

**3GPP TSG CN Plenary  
Meeting #10, Bangkok, Thailand  
6<sup>th</sup> – 8<sup>th</sup> December 2000**

**Tdoc NP-000642**

**Source:** TSG\_CN WG 4  
**Title:** CRs to R99 Work Item GTP enhancements  
**Agenda item:** 7.14  
**Document for:** APPROVAL

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**Introduction:**

This document contains 4 CRs on R99 Work Item GTP enhancements, that have been agreed by TSG\_CN WG4, and is forwarded to TSG\_CN Plenary meeting #10 for approval.

SMG#	TDoc	SPEC	CR	RE	PHAS	VERS	SUBJECT	CAT
CN10	N4-000942	29.060	150		R99	3.6.0	Correction to the PDU Notification Request message	F
CN10	N4-000946	29.060	152		R99	3.6.0	Moving of Annex A to 3G TS 23.003	F
CN10	N4-000947	23.003	024		R99	3.6.0	Moving informative Annex A from 3G TS 29.060 and making it normative.	F
CN10	N4-000941	29.060	149		R99	3.6.0	Clarification on the use of Teardown Indicator	F

## CHANGE REQUEST

**23.003 CR 024**

Current Version: 3.6.0

For submission to: **CN#10** for approval   
for information  strategic   
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   
*(at least one should be marked with an X)*

**Source:** CN4 **Date:** 18<sup>th</sup> October 2000

**Subject:** Moving informative Annex A from 3G TS 29.060 and making it normative.

**Work item:** GTP Enhancement

<b>Category:</b>	F Correction <input checked="" type="checkbox"/>	<b>Release:</b>	Phase 2 <input type="checkbox"/>
	A Corresponds to a correction in an earlier release <input type="checkbox"/>		Release 96 <input type="checkbox"/>
	B Addition of feature <input type="checkbox"/>		Release 97 <input type="checkbox"/>
	C Functional modification of feature <input type="checkbox"/>		Release 98 <input type="checkbox"/>
	D Editorial modification <input type="checkbox"/>		Release 99 <input checked="" type="checkbox"/>
			Rel 4 <input type="checkbox"/>

**Reason for change:** The Annex A in 3G TS 29.060 contains naming convention including coding information for RAI and SGSN. For clarity it would be better to have all coding related information in one place, i.e. in 3G TS 23.003.

Change from Informative to Normative is needed because the text in the annex already states "The use of logical names is optional, but if the option is used, it shall comply with the naming convention described in this annex." The naming convention should be mandatory for interoperability reasons.

The following sentence is added to the Annex for clarification:  
"If there are less than 4 significant digits in xxxx, yyyy, zzzz, wwww, one or more "0" digit(s) is/are inserted at the left side to fill the 4 digits HEX coding."

**Clauses affected:** Annex C

<b>Other specs affected:</b>	Other 3G core specifications <input type="checkbox"/>	→ List of CRs:	29.060-152
	Other GSM core specifications <input checked="" type="checkbox"/>	→ List of CRs:	
	MS test specifications <input type="checkbox"/>	→ List of CRs:	
	BSS test specifications <input type="checkbox"/>	→ List of CRs:	
	O&M specifications <input type="checkbox"/>	→ List of CRs:	

**Other comments:** This contribution was accepted by consensus.

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## Annex C (Normative): Naming convention

A naming convention that will make it possible for DNS servers to translate logical names for GSNs and RAs to physical IP addresses is described in this normative annex. The use of logical names is optional, but if the option is used, it shall comply with the naming convention described in this annex.

### C.1 Routing Area Identities

A possible way to support inter-PLMN roaming is discussed very briefly in this sub-section.

When an MS roams between two SGSNs within the same PLMN, the new SGSN finds the address to the old SGSN by the association old RA - old SGSN. Thus, each SGSN knows the address to every other SGSN in the PLMN.

When an MS roams from an SGSN to an SGSN in another PLMN, the new SGSN may not itself have access to the address to the old SGSN. Instead, the SGSN transforms the old RA information to a logical name of the form:

*RACxxx.LACyyyy.MNCzzzz.MCCwwww.GPRS;* \_\_\_\_\_ *x,y,z* and *w* shall be Hex coded digits.

If there are less than 4 significant digits in xxxx, yyyy, zzzz, wwwww, one or more "0" digit(s) is/are inserted at the left side to fill the 4 digits HEX coding.

The SGSN may then acquire the IP address of the old SGSN from a DNS server, using the logical address. Every PLMN should include one DNS server each. Note that these DNS servers are GPRS internal entities, unknown outside the GPRS system.

