3GPP TSG CN Plenary **Tdoc NP-000656**
Meeting #10, Bangkok, Thailand
6th – 8th December 2000

Source: **TSG CN WG 4**

Title: **All LSs send from TrFO/TFO workshop since TSG CN#9**

Agenda item: **6.7**

Document for: **Information**

Introduction:

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

Tdoc	Subject	To	Cc	Attachment	Sent
N4-001102	LS Proposed enhancements to Mc specification	N3, N4R3		N4-00885	11/11/2000
N4-000874	LS to S2 LS Regarding WI for " Transcoder At The Edge"	S2	N4		20/10/2000
N4-000881	LS on Codec Requirements to UMTS UEs / Mandatory Subflow Combinations for SID and NO_DATA frames for speech calls	TSG_T, T2, S4			20/10/2000

3GPP TSG-CN4 **Tdoc N4-000874**
TrFO workshop Meeting #4 Meeting , Windsor, UK (N4-000871)
17th October – 19th October 2000

Title: **LS Regarding WI for "Transcoder At The Edge"**

Source: **3GPP TrFO/TFO Harmonisation Workshop**

To: **TSG_SA WG2**

Cc: **CN4**

Contact Person:

Name: **Phil Hodges**
E-mail Address: **phil.hodges@eed.ericsson.se**
Tel. Number:

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1. Overall Description:

During the discussions in the TrFO/TFO workshop the question was raised whether the OoBTC Stage 2 should also described the procedures for Transcoder at the Edge. The group agreed that the OoBTC procedures include, by default, the signalling for Transcoder at the Edge. It was thus agreed that the OoBTC WI shall include the WI for Transcoder at the Edge, and the Stage 2 shall include these procedures.

2. Actions:

To TSG SA2:

TrFO/TFO workshop would like to inform S2 that they believe that the Transcoder at the Edge is a specific Work Task under the Building Block "Out of Band Transcoder Control". If this is in line with the perception of S2 then the project plan needs to be updated.

The TrFO/TFO workshop assumes that the stage 2 descriptions related to the BB "Out-of-Band Transcoder Control" shall be described in one single document (i.e. TS 23.153). Therefore, they also assume that this shall be performed in one single Workgroup and currently the responsibility of TS 23.153 is within CN4.

A reply from SA2 on these assumptions will be highly appreciated.

The next meeting of the TrFO/TFO workshop will be held on 9-10 October 2000 in Stockholm, Sweden

3. Attachments:

None.

3GPP TSG-CN4 **Tdoc N4-000881**
TrFO workshop Meeting #4 Meeting , Windsor, UK **(N4-000875)**
17th October – 19th October 2000

Title: **LS on Codec Requirements to UMTS UEs / Mandatory Subflow Combinations for SID and NO_DATA frames for speech calls**

Source: **3GPP TrFO/TFO Harmonisation Workshop**

To: **TSG_T, TSG_T WG2, TSG_SA WG4**

Contact Person:

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1. Overall Description:

Although the speech encoding, SID parameters, DTX of AMR_UMTS are bit exact to that of AMR_FR, AMR_UMTS is not compatible to AMR_FR. The reason is:

- In UMTS the codec mode used for the encoding can be changed in each speech frame, i.e. every 20ms. This is the basic rate of the AMR algorithm and no further specification is provided in R99.
- In GSM this codec mode update can only happen in every second speech frame, i.e. every 40ms. A synchronization (whether to use the even or the odd frames) takes place and afterwards the update "grid" must be kept. This is well defined in GSM.

GSM equipment is therefore not prepared to receive an unexpected codec mode change in the "other" frame. In a GSM-UMTS TFO or TrFO call consequently a loss of one or two speech frames will happen in downlink GSM with a probability of 50% at every codec mode change in uplink UMTS. In a GSM-UMTS TFO or TrFO call these mode changes may be expected as often as every 100ms - 500ms (5 - 25 frames), leading to unacceptable speech quality.

A straight-forward solution – to restrict the codec mode change to the 40ms rhythm also in AMR_UMTS – was rejected because it would have been a too late change for R99, and incompatible AMR_UMTS version in R99 and Release 4 (onwards) were considered unacceptable. (Instead the TrFO workshop recommends that the AMR_UMTS Codec Type shall not be altered for compatibility with R99, and all UEs shall support this Codec Type also further on).

The remaining solution is therefore to use AMR_FR as default codec type to start with for UMTS calls in networks with high interest of UMTS - GSM calls. As a side-effect, this would also allow the employment of a TDMA2000-UMTS TFO or TrFO call, because AMR_FR is used identically to GSM also in TDMA2000.

Therefore it is proposed that

- support for the AMR_FR is mandatory for UMTS terminals from Rel4 onwards

E.g. in networks with a large installed base of GSM it could then be prioritised to choose AMR_FR over UMTS_AMR. This would then avoid modification in most cases where a UMTS to GSM call is established or when a handover from UMTS to GSM occurs.

Remark: The CN will support the necessary signalling, but: If the UEs would not support this, as a consequence TFO and TrFO with their major benefits of improved speech quality and bandwidth savings would both not be possible in UMTS-GSM calls.

The same principles should be applied to support TFO/TrFO calls from UMTS to EFR in GSM and other systems such as TDMA and PDC.
Therefore it was proposed that

- EFR_GSM, EFR_ TDMA and EFR_ PDC should be supported by all UEs from Rel4 onwards.

Remark: EFR_GSM is identical with the AMR mode 12.2kbit/s, the EFR_ TDMA is identical with AMR mode 7.4 and the EFR_ PDC is identical with the AMR mode 6.7, with the only exceptions in SID coding and DTX handling.

Another item was agreed by the workshop:

- For all speech calls SID and No_Data RAB subflow combinations shall always be assigned in UMTS.

Reasoning:
In uplink DTX/SCR is vital for efficiency and battery lifetime. Therefore the corresponding sub-flows are a must. Because in TrFO and TFO connections the distant partner shall always have the freedom to use uplink DTX/SCR and both TrFO and TFO are of symmetric nature, this leads to the same requirement in the other direction, i.e. downlink.

2. Actions:

To TSG_T:

ACTION: TrFO/TFO Workshop kindly asks **TSG T**

- to endorse the requirement that all UE for Release 4 and after shall support AMR-FR codec and optionally support the GSM_EFR, TDMA_EFR and PDC_EFR.

To TSG_T WG2:

ACTION: TrFO/TFO Workshop kindly asks **TSG T WG2**

- to consider the above comments and add the necessary requirements to the relevant specifications

To TSG_SA WG4:

ACTION: TrFO/TFO Workshop kindly asks **TSG SA WG4** to include

- the requirement to assign SID and NO_DATA SDU format for speech calls in the relevant specifications
- the mapping of the GSM_EFR, TDMA_EFR and PDC_EFR SID frames in the relevant specifications.

