Technical Specification Group Services and System Aspects
Meeting #28, 06 - 08 June 2005,
Quebec, Canada

TSGS#28(05)0355

Source: **SA WG2**

Title: **CR to TS 23.246: Combined CR on MBMS Trace and Charging Information (Combining CR0147R2 and CR0154) (Rel-6)**

Document for: **Approval**

Agenda Item: **7.2.3**

This CR has been developed by the CR authors and is brought to TSG SA proposing a meged CR to replace these two CRs in SP-050355 (CRs 0147R2 and 0154).

SA Doc	TS No.	CR No	Rev	Rel	Cat	Subject	Vers Cur	SA2 Doc	WI	Clauses affected
SP-050353	23.246	0157	-	Rel-6	F	Combined CR on MBMS Trace and Charging Information (Combining CR0147R2 and CR0154)	6.6.0	S2-051463	MBMS	2, 6.1, 8.2, 8.10, 8.11

3GPP TSG SA WG2 Architecture — S2#46 S2-051463

9 - 13 May 2005, Athens, Greece

CR-Form-v7.1

CHANGE REQUEST

⌘ 23.246 CR 0157 ⌘rev - ⌘ Current version: 6.6.0 ⌘

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

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

Title:	⌘	Combined CR on MBMS Trace and Charging Information (Combining CR0147R2 and CR0154)
Source:	⌘	SA WG2
Work item code:	⌘	OAM-TRACE / MBMS
Date:	⌘	30/05/2005
Category:	⌘	F
Release:	⌘	Rel-6

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

Use one of the following releases:
Ph2 *(GSM Phase 2)*
R96 *(Release 1996)*
R97 *(Release 1997)*
R98 *(Release 1998)*
R99 *(Release 1999)*
Rel-4 *(Release 4)*
Rel-5 *(Release 5)*
Rel-6 *(Release 6)*
Rel-7 *(Release 7)*

Reason for change:	⌘	[CR 154] MBMS stage 2 is missing trace which is already partially defined in O&M specifications and GTP. Extra information elements were added to the Create PDP Context Request message and the Update PDP Context Request message to allow for flow based charging to be performed in the GGSN. However, subscriber charging for MBMS is not charged at the GPRS layer and therefore the same information needs to be passed to the BM-SC during the MBMS UE Context activation procedure, which are separate from PDP Contexts and were overlooked. [CR147] In section 8.10 of current version, handling of MBMS bearer service is specified for the case when a UE changes from a MBMS supporting SGSN to a non-supporting SGSN. However, 1. Current sequences do not describe whether the new SGSN indicates it supports MBMS in order to transfer or not the contexts from old SGSN. . 2. Update MBMS UE Context procedure between GGSN and BM-SC is missing. 3. MBMS registration procedure between the new SGSN and GGSN can only happen when the new SGSN indicates MBMS support in step 2), this assumption is missing. Some editorial modifications are necessary.
Summary of change:	⌘	[CR 154] Adds text similar to TS 23.060 for PDP context activation procedure relating to Trace to the MBMS multicast service activation at GPRS level, and adds additional MBMS specific tracing information for use at the BM-SC including standalone messaging to activate BM-SC trace as a result of Routeing Area Updates. Adds parameter transfer of IMEI-SV, RAT Type, User Location Information, MS Time Zone from SGSN to GGSN, and subsequently to the BM-SC where possible along the same principles as those implemented for TS 23.060. IMEI-SV is expected to be used for accounting purposes only.

	[CR 147] 1. Add the description that the new SGSN indicates it supports MBMS in SGSN Context Request message in step 2). 2. Add the Update MBMS UE Context procedure between GGSN and BM-SC. 3. Add the assumption that MBMS Registration procedure can only be happen in case the new SGSN indicated it is supporting MBMS in step 2) 4. Word “clause” is modified to “subclause”. Subclause number is added for the reference procedures.
Consequences if not approved:	⌘ [CR 154] MBMS tracing will not be possible. The operator will not be able to use an important tool for network monitoring. Specific information will be missing from the BM-SC that is responsible for the service level charging. [CR 147] The Inter SGSN Routeing Area Update procedure is not correct.

Clauses affected:	⌘	2, 6.1, 8.2, 8.10, 8.11			
Other specs affected:	⌘	**Y** / **N**	Other core specifications	⌘	29.061, 29.002, 29.060
		X /	Test specifications		
		/ X	O&M Specifications		32.421, 32.422, 32.423
		X /			
Other comments:	⌘	CAMEL Charging Charateristics are not included in this CR as CAMEL interactions do not apply to MBMS. This is a combined CR of CR #143, #145, and #147			

2 References

The following documents contain provisions which, through reference in this text, constitute provisions of the present document.

- References are either specific (identified by date of publication, edition number, version number, etc.) or non-specific.
- For a specific reference, subsequent revisions do not apply.
- For a non-specific reference, the latest version applies. In the case of a reference to a 3GPP document (including a GSM document), a non-specific reference implicitly refers to the latest version of that document *in the same Release as the present document*.

[1] 3GPP TR 21.905: "Vocabulary for 3GPP Specifications".

[2] 3GPP TS 22.146: "Multimedia Broadcast/Multicast Service; Stage 1".

[3] 3GPP TS 23.107: "Quality of Service (QoS) concept and architecture".

[4] 3GPP TS 29.061: "Interworking between the Public Land Mobile Network (PLMN) supporting packet based services and Packet Data Networks (PDN)".

[5] 3GPP TS 33.246: "Security of Multimedia Broadcast/Multicast Service”

[6] 3GPP TS 22.246: "Multimedia Broadcast/Multicase Service (MBMS) user services".

[7] 3GPP TS 26.346: "MBMS: Protocols and Codecs".

[8] void

[9] void

[10] 3GPP TS 25.346: "Introduction of the Multimedia Broadcast Multicast Service (MBMS) in the Radio Access Network".

[11] 3GPP TS 43.246: "Technical Specification Group GSM/EDGE Radio Access Network; Multimedia Broadcast Multicast Service (MBMS) in the GERAN".