The above implies that at least MCC + MNC + RAC + LAC (= RAI) is sent as RA parameter over the radio when an MS roams to another RA.

If the new SGSN for any reason fails to obtain the address of the old SGSN, the same actions as when the corresponding event occurs within one PLMN are taken.

Introducing the DNS concept in GPRS gives a general possibility to use logical names instead of IP addresses when referring to e.g. GSNs, thus providing flexibility in addressing of PLMN nodes.

Another way to support seamless inter-PLMN roaming is to store the SGSN IP addresses in HLR and request them when necessary.

### C.2 GPRS Support Nodes

In this sub-section a naming convention for GSNs is described.

It shall be possible to refer to a GSN by a logical name that shall then be translated into a physical IP address. Here a GSN naming convention is proposed which would make it possible for an internal GPRS DNS server to make the translation.

An example of how a logical name of a SGSN could look like is:

\_\_\_\_\_ *SGSNxxx.MNCyyyy.MCCzzzz.GPRS;* \_\_\_\_\_ *x,y* and *z* shall be Hex coded digits.

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Annex C-D (informative):  
Change history

<b>CHANGE REQUEST</b>			Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.	
<b>29.060</b>	<b>CR</b>	<b>149</b>	Current Version: <b>3.6.0</b>	
GSM (AA.BB) or 3G (AA.BBB) specification number ↑		↑ CR number as allocated by MCC support team		
For submission to: <b>CN#10</b>	for approval	<input checked="" type="checkbox"/>	strategic	<input type="checkbox"/>
list expected approval meeting # here ↑	for information	<input type="checkbox"/>	non-strategic	<input type="checkbox"/> (for SMG use only)

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   
*(at least one should be marked with an X)*

**Source:**    CN4    **Date:**    13/11/2000

**Subject:**    Clarification on the use of Teardown Indicator

**Work item:**    GTP enhancements

<b>Category:</b>	F Correction	<input checked="" type="checkbox"/>	<b>Release:</b>	Phase 2	<input type="checkbox"/>
(only one category shall be marked with an X)	A Corresponds to a correction in an earlier release	<input type="checkbox"/>		Release 96	<input type="checkbox"/>
	B Addition of feature	<input type="checkbox"/>		Release 97	<input type="checkbox"/>
	C Functional modification of feature	<input type="checkbox"/>		Release 98	<input type="checkbox"/>
	D Editorial modification	<input type="checkbox"/>		Release 99	<input checked="" type="checkbox"/>
				Release 00	<input type="checkbox"/>

**Reason for change:**

In CN4#4 meeting, CR 29.060-105r1 on the use of Teardown Indicator was approved. This CR proposed:

*Teardown Indicator shall always be included in Delete PDP Context Request message by sending GSN when the last PDP context associated to a PDP address is torn down and there are no outstanding Create PDP context requests for other PDP context different from the one being torn down for that PDP address.*

This sentence shows the criterion for the sending GSN to include the Teardown Indicator in the Delete PDP Context Request message when the intention of the user is not clear, i.e. no Tear down indicator was included in Deactivate PDP Context Request message from the user.

However this criterion is not used when the Teardown indicator was included in Deactivate PDP Context Request message from the user, since he clearly shows his intention on whether he wants to deactivate all PDP contexts (including possible PDP Contexts being activated) associated to the PDP address or not. This should be clarified.

If this CR is not approved, the CN may not proceed with the deactivation procedure as the user expects. In addition this modification is in line with GPRS stage2 (23.060).

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

**Clauses affected:**    7.3.5

<b>Other specs affected:</b>	Other 3G core specifications	<input type="checkbox"/>	→ List of CRs:	
	Other GSM core specifications	<input type="checkbox"/>	→ List of CRs:	
	MS test specifications	<input type="checkbox"/>	→ List of CRs:	
	BSS test specifications	<input type="checkbox"/>	→ List of CRs:	
	O&M specifications	<input type="checkbox"/>	→ List of CRs:	

**Other  
comments:**



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

### 7.3.5 Delete PDP Context Request

A Delete PDP Context Request shall be sent from a SGSN node to a GGSN node as part of the GPRS Detach procedure or the GPRS PDP Context Deactivation procedure or from a GGSN node to a SGSN node as part of the PDP Context Deactivation Initiated by GGSN procedure. A request shall be used to deactivate an activated PDP Context or an activated set of PDP contexts associated to a PDP address assigned to a single MS.