3. Attachments:

None

3GPP TSG TrFO Workshop CN#05 Meeting **Tdoc N4-000885**
Stockholm, SWEDEN
9th November – 10th November 2000

Source: LM Ericsson

Title: Iu UP establishment and Iu UP H.248 Requirements

Agenda item: 5.2

Document for: APPROVAL

Introduction

In the previous TrFO/TFO workshop (#4, Windsor), the sequences for call establishment and SRNS relocation were accepted for inclusion in the editors draft of the stage 2 description. However it was commented that there was a conflict with the procedure for establishing the Iu UP in the sequences and that agreed for inclusion in the text under chapter 5.5. It was then proposed that further discussion and contributions were required to agree the way forward, this contribution aims at addressing this problem and proposing the requirements on the H.248 package for Iu UP.

Problems

The first problem seen with the proposed sequence in 23.153 v2.1.0 Figure 6.1/3 message 13 is that the MGW-0 is may be backward path connected. The Iu UP H.248 package allows the MGW to receive Iu UP protocol frames independently of the Stream Mode property, but in this sequence the MGW is shown to be sending on the Iu UP Initialisation frame to the terminating MGW. Thus the Iu UP peers are RNC-O and MGW-T. However the Iu UP payload is stopped at the first MGW-O. This means that the two peers are communicating with each other with control frames but no payload is being passed (although neither peer is aware of the reason). This seems conceptually wrong.

The second problem is that the MGW behaviour is not consistent for all MGWs, depending on the call. This is detailed further in the Figures 1 to 4, below.

The perceived advantage for not acknowledging the Iu UP initialisation at the first MGW, in fact not until the terminating MGW is that the RAB Assignment Response can then be used as an acknowledgment that the entire bearer is established. However this can only be used in the simple case that the call is established mobile to mobile directly. As can be shown in the following sequences this is not often the case.
Further this requires an additional Notify message (message 9 in figure 6.1/2, 23.153 v2.1.0) before the RAB Assignment is sent to indicate that the bearer has been established to the next MGW. This however does not ensure that the bearer has been established to any subsequent MGWs. In the figures in 23.153 on a simple call has been considered with only 2 MGWs but as shown in the figures1 to 3 below, this could result to a delay to the Iu UP initialisation, and possible re-transmission due to time-out of T-INIT.

A further problem is how to handle the Iu UP in a MGW due to the fact that in the BICC procedures the bearer can be established at any time after the codec has been selected. As the Iu UP should be initialisation should propagate through the network if it is originated by an RNC then in such a case the MGWs in the CN should wait to receive an Initialisation frame. However if the Iu UP cannot be propagated from the preceding node then the MGW should initiate the Iu UP itself. For example at a network border where Iu UP inter-works with another framing protocol (e.g. I.366.1 or RTP). This is shown in figure 4 below. In the figure the MGW is initiating Iu UP towards a terminating 3GPP network. The question is how does the MGW know that it should initiate the Iu UP rather than wait to receive Iu UP Initialisation, as would be the case for a call originating from that network. Note it is assumed that the Iu UP is initialised always in the forward direction, independent of the bearer establishment direction. This is because the originating RNC generates the RFCI set to be conveyed through the network to the terminating side and the RAB assignment for originating calls is performed forward. Clearly there will be calls which do not originate from an RNC or that cannot pass the RFCI set end to end (as in figure 4), then the question appears

whether the Iu UP initialisation should follow the bearer direction. The major problem seen with this is that interworking between forward bearer and backward bearer and between the two RNCs allocating different RFCI values that need to be matched becomes quite messy and could result in many unwanted re-initialisations.

Proposed Solutions

The main intention is to keep the Iu UP handling as much as possible within the MGW, leaving the Server/H.248 procedures to be as generic as possible. This means that the MGW behaviour should be a consistent as possible and the MGW must be able to determine what it should do without having the call state knowledge of the server.

It is proposed that the Iu UP is acknowledged at each MGW. This support of the Iu UP is required by the MGW if it is to support TrFO break in any case. Each MGW stores the RFCIs, returns an Iu UP Initialisation Acknowledgement. The Iu UP package is enhanced to include a property to indicate Iu-RAN interface or Iu-CN interface and also a direction parameter, incoming or outgoing.

If a MGW termination is added with Iu UP package property, direction incoming then it shall wait to receive an Iu UP initialisation. If the MGW termination on one side of a MGW has received an Iu UP initialisation and the MGW Termination on the other side has no Iu package or has not been assigned then the Iu UP is terminated at that MGW. If the MGW termination is already defined, or at a later stage a MGW termination is added to the MGW with Iu UP package property with direction incoming, then the MGW shall initiate the Iu UP using the stored RFCI values read from the previous MGW termination. Note this procedure is only performed after the bearer to the next MGW has been established and then the NOTIFY.req to indicate successful bearer connection is not sent until after the Iu UP initialisation is complete. This is shown in figures 5 & 6 below.

If a MGW termination is added with Iu UP package property, direction outgoing then it shall initiate Iu UP based on a default rule for RFCI mappings (rule for further study). This is shown in figure 8.

When a MGW has termination(s) assigned with Iu UP package property Iu-RAN then it shall wait for Iu UP initialisation from either side of the MGW. The first Iu UP initialisation to be received shall be used to store the RFCIs. If the subsequent initialisation is from a MGW termination with Iu UP package property Iu-CN then the procedures described above are followed. If the subsequent initialisation is from a MGW termination with Iu UP package property Iu-RAN then the MGW shall send an Iu UP initialisation from the termination Iu-RAN with the RFCI values read from the other MGW termination. Note if the MGW is not through connected at this point this 'RFCI Matching' procedure could be delayed until the MGW stream mode is modified to be bothway.
This is shown in figure 9.

If a MGW has terminations with Iu UP package property but the assigned codecs to the streams are not identical then the MGW shall perform transcoding between these streams and shall thus terminate the Iu UP protocol at these MGW terminations. No 'RFCI matching' shall be applicable during this time.

If a MGW has multiple terminations with Iu UP package property (relocation, handover, call waiting, call hold) and common codecs are assigned then 'RFCI matching' may be performed. The first Iu UP initialisation received per context shall be used for storing the RFCIs. If subsequent Iu UP initialisations are received then if the stored RFCI values are not the same indexes as for the received Iu Initialisation then the MGW shall send a new Iu UP initialisation from the new MGW termination. Note only terminations with property Iu-RAN can be used to send the RFCI matching Initialisation, as CN nodes may not be monitoring for Iu UP frames.