[12] 3GPP TS 23.125: "Flow Based Charging".

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

[xy] 3GPP TS 23.060: "General Packet Radio Service (GPRS); Service description; Stage 2"

********** NEXT MODIFIED SECTION **********

6.1 MBMS UE Context

The MBMS UE Context contains UE-specific information related to a particular MBMS bearer service that the UE has joined. An MBMS UE Context is created in the UE, SGSN,GGSN and BM-SC Membership function when the UE joins an MBMS bearer service. In the SGSN, an MBMS UE Context is also created as a result of an inter-SGSN routing area update after the transfer of the MBMS UE Context from the old SGSN.

In Iu mode, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism to the BSC/SRNC at least when the first PS RAB is established for the UE, or when the UE performs MBMS Multicast Service Activation. MBMS UE Contexts are provided to the Iu mode BSC/SRNC regardless whether MBMS Sessions are ongoing or not (i.e. before, between and after Sessions). In addition, all MBMS UE Contexts of a UE are provided via MBMS UE Linking mechanism when a UE, which has an MBMS UE Context active, moves to PMM-Connected state via the MBMS Service Request procedure for the purpose of MBMS.

In the UE and SGSN, the MBMS UE Context is stored as part of the MM Context for the UE. The MBMS UE Context is stored in the GGSN. There is one MBMS UE Context per MBMS bearer service that the UE has joined.

In the Iu mode BSC/RNC, the MBMS UE Contexts are stored as part of the UE Context of the BSC/RNC.

The content of the MBMS UE Context is described in Table 1.

Table 1: MBMS UE Context

Parameter	Description	UE	SGSN	GGSN	RNC	BSC	BM-SC
IP multicast address	IP multicast address identifying an MBMS bearer that the UE has joined.	X	X	X	X	Iu - X Gb - none	X
APN	Access Point Name on which this IP multicast address is defined.	X	X	X	X	Iu - X Gb – none	X
GGSN Address in Use	The IP address of the GGSN currently used		X				
SGSN address	The IP address of SGSN			X			
TMGI	Temporary Mobile Group Identity allocated to the MBMS bearer.	X	X		X	Iu - X Gb – none	
Linked NSAPI	NSAPI of the PDP context used by the UE to carry IGMP/MLD signalling.	X	X				
IMSI	IMSI identifying the user.	(1)	(1)	X	(2)	Iu – (2) Gb – (3)	X
TI	Transaction Identifier	X	X				
MBMS_NSAPI	Network layer Service Access Point Identifier which identifies an MBMS UE Context.	X	X	X	X		
Additional MBMS Trace Info	Identifies additional information required to perform trace.		(4)	(4)			(4)
Trace Reference	Identifies a record or a collection of records for a particular trace.		(4)	(4)	(4)	(4)	
Trace Type	Indicates the type of trace.		(4)	(4)	(4)	(4)	
Trigger Id	Identifies the entity that initiated the trace.		(4)	(4)	(4)	(4)	
OMC Identity	Identifies the OMC that shall receive the trace record(s).		(4)	(4)	(4)	(4)	

(1) In the UE and SGSN, the IMSI is available within the MM Context which contains the MBMS UE Context

(2) The IMSI is available within the UE Context which contains the MBMS UE Context.

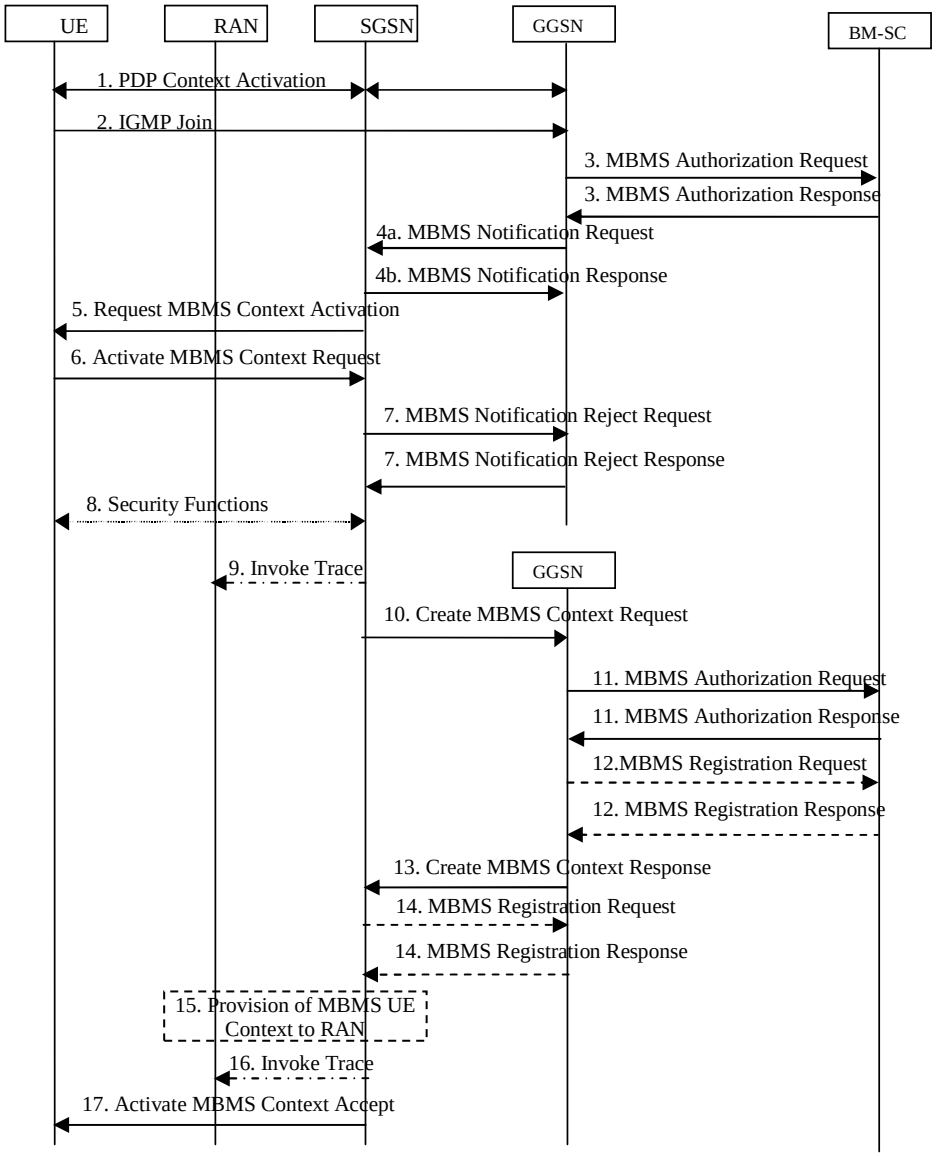
(3) IMSI availability does not depend on MBMS.

