Source:	TSG CN WG3
Title:	CRs on R99 Work Item GPRS
Agenda item:	7.12
Document for:	APPROVAL

Introduction:

This document contains 4 CRs on R99 Work Item "GPRS", that have been agreed by TSG CN WG3, and are forwarded to TSG CN Plenary meeting #12 for approval.

N3-Tdoc	Spec	CR	Rev	Cat	Subject	Phase	Version-Current
N3-010240	29.061	017		F	Clarifications on the non-transparent access mode"	R99	3.5.0
N3-010242	29.061	018		A	Clarifications on the non-transparent access mode"	Rel-4	4.0.0
N3-010239	29.061	019		F	Set the use of PPP between the MT and TE as an option when interworking with MIPv4	R99	3.5.0
N3-010241	29.061	020		A	Set the use of PPP between the MT and TE as an option when interworking with MIPv4	Rel-4	4.0.0

Tdoc N3-010239

CR-Form-v4

CHANGE REQUEST

| ⌘ | **29.061** CR **019** | ⌘ **rev** | **-** | ⌘ **Current vers** | **3.5.0** | ⌘ |

*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 **X**   Radio Access Network ☐   Core Network **X**

Title: ⌘	Set the use of PPP between the MT and TE as an option when interworking with MIPv4	
Source: ⌘	TSG_CN WG3	
Work item code: ⌘	GPRS	***Date:*** ⌘ May 14, 2001
Category: ⌘ **F**		***Release:*** ⌘ R99

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

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

Reason for change: ⌘	When interworking with MobileIPv4, the use of MobileIPv4 in the TE should not mandate the use of PPP between the MT and TE. This CR sets PPP as an optional layer two protocol between the MT and the TE, when interworking with MIPv4.
Summary of change: ⌘	Text added describing that the scenario given is an example of MIPv4 interworking.
Consequences if not approved: ⌘	Interworking with MIPv4 does not mandate the use of PPP between the MT and TE. 3G TS 29.061 shall clarify this to avoid any inconsistencies.

Clauses affected: ⌘	11.2.1.3

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

| ***Other comments:*** ⌘ | |

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

11.2.1.3   Access to Internet, Intranet or ISP with Mobile IPv4

General

A way to allow users to roam from one environment to another, between fixed and mobile, between public and private as well as between different public systems is to use Mobile IP [30]. Mobile IP (MIP) is a mobility management protocol developed by IETF. The Mobile IP Foreign Agent (FA) [30] is located in the Core Network in the GGSN. MIP also uses a Home Agent (HA) [30] which may or may not be located in a GSM/UMTS network.

Interworking model for MIP

A FA is located in the GGSN. The interface between the GGSN and the FA will probably not be standardised as the GGSN/FA is considered being one integrated node. The mapping between these two is a matter of implementation. Each FA must be configured with at least one care-of address. In addition a FA must maintain a list that combines IP addresses with TEIDs of all the visiting MSs that have registered with the FA. IP packets destined for the MS are intercepted by the HA and tunneled to the MS's care-of address, i.e. the FA. The FA de-tunnels the packets and forwards the packets to the MS. Mobile IP related signalling between the MS and the FA is done in the user plane. MIP registration messages [30] are sent with UDP.
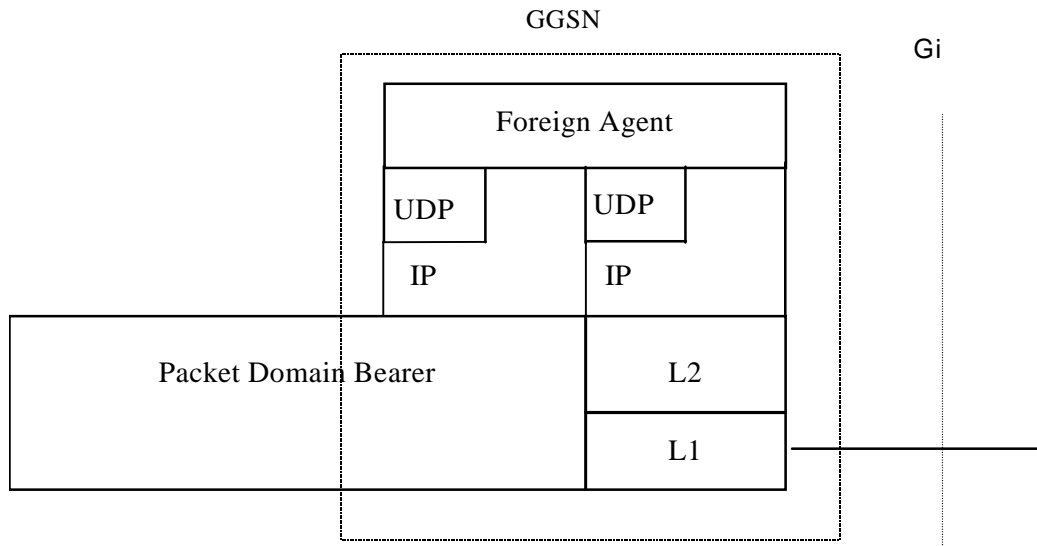