Sequences

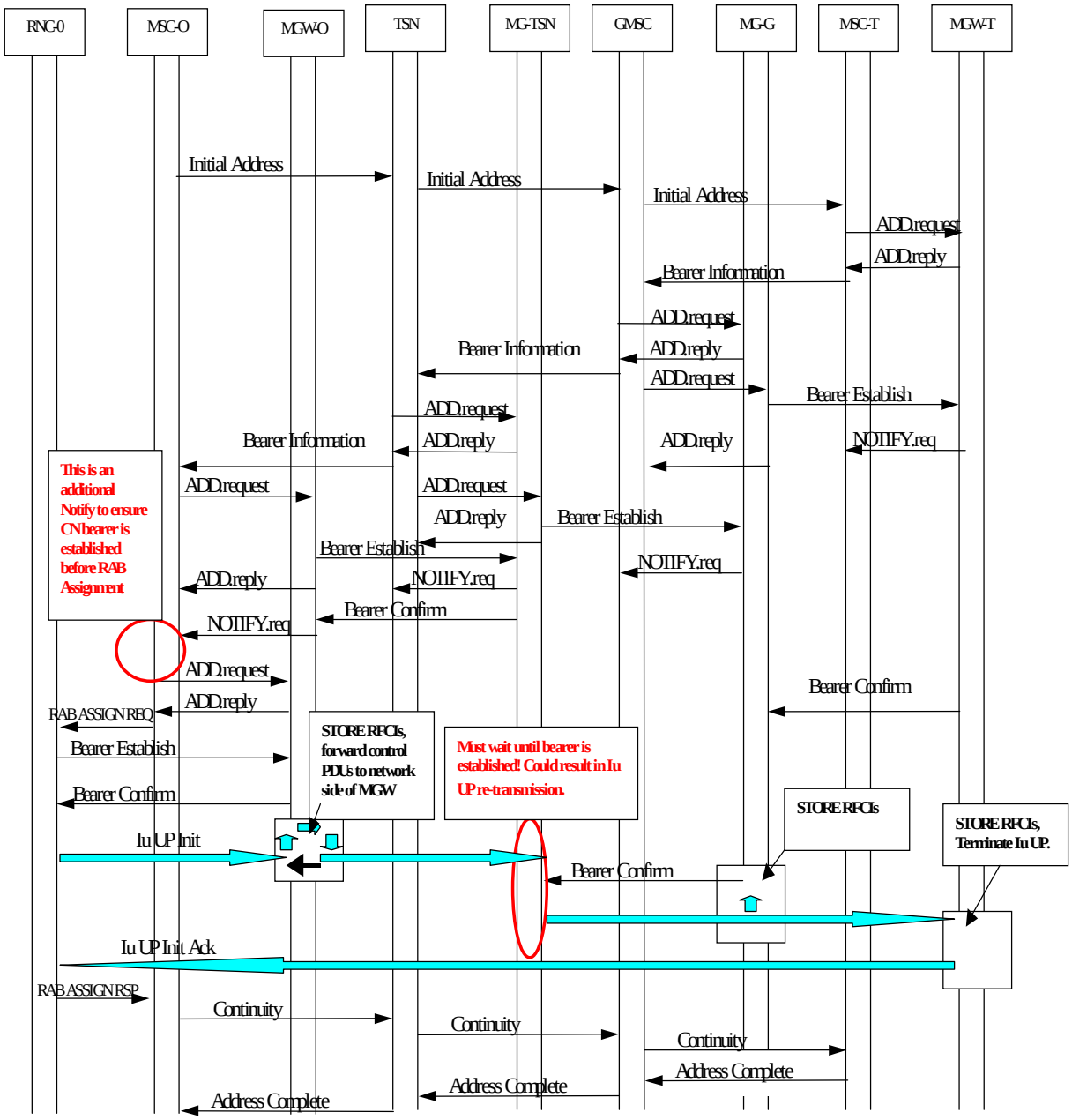

Figure 1: Iu UP establishment for mobile to mobile call.
Established from originating RNC to terminating MGW, Forward Bearer.

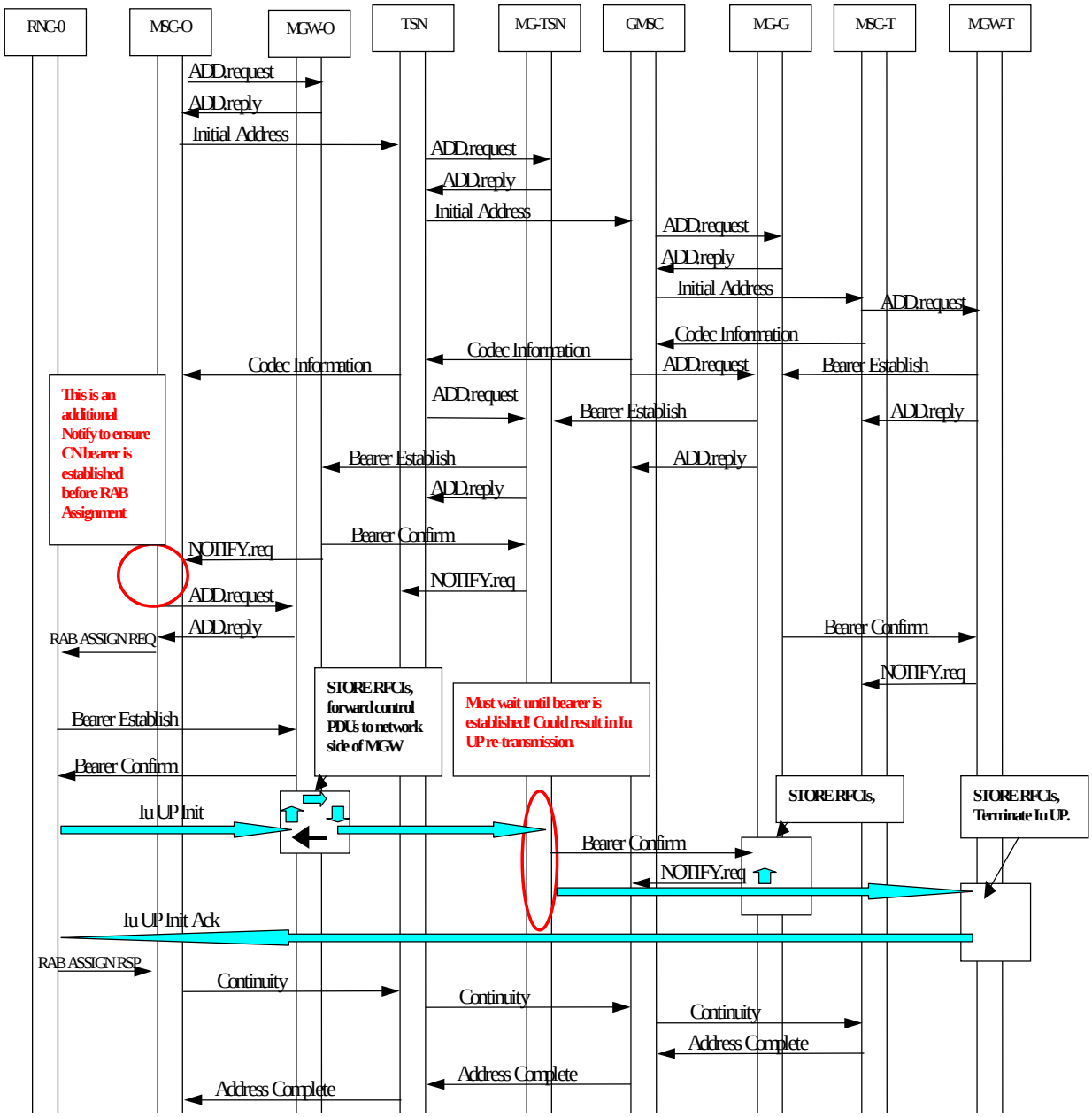

Figure 2: Iu UP establishment for mobile to mobile call.
Established from originating RNC to terminating MGW, Backward Bearer.