(4) Trace parameters are only stored if trace is activated.

********** NEXT MODIFIED SECTION ********

8.2 MBMS Multicast Service Activation

The MBMS multicast service activation procedure registers the user in the network to enable the reception of data from a specific multicast MBMS bearer service. The activation is a signalling procedure between the UE and the network. The procedure establishes MBMS UE contexts in UE, SGSN and GGSN and Iu mode BSC/RNC for each activated multicast MBMS bearer service comparable to regular PDP contexts.


UE
RAN
SGSN
GGSN
BM-SC
1. PDP Context Activation
2. IGMP Join
3. MBMS Authorization Request
3. MBMS Authorization Response
4a. MBMS Notification Request
4b. MBMS Notification Response
5. Request MBMS Context Activation
6. Activate MBMS Context Request
7. MBMS Notification Reject Request
7. MBMS Notification Reject Response
8. Security Functions
9. Invoke Trace
GGSN
10. Create MBMS Context Request
11. MBMS Authorization Request
11. MBMS Authorization Response
12.MBMS Registration Request
12. MBMS Registration Response
13. Create MBMS Context Response
14. MBMS Registration Request
14. MBMS Registration Response
15. Provision of MBMS UE Context to RAN
16. Invoke Trace
17. Activate MBMS Context Accept

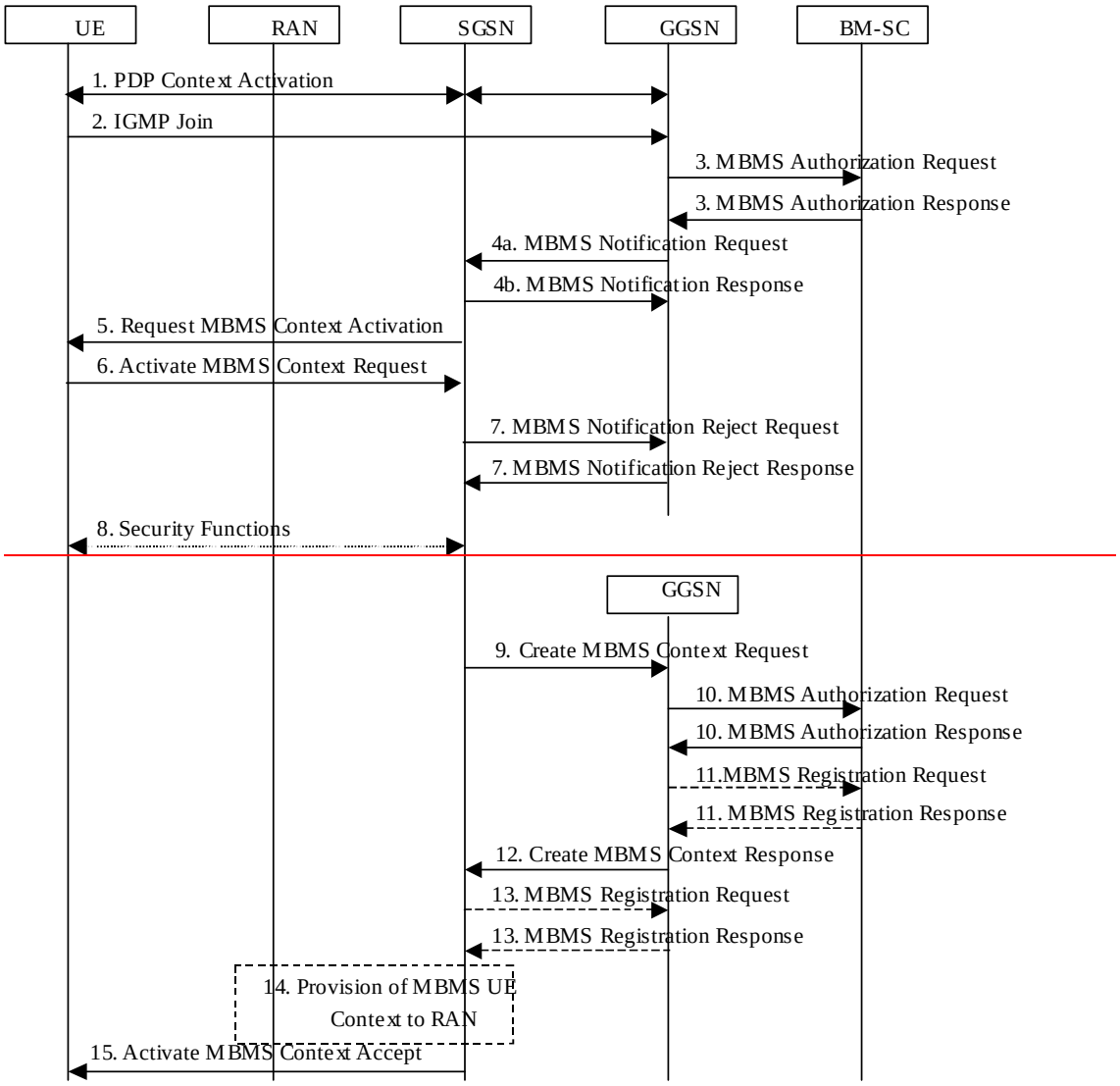


Figure 7: The activation of an MBMS multicast service

1. The UE activates a default, typically best-effort PDP context if not already established. This can be a PDP context used for basic IP services like WAP or Internet access, or it might be the signalling PDP context used for IMS access.