A GSN shall be prepared to receive a Delete PDP Context Request at any time and shall always reply regardless if the PDP context exists or not, except in cases described below.

If any collision occurs, the Delete PDP Context Request takes precedence over any other Tunnel Management message.

The Teardown Ind is used to indicate that all PDP contexts that share the PDP address with the PDP context identified in the request should also be deactivated. This may trigger the deletion of all the information kept for a MS at a GSN, if no other PDP contexts associated to other PDP addresses are active on the GSN. This information element shall be included by the SGSN if the Deactivate PDP Context Request message from the MS includes the Tear down indicator at PDP Context Deactivation initiated by MS. Otherwise this information element shall always be included by the sending GSN when the last PDP context associated to a PDP address is torn down and there are no outstanding Create PDP context requests for other PDP context different from the one being torn down for that PDP address.

If a GSN receives a Delete PDP context without a Teardown Indicator and only that PDP context is active for a PDP address, then the GSN shall ignore the message. (Note: This is symptom of a race condition. The reliable delivery of signalling messages will eventually lead to a consistent situation, allowing the teardown of the PDP context.)The optional Private Extension contains vendor or operator specific information.

**Table 11: Information Elements in a Delete PDP Context Request**

Information element	Presence requirement	Reference
Teardown Ind	Conditional	7.7.16
NSAPI	Mandatory	7.7.17
Private Extension	Optional	7.7.44

<h2 style="margin: 0;">CHANGE REQUEST</h2>			Please see embedded help file at the bottom of this page for instructions on how to fill in this form correctly.
<b>29.060</b>	<b>CR</b>	<b>150</b>	Current Version: <b>3.6.0</b>
GSM (AA.BB) or 3G (AA.BBB) specification number ↑		↑ CR number as allocated by MCC support team	
For submission to: <b>CN#10</b> <small>list expected approval meeting # here ↑</small>	for approval <input checked="" type="checkbox"/> for information <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	strategic <input type="checkbox"/> non-strategic <input type="checkbox"/> <small>(for SMG use only)</small>

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   
(at least one should be marked with an X)

**Source:**    **CN4**    **Date:**    **13<sup>th</sup> Nov. 2000**

**Subject:**    Correction to the PDU Notification Request message

**Work item:**    GTP enhancements

<b>Category:</b>	F Correction <input checked="" type="checkbox"/> A Corresponds to a correction in an earlier release <input type="checkbox"/> B Addition of feature <input type="checkbox"/> C Functional modification of feature <input type="checkbox"/> D Editorial modification <input type="checkbox"/>	<b>Release:</b>	Phase 2 <input type="checkbox"/> Release 96 <input type="checkbox"/> Release 97 <input type="checkbox"/> Release 98 <input type="checkbox"/> Release 99 <input checked="" type="checkbox"/> Release 00 <input type="checkbox"/>
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(only one category shall be marked with an X)

**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

<b>Other specs affected:</b>	Other 3G core specifications <input type="checkbox"/> Other GSM core specifications <input type="checkbox"/> MS test specifications <input type="checkbox"/> BSS test specifications <input type="checkbox"/> O&M specifications <input type="checkbox"/>	→ List of CRs: <input type="text"/> → List of CRs: <input type="text"/> → List of CRs: <input type="text"/> → List of CRs: <input type="text"/> → List of CRs: <input type="text"/>
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**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
<u>GGSN Address for Control Plane</u>	<u>Mandatory</u>	<u>7.7.32</u>
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

## CHANGE REQUEST

**29.060 CR 152**

Current Version: **3.6.0**

For submission to: **CN#10** for approval   
 for information

strategic   
 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   
*(at least one should be marked with an X)*

**Source:** **CN4** **Date:** **18<sup>th</sup> October 2000**

**Subject:** **Moving of Annex A to 3G TS 23.003.**

**Work item:** **GTP Enhancement**

<b>Category:</b>	F Correction <input checked="" type="checkbox"/>	<b>Release:</b>	Phase 2 <input type="checkbox"/>
	A Corresponds to a correction in an earlier release <input type="checkbox"/>		Release 96 <input type="checkbox"/>
	B Addition of feature <input type="checkbox"/>		Release 97 <input type="checkbox"/>
	C Functional modification of feature <input type="checkbox"/>		Release 98 <input type="checkbox"/>
	D Editorial modification <input type="checkbox"/>		Release 99 <input checked="" type="checkbox"/>
			Rel 4 <input type="checkbox"/>