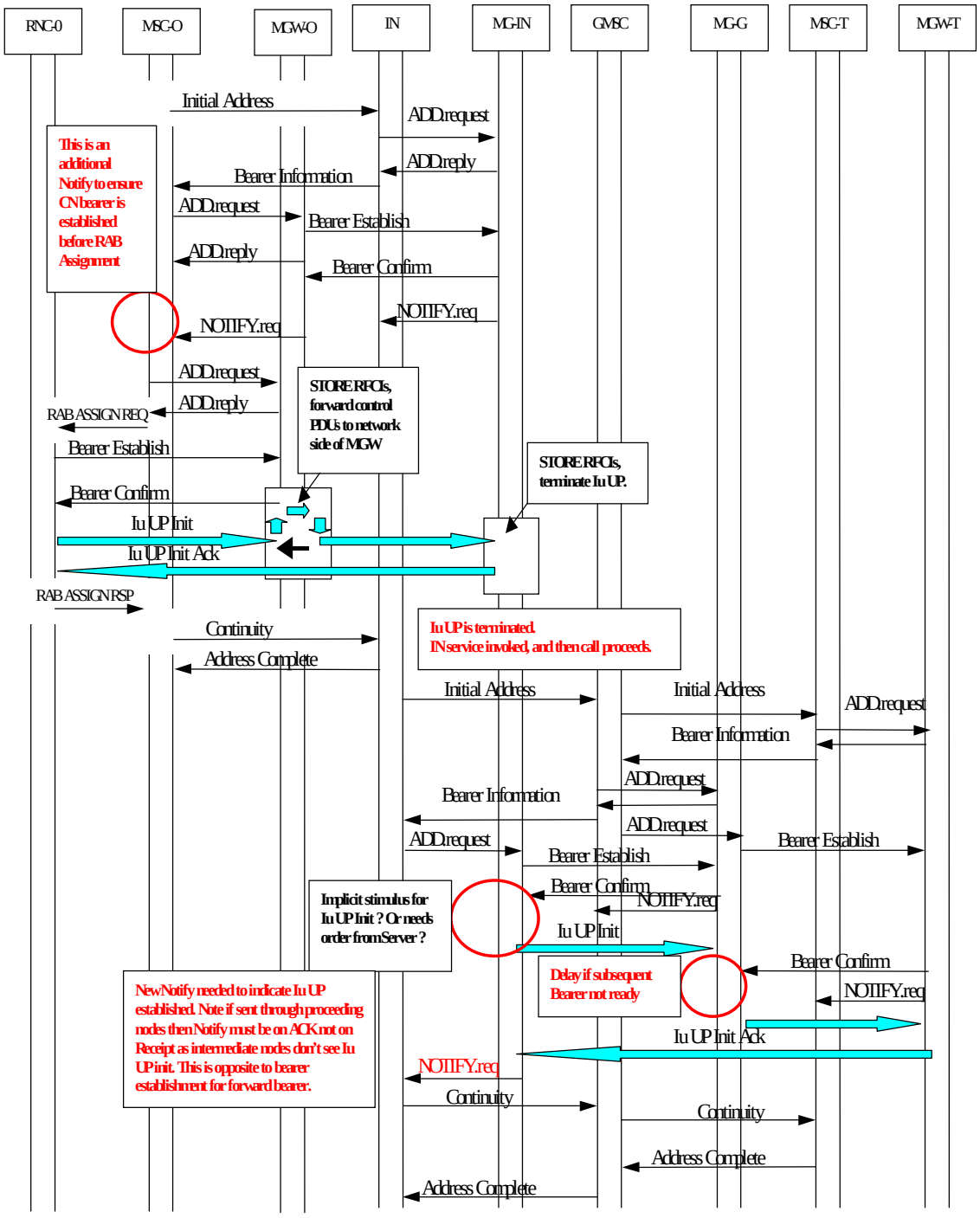

Figure 3: Iu UP establishment for mobile to mobile call.
Established from originating RNC to IN MGW and then subsequently to terminating end. Forward Bearer.

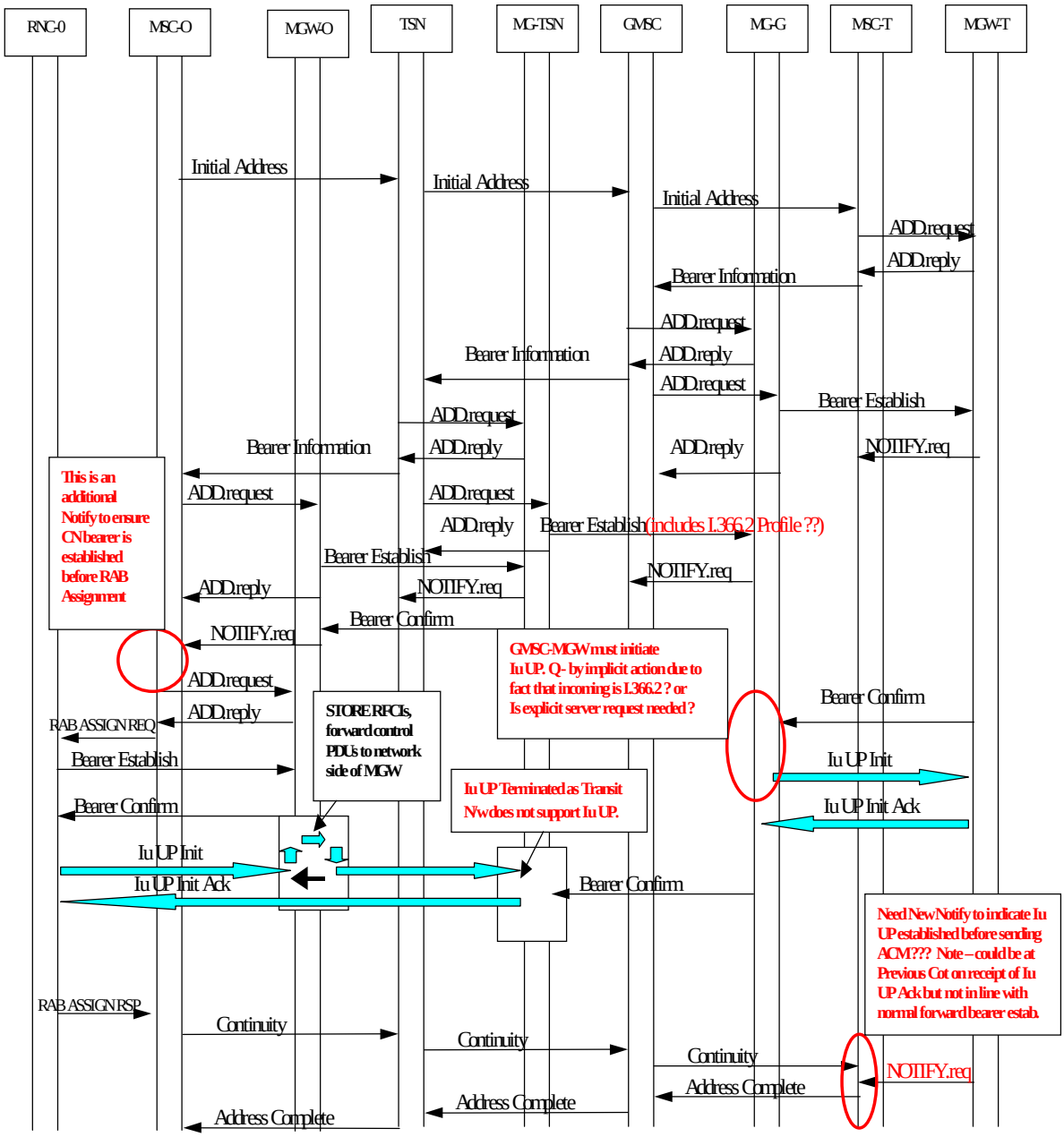

Figure 4: Iu UP establishment for mobile to mobile call.
Established from originating RNC to Transit MGW and then I.366.2 employed.
GMSC must initiate Iu UP.