2. The UE sends an IGMP (IPv4) or MLD (IPv6) Join message over the default PDP context to signal its interest in receiving a particular multicast MBMS bearer service identified by an IP multicast address.

3. The GGSN sends an MBMS Authorization Request seeking authorization for the activating UE to receive data. The MBMS Authorization Request may include trace information (Additional MBMS Trace Info), if activated. The authorization decision, which may be based on subscription data in the BM-SC, Membership function is provided in the MBMS Authorization Response together with the APN to be used for creation of the MBMS UE context. If the MBMS Authorization Response indicates that the UE is not authorized to receive the MBMS data the process terminates with no additional message exchange.

4a. The GGSN sends an MBMS Notification Request (IP multicast address, APN, Linked NSAPI) to the SGSN. Linked NSAPI is set equal to the NSAPI of the PDP context over which the Join request was received. The IP multicast address is the one requested by the UE in the Join request. The APN may be different from the APN to which the default PDP context has been activated. In any case, the APN may resolve to a GGSN that is different from the GGSN receiving the IGMP/MLD Join request. The GGSN starts a MBMS Activation Timer as GGSN may receive no response, e.g. in case SGSN or UE does not support MBMS.

4b. The SGSN sends a MBMS Notification Response (Cause) to the GGSN that sent the MBMS Notification Request, where Cause shall indicate whether or not the MBMS context activation will proceed. Upon reception

of the response message with Cause indicating unsuccessful operation the GGSN should not send any further MBMS Notification Request messages. The procedure is then terminated.

5. The SGSN sends a Request MBMS Context Activation (IP multicast address, APN, Linked NSAPI, TI) to the UE to request it to activate an MBMS UE Context. Linked NSAPI allows the UE to associate the MBMS UE Context with the PDP context over which it sent the IGMP/MLD Join message in step 2. TI was chosen by the SGSN and contains a value not used by any other activated PDP context and MBMS UE context for this UE.

6. The UE creates an MBMS UE context and sends an Activate MBMS Context Request (IP multicast address, APN, MBMS_NSAPI, MBMS bearer capabilities) to the SGSN. The IP multicast address identifies the MBMS multicast service, which the UE wants to join/activate. An APN may indicate a specific GGSN. The MBMS bearer capabilities indicate the maximum QoS the UE can handle. The MBMS_NSAPI was chosen by the UE and contains a value not used by any other activated PDP context and MBMS UE context for this UE. If the SGSN has the MBMS Bearer Context information for this MBMS bearer service, the SGSN should verify the UE's MBMS bearer capabilities. If the SGSN determines that the UE's MBMS bearer capabilities are less than the Required MBMS Bearer Capabilities, it shall reject the request for activation of an MBMS context with an appropriate cause.

7. If the MBMS UE Context was not established, the SGSN sends a MBMS Notification Reject Request (Cause) to the GGSN that sent the MBMS Notification Request, where Cause shall indicate the reason why the MBMS UE Context could not be established. The GGSN then sends a MBMS Notification Reject Response back to the SGSN. This should prevent further sending of MBMS Notification Request messages. The procedure is then terminated.

8. Security Functions may be performed, e.g. to authenticate the UE.

9. In A/Gb mode and if BSS trace is activated, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, and OMC Identity) message to the BSS. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.

10~~9~~. The SGSN creates an MBMS UE context and sends a Create MBMS Context Requests (IP multicast address, APN, MBMS_NSAPI, IMSI, MSISDN, RAI, IMEI-SV, RAT Type, MS Time Zone, CGI/SAI, Trace Reference, Trace Type, Trigger Id, OMC Identity , Additional MBMS Trace Info) to the GGSN. The SGSN shall include Trace Reference, Trace Type, Trigger Id, and OMC Identity if GGSN trace is activated. The SGSN shall include Additional MBMS Trace Info if BM-SC trace is activated. The SGSN shall copy Trace Reference, Trace Type, and OMC Identity from the trace information received from the HLR or OMC. The inclusion of CGI/SAI shall be according rules detailed in sub-clause 15.1.1a in 3GPP TS 23.060 [xy].

11~~0~~. The GGSN sends an MBMS Authorization Request (IMSI, MSISDN, RAI, IMEI-SV, RAT Type, MS Time Zone, CGI/SAI, Additional MBMS Trace Info) seeking authorization for the activating UE. The GGSN shall include Additional MBMS Trace Info if BM-SC trace is activated. The CGI/SAI is included, if available. The authorization decision is provided in the MBMS Authorization Response. The BM-SC creates an MBMS UE Context.

12~~1~~. If the GGSN does not have the MBMS Bearer Context information for this MBMS bearer service, the GGSN sends a MBMS Registration Request to the BM-SC. See subclause "MBMS Registration Procedure".

If no TMGI has been allocated for this MBMS bearer service, the BM-SC will allocate a new TMGI. This TMGI will be passed to GGSN and SGSN via the MBMS Registration Response message and further to UE via Activate MBMS Context Accept message.

The BM-SC responds with a MBMS Registration Response containing the MBMS Bearer Context information for this MBMS bearer service and adds the identifier of the GGSN to the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS Registration Procedure".

13~~2~~. The GGSN creates an MBMS UE context and sends a Create MBMS Context Response to the SGSN.

14~~3~~. If the SGSN does not have the MBMS Bearer Context information for this MBMS bearer service, the SGSN sends a MBMS Registration Request to the GGSN. See subclause "MBMS Registration Procedure".

The GGSN responds with a MBMS Registration Response containing the MBMS Bearer Context information for this MBMS bearer service and adds the identifier of the SGSN to the "list of downstream nodes" parameter in its MBMS Bearer Context. See subclause "MBMS Registration Procedure".