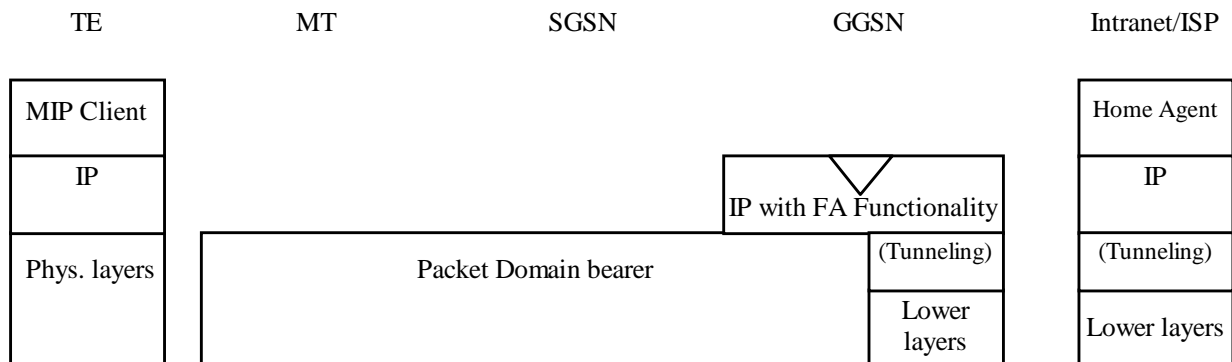**Figure 11c: The protocol stacks for the Gi IP reference point in the MIP signalling plane**

Figure 11d: Protocol stacks for user access with MIP

In figure 11d: "(Tunneling)" is intended to show asymmetric traffic flow. Tunneling (IP-in-IP) is only used in the direction from the ISP towards the MT.

Authentication of the user is supported in Mobile IPv4. This authentication mechanism may involve communication with an authentication server (e.g. RADIUS), although this is not shown in figure 11d.

Address allocation - at PDP context activation no IP address is allocated to the MS indicated by 0.0.0.0. in the "Requested PDP Address" field. If the MS does not have a static IP address which it could register with the HA, it will acquire a dynamic IP address from the HA [25]. After completion of the PDP activation the SGSN is informed of the assigned IP address by means of the GGSN initiated PDP Context Modification Procedure.