Proposed Solutions:

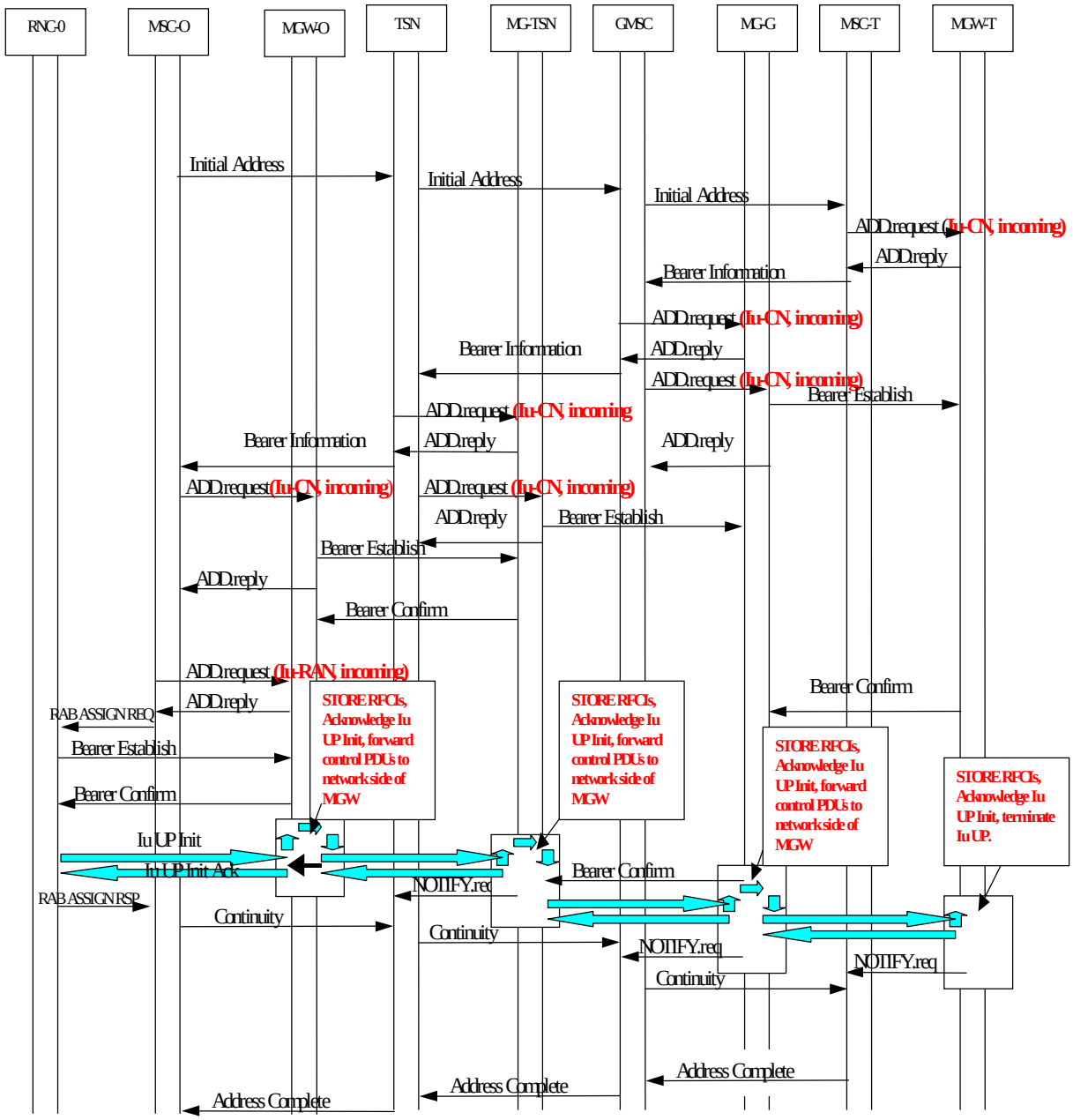

Figure 5: Iu UP establishment for mobile to mobile call.
Established hop by hop between each MGW. Forward Bearer.