15~~4~~. The SGSN provides Iu mode RAN with the MBMS UE Context(s) if at least one PS RAB is established for the UE.

16. In Iu mode and if trace is activated, the SGSN shall send an Invoke Trace (Trace Reference, Trace Type, Trigger Id, and OMC Identity) message to the RAN. Trace Reference, and Trace Type are copied from the trace information received from the HLR or OMC.

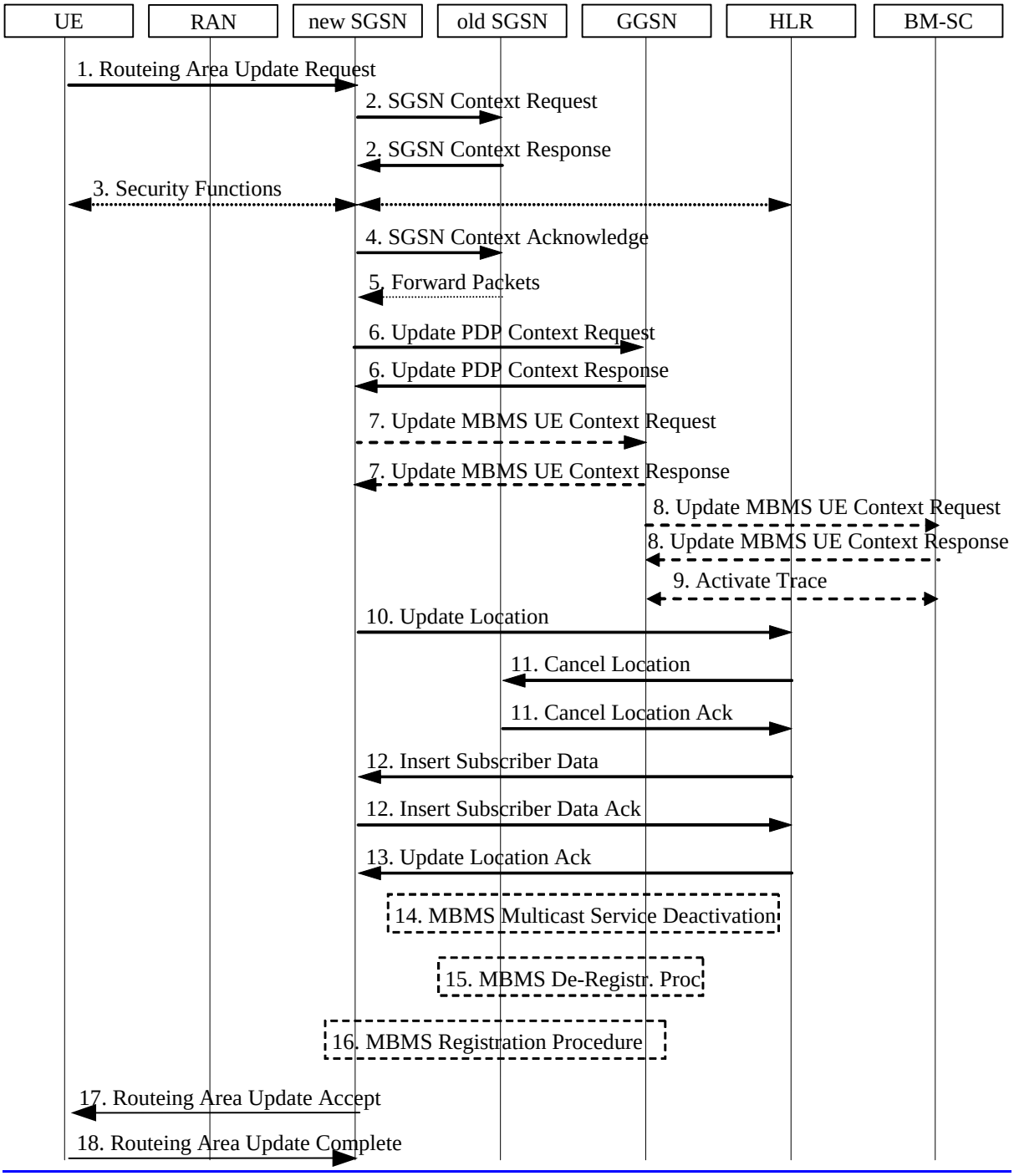
Note: Step 16 is applied when the trace activation is triggered by means of signalling. Another alternative is the triggering of trace activation by the OMC. The details of both Trace Activation procedures are described in 3GPP TS 32.422 [84].

15~~7~~. The SGSN sends an Activate MBMS Context Accept (TMGI, MBMS bearer capabilities) to the UE. The MBMS bearer capabilities indicate the maximum QoS that is used by this MBMS bearer service and the UE may take it into account when further MBMS bearer services are activated. If it was not possible to verify the UE's MBMS bearer capabilities in Step 6, the UE's MBMS bearer capabilities will be verified now. If the SGSN determines that the UE's MBMS bearer capabilities are lower than the Required MBMS Bearer Capabilities the SGSN rejects the request for activation of an MBMS context indicating an appropriate cause and starts the deactivation of the already established MBMS UE contexts.

***** NEXT CHANGED SECTION ******

8.10 Inter SGSN Routeing Area Update

This procedure describes the handling of MBMS bearer services when an MBMS UE performs a Routeing Area Update and the serving SGSN changes. It is based~~s~~ on the Inter SGSN Routeing Area Update procedure specified in TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the Routeing Area update procedure. Only for the MBMS specific additions the steps are described.