An example of a signalling scheme, shown in figure 11e, is described below. In this example the MS is separated into a TE and MT, with AT commands and PPP used in-between (see 3G TS 27.060). The PS attach procedures have been omitted for clarity.
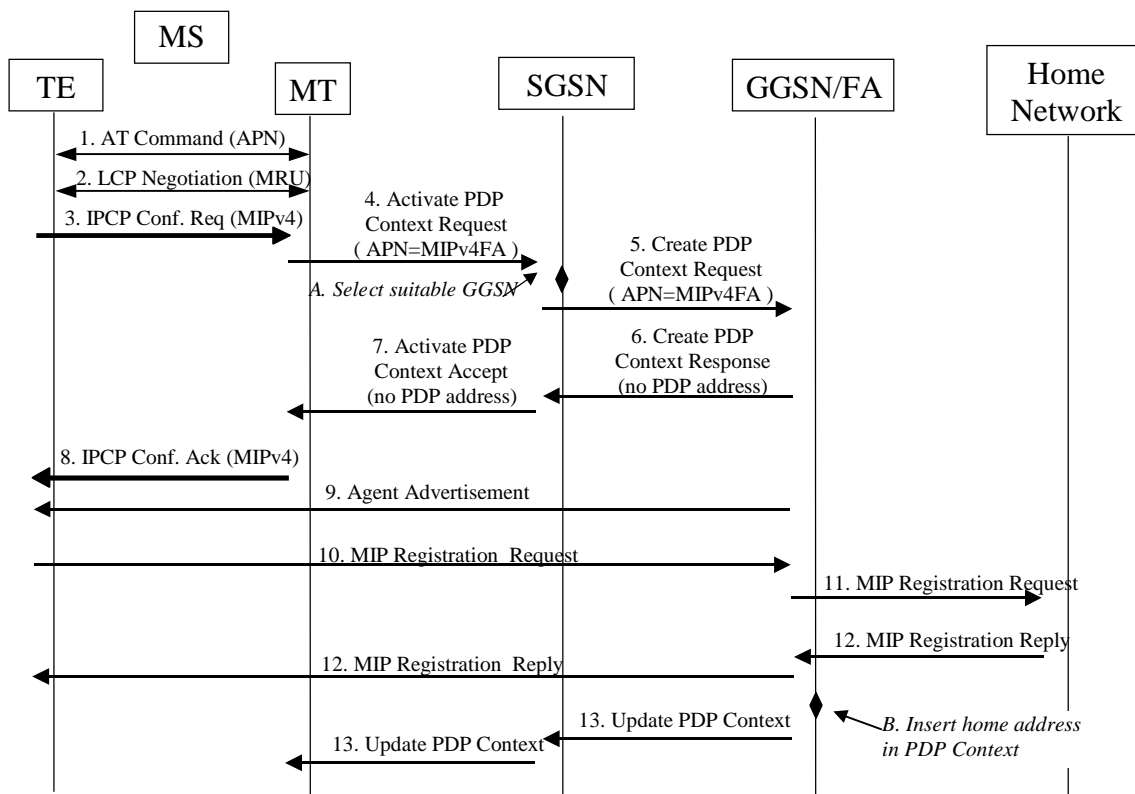
IPv4 - Registration UMTS/GPRS + MIP , FA care-of address

Figure 11e: Example of PDP Context activation with Mobile IP registration (the PS attach procedure not included)

1. The AT command carries parameters that the MT needs to request the PDP Context Activation. The important parameter here, is the APN (Access Point Name), see clause A below. The AT command is followed by a setup of the PPP connection between the MT and the TE.

2. As part of the PPP connection, LCP negotiates Maximum-Receive-Unit between the TE and the MT. No PPP authentication is required when using MIPv4.

3. As part of the PPP connection(if PPP is used as the layer 2 protocol between the MT and TE), the TE sends an IPCP Configure Request using the MIPv4 configuration option (see [37]). The TE sends either its Home Address or a null address (i.e. 0.0.0.0) if the Network Address identifier is used (see [25]).

4. The MT sends the "Activate PDP Context Request" to the SGSN. The message includes various parameters of which the "APN" (Access Point Name) and the "Requested PDP Address" are of interest here. The TE/MT may use APN to select a reference point to a certain external network or to select a service. APN is a logical name referring to the external packet data network or to a service that the subscriber wishes to connect to. The "Requested PDP Address" should be omitted for all MS's using Mobile IP. This is done irrespective of if the TE has a permanently assigned Mobile IP address from its Mobile IP home network, a previously assigned dynamic home address from its Mobile IP home network or if it wishes the Mobile IP home network to allocate a "new" dynamic home address.

A. The SGSN will base the choice of GGSN based on the APN that is given by the MS.

5. The SGSN requests the selected GGSN to set up a PDP Context for the MS. The PDP address and APN fields are the same as in the "Activate PDP Context Request" message.