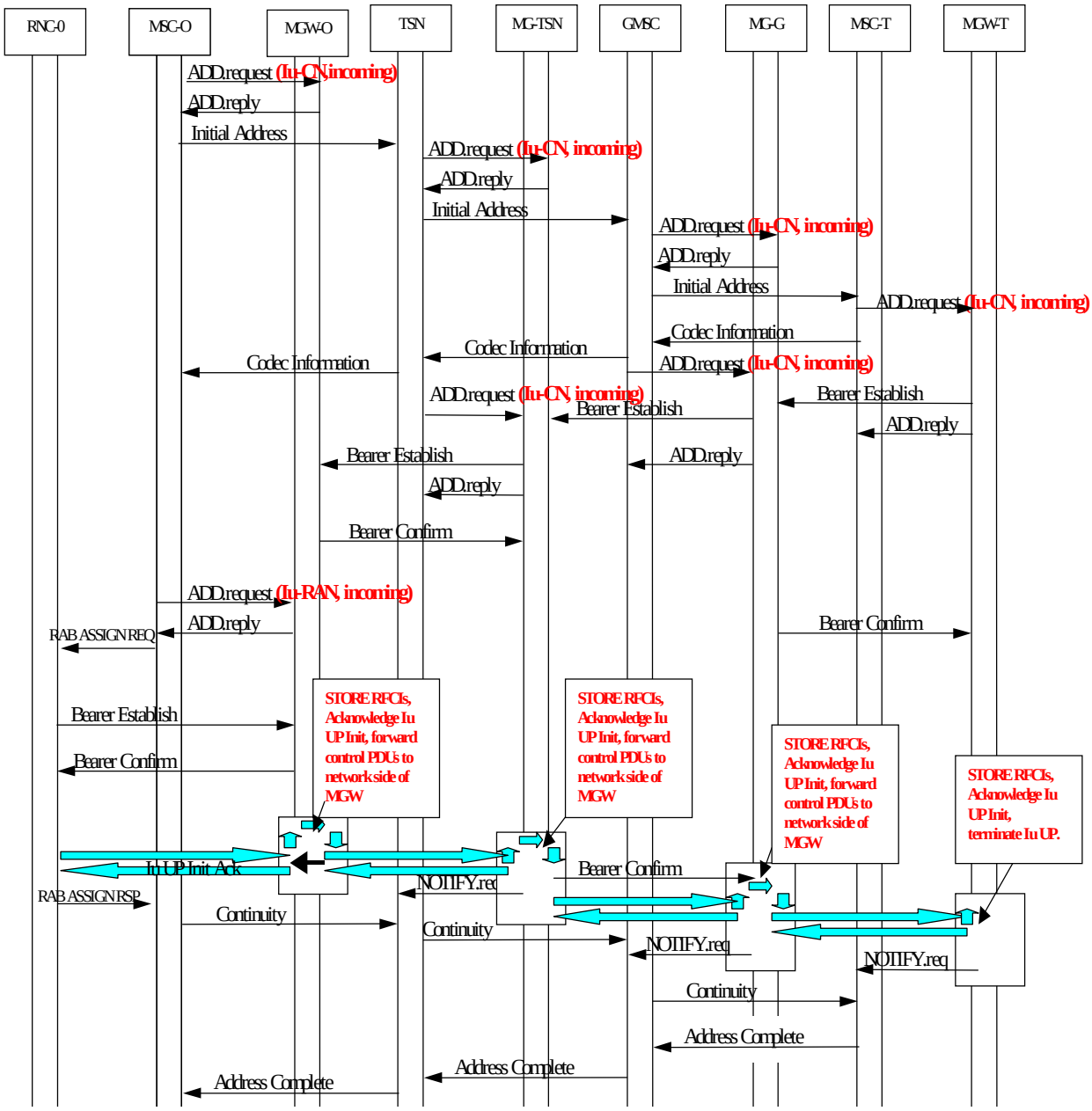

Figure 6: Iu UP establishment for mobile to mobile call.
Established hop by hop between each MGW. Backward Bearer.

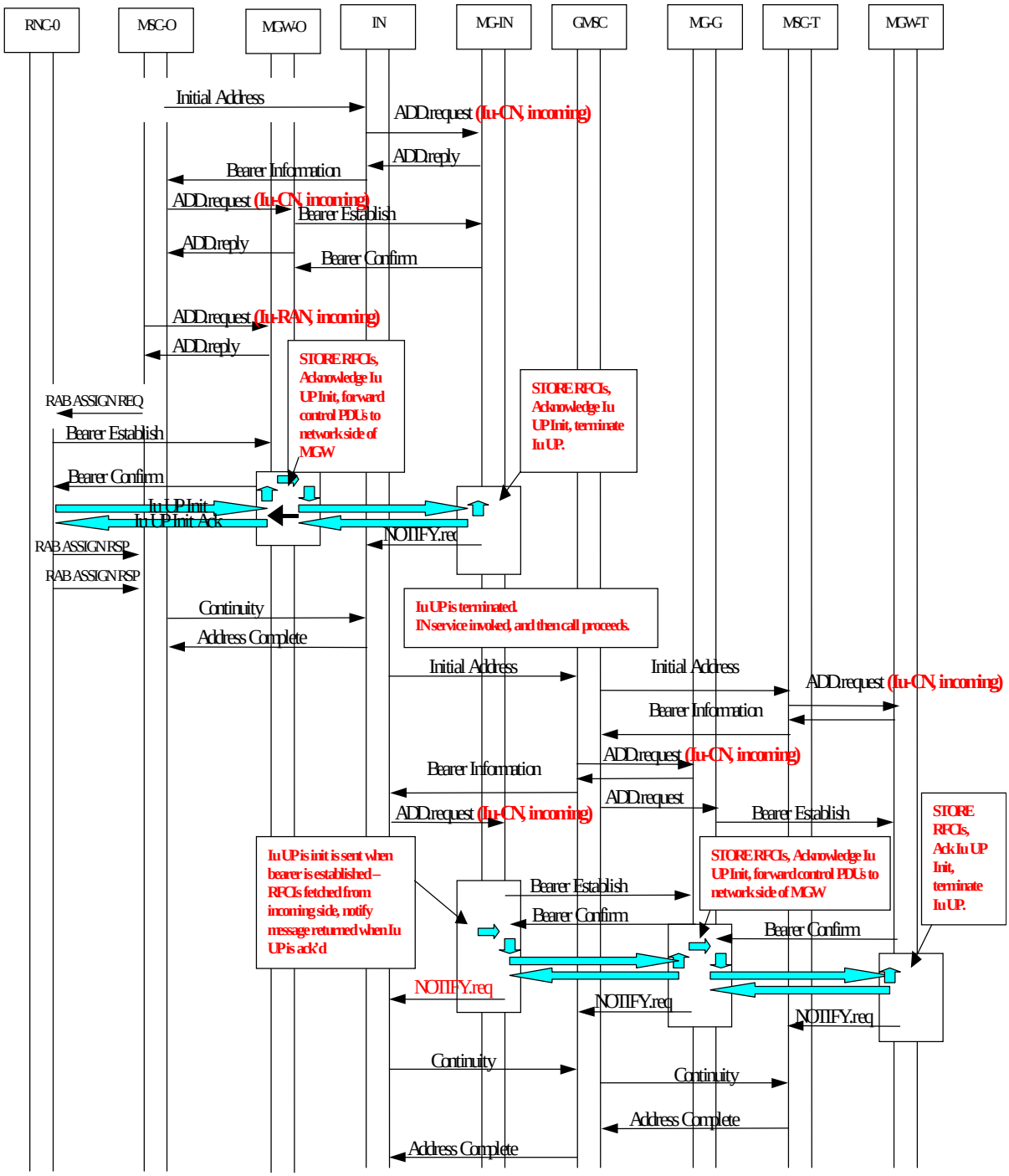

Figure 7: Iu UP establishment for mobile to mobile call.
Established hop by hop between MGWs to IN MGW and then subsequently hop by hop to terminating end. Forward Bearer.