UE
RAN
new SGSN
old SGSN
GGSN
HLR
BM-SC
1. Routeing Area Update Request
2. SGSN Context Request
2. SGSN Context Response
3. Security Functions
4. SGSN Context Acknowledge
5. Forward Packets
6. Update PDP Context Request
6. Update PDP Context Response
7. Update MBMS UE Context Request
7. Update MBMS UE Context Response
8. Update MBMS UE Context Request
8. Update MBMS UE Context Response
9. Activate Trace
10. Update Location
11. Cancel Location
11. Cancel Location Ack
12. Insert Subscriber Data
12. Insert Subscriber Data Ack
13. Update Location Ack
14. MBMS Multicast Service Deactivation
15. MBMS De-Registr. Proc
16. MBMS Registration Procedure
17. Routeing Area Update Accept
18. Routeing Area Update Complete

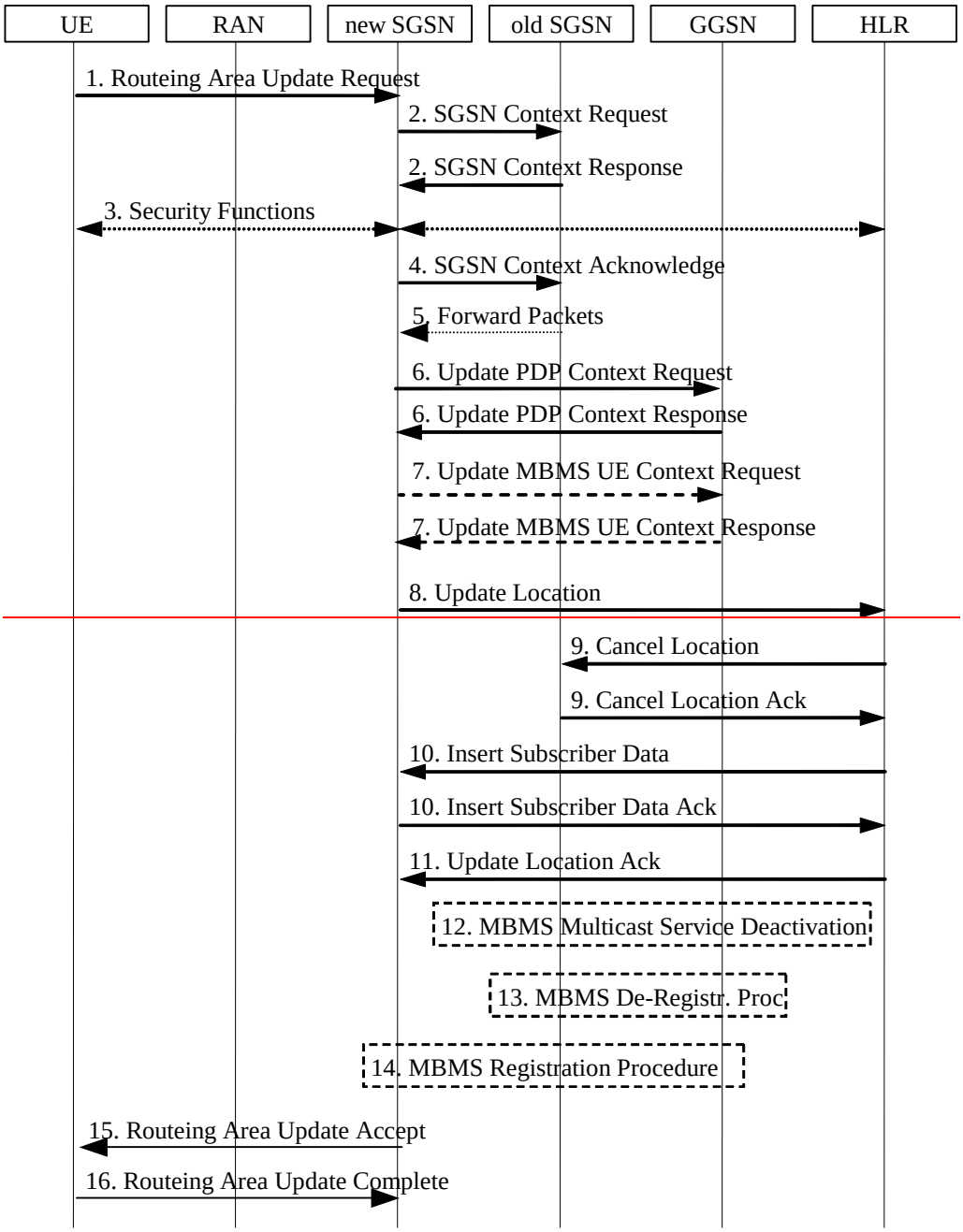


Figure 14: Inter SGSN Routeing Area Update

2) An SGSN supporting MBMS indicates its MBMS support in the SGSN Context Request message. ~~The~~ If the SGSN indicates that it supports MBMS, the old SGSN includes the transfer of the MBMS UE Context(s) in the SGSN Context Response message.

7) For the MBMS UE context(s) received in step 2) the new SGSN sends Update MBMS UE Context Request (Serving network identity, MS Time Zone, CGI/SAI, RAT Type, Additional MBMS Trace Info) to the GGSNs concerned. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response.

8) The GGSN sends Update MBMS UE Context Request (~~updated Serving network identity~~RAI) to the BM-SC. The inclusion of CGI/SAI shall be according rules detailed in sub-clause 15.1.1a in TS 23.060 [xy]. The BM-SC updates its MBMS UE Context fields and return Update MBMS UE Context Response.

9) If the GGSN receives new or updated Additional MBMS Trace Info from the new SGSN, the GGSN sends an Activate Trace (Additional MBMS Trace Info) message to the BM-SC.

~~12~~14) In case the new SGSN indicated no MBMS support in step 2) the old SGSN deactivates all MBMS UE context(s) of the UE in SGSN, GGSN and BM-SC by initiating deactivation procedure(s) as described in subclause “8.7 MBMS Multicast Service Deactivation”.