**Reason for change:** **The Annex A contains naming convention including coding information for RAI and SGSN. For clarity it would be better to have all coding related information in one place, i.e. in 3G TS 23.003.**

**Clauses affected:** **7.5, 9.3.1.1, Annex A**

<b>Other specs affected:</b>	Other 3G core specifications <input type="checkbox"/>	→ List of CRs:	<b>CR 23.003-024</b>
	Other GSM core specifications <input checked="" type="checkbox"/>	→ List of CRs:	
	MS test specifications <input type="checkbox"/>	→ List of CRs:	
	BSS test specifications <input type="checkbox"/>	→ List of CRs:	
	O&M specifications <input type="checkbox"/>	→ List of CRs:	

**Other comments:** **This was approved as consensus decision.**

## 7.5 Mobility Management Messages

The Mobility Management messages are the control plane messages, defined in 3G TS 23.060 and 3G TS 24.008, that are sent between SGSNs at the GPRS Attach and Inter SGSN Routing Update procedures. The new SGSN derives the address of the old SGSN from the old routing area identity. The address translation mechanism is implementation specific. Some possible translation mechanisms are found in Annex [AC in 3G TS 23.003](#). Generally, the purpose of the control plane is to transfer data associated with the MS from the old SGSN to the new SGSN.

### 9.3.1.1 Usage of Sequence Number

The sending GSN shall use 0 for the value of the Sequence Number of the first T-PDU in a tunnel and shall increment the Sequence Number for each following T-PDU. The value shall wrap to zero after 65535.

When a dialogue is opened between GSNs, the receiving GSN shall set the content of a counter to zero. When the receiving GSN receives a valid T-PDU, it shall increment this counter by one. This counter shall wrap to zero after 65535. It defines the 'Expected Sequence Number'.

Based on the received and Expected Sequence Number values, the receiving GSN may decide whether or not to discard the received T-PDU. Annex [BA](#) (Informative) describes a method to determine whether a received T-PDU is valid.

The receiving GSN shall reorder the incoming T-PDUs in sequence if the Reordering Required flag in the PDP context is set. In this case, if needed, the receiving GSN shall take into account a maximum number of valid received frames and a maximum elapsed time to assume that a T-PDU was lost.

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## Annex A (informative): Naming convention

A naming convention that will make it possible for DNS servers to translate logical names for GSNs and RAS to physical IP addresses is described in this informative annex. The use of logical names is optional, but if the option is used, it shall comply with the naming convention described in this annex.

### A.1—Routing Area Identities

A possible way to support inter-PLMN roaming is discussed very briefly in this sub-section.

When an MS roams between two SGSNs within the same PLMN, the new SGSN finds the address to the old SGSN by the association old-RA—old SGSN. Thus, each SGSN knows the address to every other SGSN in the PLMN.

When an MS roams from an SGSN to an SGSN in another PLMN, the new SGSN may not itself have access to the address to the old SGSN. Instead, the SGSN transforms the old-RA information to a logical name of the form:

*RACxxxx.LACyyyy.MNCzzzz.MCCwwwww.GPRS;* \_\_\_\_\_ *x,y,z and w shall be Hex coded digits.*

The SGSN may then acquire the IP address of the old SGSN from a DNS server, using the logical address. Every PLMN should include one DNS server each. Note that these DNS servers are GPRS internal entities, unknown outside the GPRS system.

The above implies that at least MCC + MNC + RAC + LAC (= RAD) is sent as RA parameter over the radio when an MS roams to another RA.

If the new SGSN for any reason fails to obtain the address of the old SGSN, the same actions as when the corresponding event occurs within one PLMN are taken.

Introducing the DNS concept in GPRS gives a general possibility to use logical names instead of IP addresses when referring to e.g. GSNs, thus providing flexibility in addressing of PLMN nodes.

Another way to support seamless inter-PLMN roaming is to store the SGSN IP addresses in HLR and request them when necessary.

### A.2—GPRS Support Nodes

In this sub-section a naming convention for GSNs is described.

It shall be possible to refer to a GSN by a logical name that shall then be translated into a physical IP address. Here a GSN naming convention is proposed which would make it possible for an internal GPRS DNS server to make the translation.

An example of how a logical name of a SGSN could look like is:

\_\_\_\_\_ *SGSNxxxx.MNCyyyy.MNCzzzz.GPRS;* \_\_\_\_\_ *x,y and z shall be Hex coded digits.*

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## Annex ~~B~~A (Informative): A method for sequence number checking

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Annex ~~G~~B (informative):  
Change history