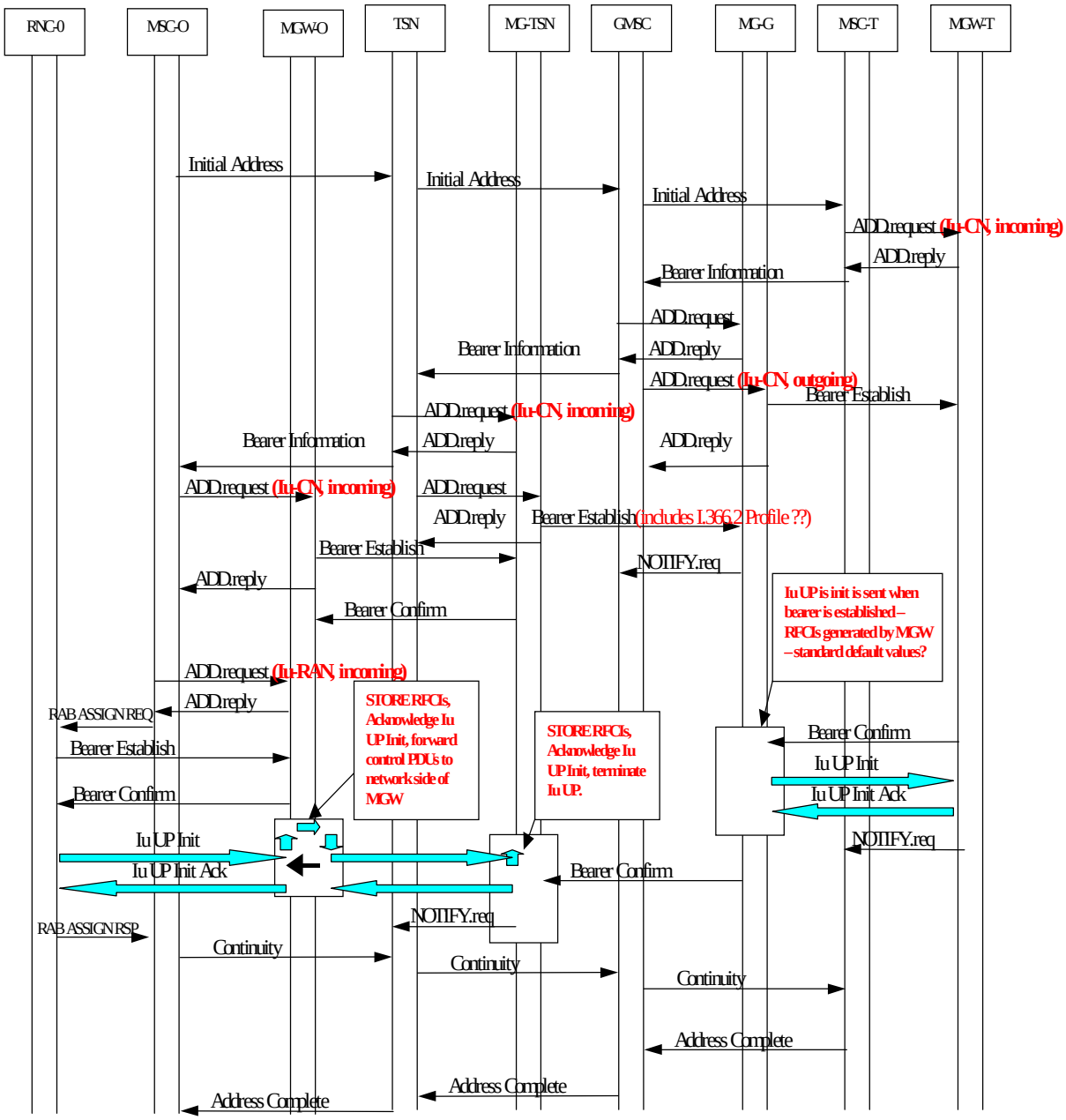

Figure 8: Iu UP establishment for mobile to mobile call.
Established hop by hop from originating RNC to Transit MGW
and then I.366.2 employed. GMSC must initiate Iu UP.

Assumed that server informs MGW that it needs to initiate Iu (not wait for Iu UP Init from preceding node.

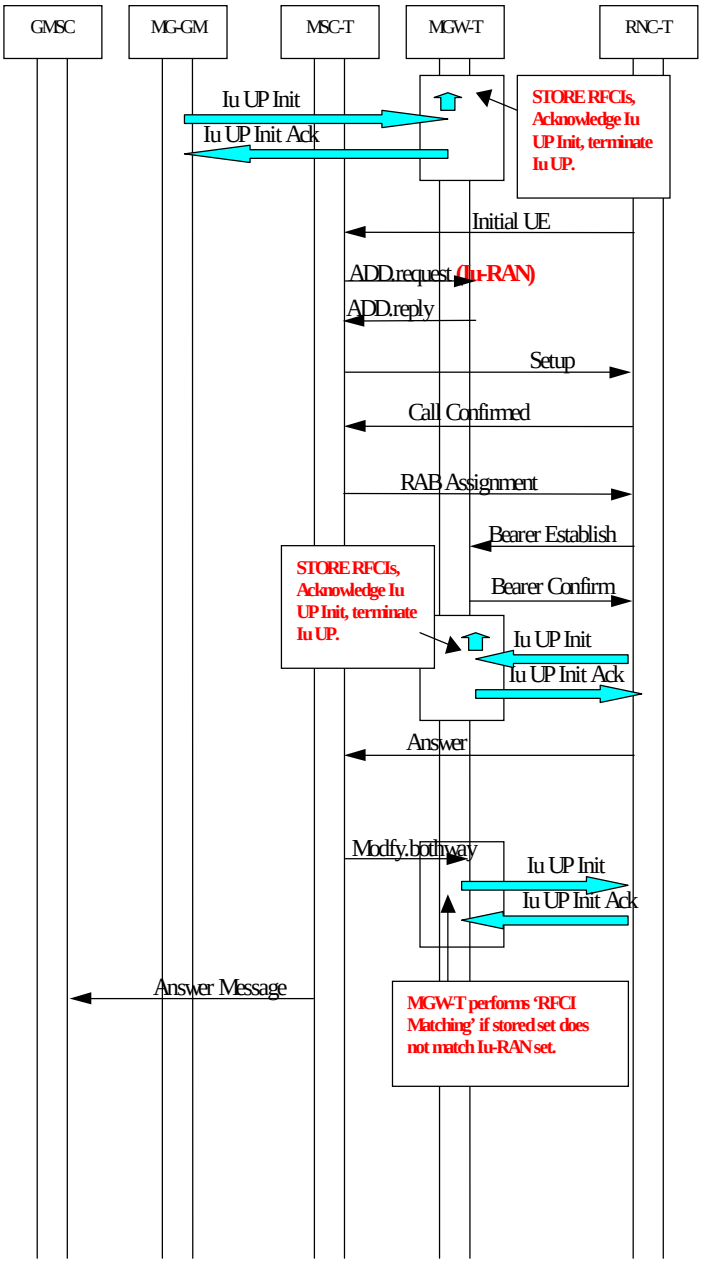

Figure 9: Terminating Call, Answer.

Summary

the following is a summary of the Iu UP H.248 requirements:

Additional Package Properties:

Iu UP Termination Type: Values - Iu-RAN
- Iu-CN

Iu UP Initialisation Procedure: Values – Incoming
- Outgoing

Iu UP Initialisation procedure is always acknowledged between MGW peers. If a request for a Notification for the bearer establishment is requested then this shall not be sent until the acknowledgement for the Iu UP initialisation has also be returned.

The RFCI parameters are always stored against the MGW termination that received the Iu UP initialisation.

If a MGW has Iu UP termination property Initialisation Procedure = Incoming then it expects to received an Initialisation (either internally or externally).

If a MGW has Iu UP termination property Initialisation Procedure = Outgoing then it generates a network originated Initialisation PDU.

If a MGW has two terminations in the same context defined as supporting Iu UP package, then on receipt of an Iu Initialisation procedure from one side (provided the bearer connection from the other termination to its peer MGW is established) it shall forward the Iu UP initialisation procedure on to the peer MGW.

If a MGW has one termination with Type = Iu-RAN and one with type Iu-CN in the same context then no forwarding of Iu UP initialisation out from the Iu-RAN termination shall be performed until an Iu UP initialisation has been received at the Iu-RAN side. If the RFCI values stored at the Iu-CN termination do not match the RFCI values stored at the Iu-RAN side then "RFCI Matching" may be performed to the Iu-RAN side – Iu UP initialisation is sent with the RFCI values from the Iu-CN side. No "RFCI Matching" is permitted at the Iu-CN side.