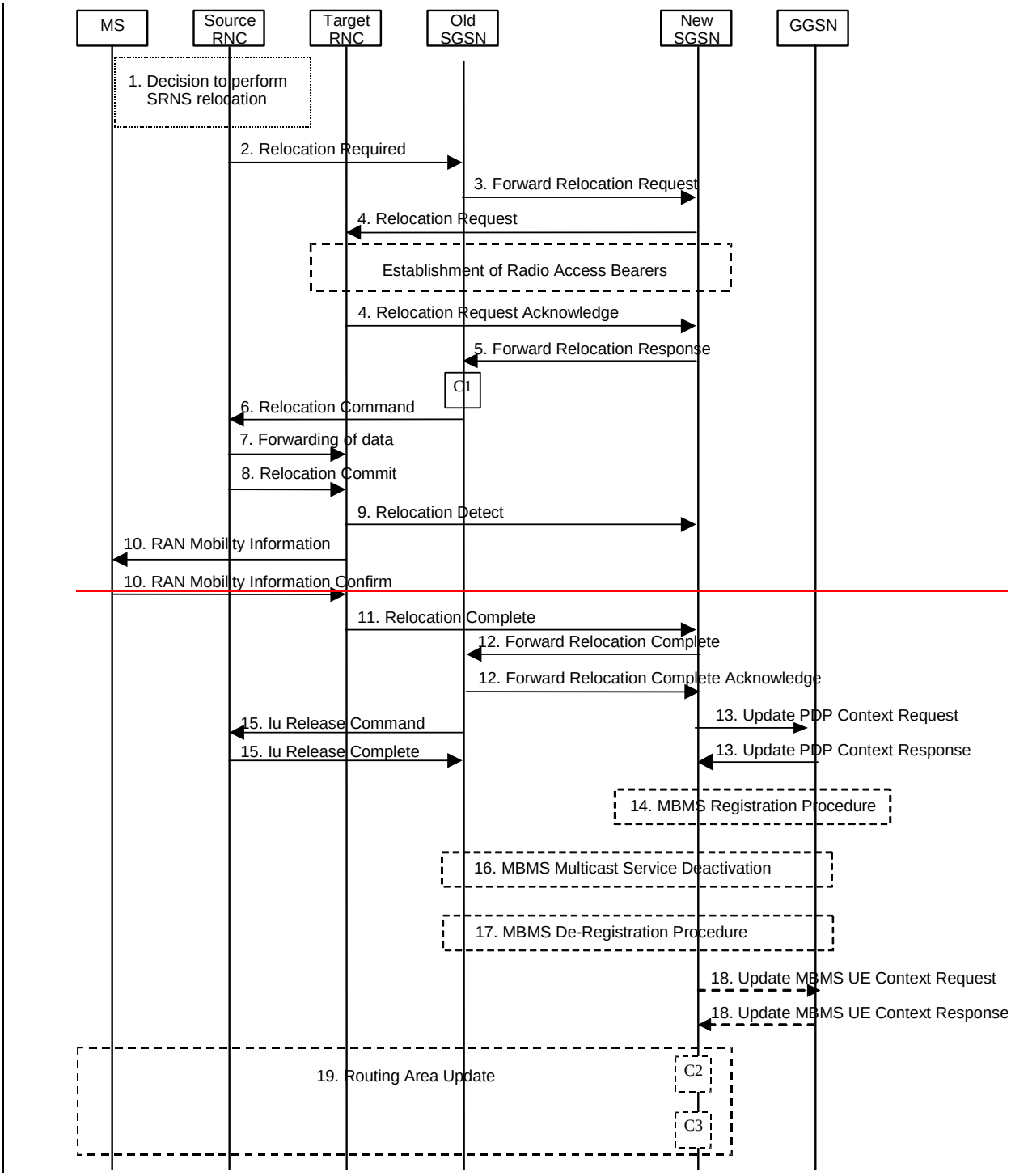
1~~3~~5) If the old SGSN does not have any more MBMS UE Contexts for the MBMS bearer service(s) and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN initiates the MBMS De-Registration Procedure. See subclause "8.6 MBMS De-Registration Procedure".

1~~4~~6) In case the new SGSN indicated MBMS support in step 2), ~~T~~the new SGSN verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context that the SGSN does not already have, the SGSN creates an MBMS Bearer Context (in "Standby" state) and initiates the MBMS Registration Procedure towards the GGSN. See subclause "8.4 MBMS Registration Procedure".

17~~5~~) An SGSN without MBMS support does not indicate MBMS feature support in the Routing Area Update Accept message. This indicates to the UE that MBMS bearers are no longer supported, which may allow the UE to use point-to-point bearers for MBMS data transfer. The Routing Area Update Accept indicates to the UE that the network supports MBMS. The UE then knows it can continue to use already activated MBMS bearers or activate new MBMS bearers.

8.11 Inter SGSN Serving RNS Relocation Procedure

This procedure is performed when the SGSN changes due to SRNS relocation. It bases on the SRNS Relocation procedure specified in 3GPP TS 23.060. The procedure is performed regardless whether MBMS sessions are ongoing or not. The handling of any PDP contexts established by the UE is not changed compared to the procedure without MBMS. The procedure described below does not show all details of the SRNS relocation procedure. Only for the MBMS specific additions the steps are described.


MS
Source RNC
Target RNC
Old SGSN
New SGSN
GGSN
1. Decision to perform SRNS relocation
2. Relocation Required
3. Forward Relocation Request
4. Relocation Request
Establishment of Radio Access Bearers
4. Relocation Request Acknowledge
5. Forward Relocation Response
C1
6. Relocation Command
7. Forwarding of data
8. Relocation Commit
9. Relocation Detect
10. RAN Mobility Information
10. RAN Mobility Information Confirm
11. Relocation Complete
12. Forward Relocation Complete
12. Forward Relocation Complete Acknowledge
13. Update PDP Context Request
15. Iu Release Command
13. Update PDP Context Response
15. Iu Release Complete
14. MBMS Registration Procedure
16. MBMS Multicast Service Deactivation
17. MBMS De-Registration Procedure
18. Update MBMS UE Context Request
18. Update MBMS UE Context Response
19. Routing Area Update
C2
C3

