change the reference architecture.

While trying to draw network models and to define respective procedures for GERAN ⇔ UTRAN inter system handover scenarios TSG CN4 got stuck at the point where it was essential to know how and whether a GERAN will be attached to a Rel4 cs CN via A interface.

As TSG CN WG4 is seeking to finalise the work on the WI "Bearer Independent circuit switched Core Network" in March 2001 (CN#11) we would kindly ask TSG GERAN and TSG SA WG2 to reach conclusion on that subject and to inform CN4 as soon as possible.

Note: Please be informed that the next CN4 meeting will be held on 15-19 January 2001 in Beijing, China.

3GPP TSG-CN4#05 Meeting **Tdoc N4-001119**
Paris, FRANCE
13th November – 17th November 2000

Title: **LS on Size of RANAP messages over the MAP E-interface**

Source: **TSG CN WG4**

To: **TSG RAN WG3**

Cc: **TSG CN WG1; TSG SA WG2**

Contact Person:

Name: **Ian Park**
E-mail Address: **ian.park@vf.vodafone.co.uk**
Tel. Number: +44 1635 673 527

---

1. Introduction

TSG CN WG4 thank TSG RAN WG3 for their liaison statement (*TSGR3#16(00)2914)* on the size of RANAP messages which can be transmitted over the MAP E-interface.

We have noted RAN WG3's analysis of the problem and the possible approaches to deal with it. We cannot comment on approach 2, which is outside our area of competence. However we agree with the analysis of approaches 1, 3 and 4, in particular the assessment that approaches 3 and 4 are not viable.

We discussed in detail the issue of whether it would be reasonable to rely on the availability of White Book (07/96) SCCP for **intra-PLMN** signalling on the MAP E-interface. RAN WG3 are asked to note that other applications besides inter-MSC handover/relocation use MAP signalling over the E-interface; however only inter-MSC handover/relocation is consistently limited to intra-PLMN signalling. We concluded that for intra-PLMN signalling it is reasonable to rely on end-to-end support of White Book SCCP, because all the nodes involved are under the control of the PLMN operator concerned. By contrast, for inter-PLMN signalling there is a high probability that the signalling path will go through SCCP transit nodes which are not under the control of a PLMN operator; the 3GPP community cannot therefore dictate that these nodes will support White Book SCCP. It is for this reason that the current version of TS 29.002 sets the change-over date of 1st July 2002, after which it can be assumed that White Book SCCP will be generally available.

We have therefore drafted a change request to TS 29.002 (document N4-001079, attached). This change request specifies that for signalling over the MAP E-interface to support inter-MSC handover/relocation the support of White Book SCCP can be assumed, with no qualification, i.e. this applies for all entities which support MAP according to TS 29.002 v3.x.y. In order to make use of this capability we have also increased the maximum size of the envelope which can be used to carry RANAP signalling encapsulated in MAP messages. The maximum size of the envelope is calculated from the maximum payload of an SCCP message sequence allowed by White Book SCCP, after deducting the overhead for the SCCP, TC and MAP layers. This aligns with RAN WG3's estimate of about 2500 octets available for the RANAP message envelope.

2. Actions:

CN WG4 ask RAN WG3 to note our action to deal with the problem identified by RAN WG3, and to confirm that the maximum size of the envelope which can be used to carry RANAP signalling encapsulated in MAP messages is adequate for RAN WG3's requirements

3. Attachments:

Tdoc N4-001079: CR 29.002-209 on the use of White Book SCCP for MAP signalling to support inter-MSC handover/relocation.

4. The next CN4 meeting

The next CN WG4 meeting will be held 15 – 19 January 2001 in Beijing, China

3GPP TSG-CN4 **Tdoc N4-001120**
#05 Meeting, Paris, FRANCE
13th November – 17th November 2000

Title: **LS on R99 Lossless Relocation for UMTS to TSG_CN**

Source: **TSG_CN WG4**

To: **TSG_CN**

Cc: **SA2, RAN3**

Contact Person:

Name: **Ahti Muhonen**
E-mail Address: **Ahti.Muhonen@nokia.com**
Tel. Number: +358 (40) 5318469