"RFCI Matching" may be delayed if terminations are not through-connected, triggered by connection modification (FFS) otherwise it shall be performed immediately.

If "RFCI Matching" is not performed the MGW shall map the indexes for Iu frames from one side to the RFCI indexes from the other side.

If a MGW has two Iu-RAN terminations connected to the same context then the "RFCI Matching" is performed to the termination latest defined.

If a MGW has two terminations with Iu UP package connected to the same context and both RFCI sets match then the MGW may switch into Iu UP transparent mode – no monitoring of the Iu frames is performed.

If a H.248 procedure is received when a MGW is in transparent mode (but Iu UP is defined as support mode) that requires interpretation or interaction with the Iu UP then the MGW shall switch back to support mode, i.e. perform monitoring or termination of the Iu UP protocol.

Conclusions

This contribution proposes that the sequences in 23.153v2.1.0 are modified to reflect the described initialisation and MGW handling, and the MGW procedures added/text under Chapters 5.5 and 5.6 modified to reflect the requirements.

The Iu UP H.248 package is updated to support handling of Iu UP in the CN.

3GPP TSG-CN4 **Tdoc N4-001102**
TrFO workshop Meeting #5 Meeting , Stockholm, Sweden
9th November – 10th November 2000

Title: **LS Proposed enhancements to Mc specification**

Source: **TSG_TrFO/TFO Harmonisation Workshop**

To: **TSG_CN WG4, TSG_CN WG3,**

Cc: **TSG_RAN WG3**

Contact Person:

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Tel. Number: +49 2407 575 6628

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1. Overall Description:

This Liason Statement proposes additional requirements for the Mc interface specification (29.232) for the Iu UP package, identified during the TrFO workshop #5, held in Stockholm 9th – 10th November. The draft is based on the TDOC N4-000885, attached to this LS.

2. Actions:

The TrFO workshop kindly asks that CN4 take this draft as input to their work for defining the Mc interface.

The TrFO workshop kindly asks that CN3 take this LS as input information when defining the Nb interface specification.

This LS is sent also to RAN3 for information, due to its association to the Iu UP specification.

3. Proposed Modifications To 29.232

4.7.4 IU user plane package.

4.7.4.1 IU User Plane package

PackageID: iuup (0x####)

Version: 1

Extends: None

This package identifies that Iu User Plane is used for the termination. It also contains some parameters for the Iu User Plane functions in the MGW.

4.7.4.1.1 Properties

Iu UP Mode of operation:

PropertyID: iumode (0x0001)

Description: Defines the mode of operation of the Iu User Plane functions:

Type: Enumeration

Possible Values:

"TR" (0x0001) Transparent mode

"SP" (0x0002) Support mode for predefined SDU sizes

Default: “TR” (0x0001) Transparent mode

Defined in: Local Control descriptor

Characteristics: Read/Write

Iu UP versions:

PropertyID: iuversions (0x0002)

Description: Defines the versions of the used Iu UP mode of operation.

Type: Sub-list

Possible Values:

{1,..., 16}

Default: {1}

Defined in: Local Control descriptor

Characteristics: Read/Write

Delivery of erroneous SDUs:

PropertyID: delerrsdu (0x0003)

Description: This property indicates how erroneous SDUs should be handled.

Type: Enumeration

Possible Values:

“YE” (0x0001) Yes

“NO” (0x0002) No

“NA” (0x0003) Not Applicable

Default: “NA” (0x0003) Not Applicable

Defined in: Local Control descriptor

Characteristics: Read/Write

Interface

PropertyID: interface (0x0004)

Description: This property indicates the type of interface the termination is used on.

Type: Enumeration

Possible Values:

“RAN” (0x0001) Iu RAN intrerface

“CN” (0x0002) Iu CN interface

Defined in: Local Control descriptor

Characteristics: Read/Write

Initialisation Direction

PropertyID: initdir (0x0005)

Description: This property indicates if the termination in the MGW should be expecting Initialisation information or not.

Type: Enumeration

Possible Values:

"IN" (0x0001) Incoming

"OUT" (0x0002) Outgoing

Defined in: Local Control descriptor

Characteristics: Read/Write

4.7.4.1.2 Events

None

4.7.4.1.3 Signals

None

4.7.4.1.4 Statistics

None

4.7.4.1.5 Procedures

This package is used by the MGC to indicate to the MGW that Iu User Plane is used between RNC and the MGW. For more information on Iu User Plane and for a description of 'Iu UP mode of operation', 'Iu UP versions' and 'Delivery of erroneous SDUs' see 3G TS 25.415 'UTRAN Iu interface User Plane Protocols.

The Iu User Plane control procedures (PDU type 14 frames) may be received and may be send by a MGW independently of the Stream Mode.

The following procedures are valid for Iu UP in Support Mode:
Iu UP Initialisation procedure is always acknowledged between MGW peers. If a request for a Notification for the bearer establishment is requested then this shall not be sent until the acknowledgement for the Iu UP initialisation has also be returned.

The RFCI parameters are always stored against the MGW termination that received the Iu UP initialisation.

If a MGW has Iu UP termination property Initialisation Procedure = Incoming then it expects to received an Initialisation (either internally or externally).

If a MGW has Iu UP termination property Initialisation Procedure = Outgoing then it generates a network originated Initialisation PDU.

If a MGW has two terminations in the same context defined as supporting Iu UP package, then on receipt of an Iu Initialisation procedure from one side (provided the bearer connection from the other termination to its peer MGW is established) it shall forward the Iu UP initialisation procedure on to the peer MGW. This procedure shall be performed independently of the through-connection of the terminations in the context.

If a MGW has one termination with Type = Iu-RAN and one with type Iu-CN in the same context then no forwarding of Iu UP initialisation out from the Iu-RAN termination shall be performed until an Iu UP initialisation has been received at the Iu-RAN side. If the RFCI values stored at the Iu-CN termination do not match the RFCI values stored at the Iu-RAN side then "RFCI Matching" may be performed to the Iu-RAN side – Iu UP initialisation is sent with the RFCI values from the Iu-CN side. No "RFCI Matching" is permitted at the Iu-CN side.

"RFCI Matching" may be delayed if terminations are not through-connected, triggered by connection modification otherwise it shall be performed immediately, this is implementation option

If "RFCI Matching" is not performed the MGW shall map the indexes for Iu frames from one side to the RFCI indexes from the other side.

If a MGW has two Iu-RAN terminations connected to the same context then the "RFCI Matching" is performed to the termination latest defined.

If a MGW has two terminations with Iu UP package connected to the same context and both RFCI sets match then the MGW may switch into Iu UP transparent mode – no monitoring of the Iu frames is performed, provided that the terminations are through-connected

If a H.248 procedure is received when a MGW is in transparent mode (but Iu UP is defined as support mode) that requires interpretation or interaction with the Iu UP then the MGW shall switch back to support mode, i.e. perform monitoring or termination of the Iu UP protocol.

4. Attachments:

N4-000885