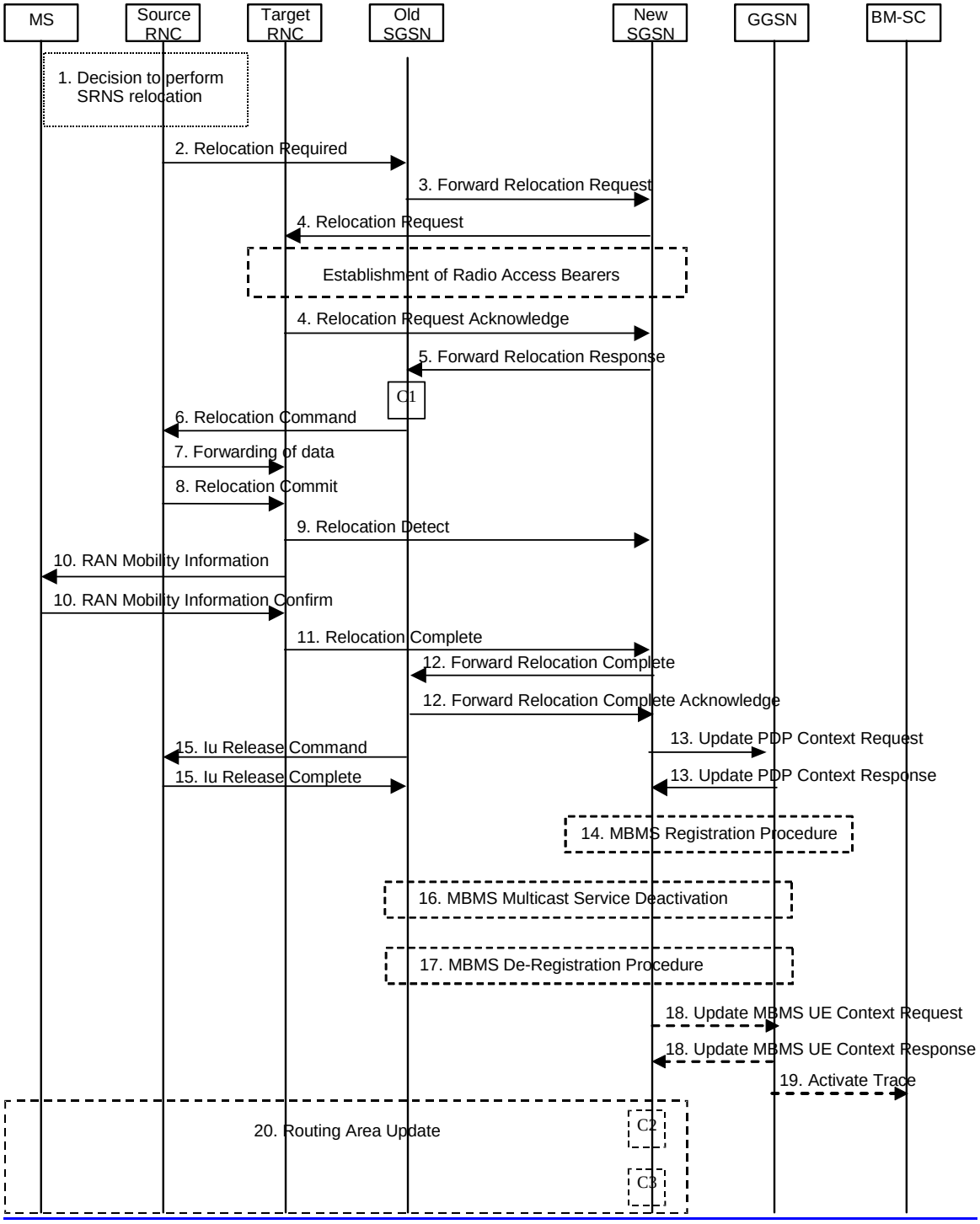


Figure 15: SRNS Relocation Procedure

3) The old SGSN transfers the MBMS UE Context(s). in the Forward Relocation Request message to the new SGSN

5) An MBMS supporting SGSN indicates its MBMS support in the Forward Relocation Response message.

14) In case the new SGSN supports MBMS it verifies for each MBMS UE Context received whether it has a corresponding MBMS Bearer Context. For each MBMS Bearer Context not yet existing in the SGSN the SGSN creates an MBMS Bearer Context (in "Standby" state) and initiates the MBMS Registration Procedure. See subclause "MBMS Registration Procedure".

16) In case the new SGSN indicated no MBMS support in step 3) the old SGSN deactivates all MBMS UE contexts of the UE in SGSN, GGSN and BMSC by initiating deactivation procedure(s) as described in clause “8.7 MBMS Multicast Service Deactivation”.

17) If the old SGSN does not have any more MBMS UE Contexts for this MBMS bearer service and the "list of downstream nodes" in the corresponding MBMS Bearer Context is empty, the SGSN initiates the MBMS De-Registration Procedure. See subclause "MBMS De-Registration Procedure".

18) If the new SGSN supports the MBMS and for the MBMS UE context(s) received in step 5) the new SGSN sends Update MBMS UE Context Request (Serving network identity, MS Time Zone, CGI/SAI, RAT Type, Additional MBMS Trace Info) to the GGSNs concerned~~In case the new SGSN supports the MBMS it sends Update MBMS UE Context Request to the GGSNs concerned~~. The GGSNs update their MBMS UE Context fields and return Update MBMS UE Context Response. The GGSN sends updated Serving network identity to the BM-SC. The inclusion of CGI/SAI shall be according rules detailed in sub-clause 15.1.1a in TS 23.060 [xy].

19) If the GGSN receives new or updated Additional MBMS Trace Info from the new SGSN, the GGSN sends an Activate Trace (Additional MBMS Trace Info) message to the BM-SC.

20) An SGSN without MBMS support does not indicate MBMS feature support in the Routing Area Update Accept message. This indicates to the UE that MBMS bearers are no longer supported, which may allow the UE to use point-to-point bearers for MBMS data transfer. The Routing Area Update Accept indicates to the UE that the network supports MBMS. The UE then knows it can continue to use already activated MBMS bearers or activate new MBMS bearers.

********** END OF CHANGES **********