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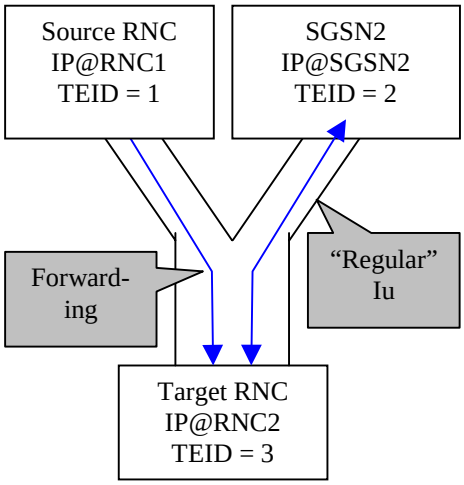
1. Overall Description:

CN4 would like to inform TSG-CN on our discussions on R99 Lossless Relocation for UMTS. There are currently two possible solutions that have been identified. There was a heavy debate on the R99 Lossless Relocation for UMTS but no consensus has been reached. Most of the companies in CN4 preferred the **solution 2**, but one company wanted to have **solution 1**.

1.1. The Problem

There is an apparent contradiction between 23.060 and 29.060 on the Release 99 lossless SRNS Relocation mechanism. In the current specifications for the R99 packet-forwarding scheme for lossless relocation (i.e. RANAP (25.413) and 23.060), it appears that, from the perspective of the target RNC, a single tunnel is used for "regular" Iu traffic and for data forwarding from the source RNC. In other words, there is a tunnel with three terminations, as shown below:



In 29.060, this appears to be strictly forbidden, when it is stated that (in v.3.3.0):

"The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities in a way that allows multiplexing of different users, different packet protocols and different QoS levels. Therefore ***no two remote GTP-U endpoints shall send traffic to a GTP-U protocol entity using the same TEID value****."*

It is believed that there will be no duplication of PDUs between the two sources, although the PDUs may not arrive in sequence. There has been identified two possible solutions: for the problem

Solution 1: Use a totally separate tunnel for forwarding and "regular" Iu (would need new IE in RANAP, and changes to 23.060).

Solution2: Modify the rule in GTP (29.060), to allow this scenario in the case of data forwarding.

2. Actions:

To TSG_CN:

ACTION: CN4 kindly asks **TSG_CN** to provide the guidance for solving the contradiction between 23.060 and 29.060 on the Release 99 lossless SRNS Relocation mechanism. It is clear that CN4 cannot reach decision by consensus between solutions, so CN4 asks TSG_CN to decide between the possible solutions. If this is not possible, this issue should be brought up in TSG_SA meeting.

3. Attachments:

N4-000943, N4-000959, N4-001022, N4-001044, N4-001054.

4. The next CN4 meeting

The next CN4 meeting will be held 15th – 19th January 2001 in Beijing.

3GPP-CN4 Meeting # 5
Paris, France 13-17 November 2000

Document N4-001121
e.g. for 3GPP use the format TP-99xxx
or for SMG, use the format P-99-xxx

SOURCE: TSG CN WG4

Title: Answer to RAN 3 LS on Real Time SRNS Relocation for PS Domain RABs

To: TSG RAN WG3 (about TSGR3#16(00)2875)

Cc: TSG SA WG2

Contact: laurent.thiebaut@alcatel.fr

TSG CN WG4 thanks RAN WG3 for their LS on Real Time SRNS Relocation for PS Domain RABs in which they describe 2 solutions:

- "Solution 1 utilises the Release 99 mechanism in Iu interface to support also real time SRNS Relocations"
- " Solution 2 utilises CN [GGSN] bi-casting based mechanism for the Real Time services"

TSG CN WG4 answer is

- Both solutions are feasible
- For solution 2, the delay required to initialise the GGSN bi-casting procedure will be the longest delay to exchange an acknowledged GTP-C message between SGSN and any GGSN serving RT traffic for the user being relocated. This delay would make the relocation preparation phase longer than it is according to current R99 specifications.
- Modifications required by solution 1 have been discussed (see attached N4-001022 and N4-000943 (the latter about R3-(00)2874 which is a connected to subject)) but no agreement has been reached due to the very strong opposition of one company.