6. A Create PDP Context Response is sent from the GGSN/FA to the SGSN. If the creation of PDP Context was successful, some parameters will be returned to the SGSN, if not, an error code will be returned. If the GGSN has been configured, by the operator, to use a Foreign Agent for the requested APN, the PDP address returned by the GGSN shall be set to 0.0.0.0. indicating that the PDP address shall be reset by the MS with a Home Agent after the PDP context activation procedure.

7. The Activate PDP Context Accept message is sent by the SGSN to the MT and contains similar information as the Create PDP Context Response message.

8. The MT sends an IPCP Configure Ack to the TE in order to terminate the PPP connection phase.

9. The Agent Advertisement [30] is an ICMP (Internet Control Message Protocol) Router Advertisement message with a mobility agent advertisement extension. The latter part contains parameters of the FA that the mobile node needs, among those are one or more care-of addresses that the FA offers. This message should be sent, in the Packet Domain user plane, as an IP limited broadcast message, i.e. destination address 255.255.255.255, however only on the TEID for the requesting MS to avoid broadcast over the radio interface.

10. The Mobile IP Registration Request is sent from the mobile node to the GGSN/FA across the Packet Domain backbone as user traffic. The mobile node includes its (permanent) home address as a parameter [30]. Alternatively, it can request a temporary address assigned by the home network by sending 0.0.0.0 as its home address, and include the Network Access Identifier (NAI) in a Mobile-Node-NAI Extension [25], [31].

11. The FA forwards the Mobile IP Registration Request to the home network of the mobile node, where a home agent (HA) processes it. Meanwhile, the GGSN/FA needs to store the home address of the mobile node or the NAI and the local link address of the MS, i.e. the TEID (Tunnel Endpoint ID).

12. The Registration Reply is sent from the home network to the FA, which extracts the information it needs and forwards the message to the mobile node in the Packet Domain user plane. As the FA/GGSN knows the TEID and the NAI or home address, it can pass it on to the correct MS.

B. The GGSN/FA extracts the home address from the Mobile IP Registration Reply message and updates its GGSN PDP Context.

13. The GGSN triggers a "GGSN initiated PDP Context modification procedure" in order to update the PDP address in the SGSN and in the MT.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **29.061** CR **017** | ⌘ **rev** | **-** | ⌘ **Current vers** | **3.5.0** | ⌘ |

*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:	⌘	Clarifications on the non-transparent access mode

Source:	⌘	TSG_CN WG3

Work item code:	⌘	GPRS	***Date:*** ⌘	May 14, 2001

Category:	⌘	**F**	***Release:*** ⌘	R99

Use one of the following categories:	*Use one of the following releases:*	
F *(correction)*	*2*	*(GSM Phase 2)*
A *(corresponds to a correction in an earlier release)*	*R96*	*(Release 1996)*
B *(Addition of feature),*	*R97*	*(Release 1997)*
C *(Functional modification of feature)*	*R98*	*(Release 1998)*
D *(Editorial modification)*	*R99*	*(Release 1999)*
Detailed explanations of the above categories can	*REL-4*	*(Release 4)*
be found in 3GPP TR 21.900.	*REL-5*	*(Release 5)*

Reason for change:	⌘	When interworking with IP networks using the non-transparent access mode, the GGSN performs authentication on behalf of the MS. However this access mode only relates to the primary PDP Context Activation procedure.

Summary of change:	⌘	Clarifications added in section 11.2.1

Consequences if not approved:	⌘	3G TS 23.060 that host configuration or user authentication is only applicable to the first PDP Context Activation procedure for a given PDP address, and not to the Secondary PDP Context Activation procedure. This shall be clarified in 3G TS 29.061 to avoid any inconsistencies

Clauses affected:	⌘	11.2.1

Other specs affected:	⌘	☐ Other core specifications	⌘	
		☐ Test specifications		
		☐ O&M Specifications		

Other comments:	⌘	

How to create CRs using this form:

Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

11.2.1 Access to Internet, Intranet or ISP through Packet Domain

The access to Internet, Intranet or ISP may involve specific functions such as : user authentication, user's authorization, end to end encryption between MS and Intranet/ISP, allocation of a dynamic address belonging to the PLMN/Intranet/ISP addressing space, etc.

For this purpose the Packet Domain may offer:

-   either direct transparent access to the Internet; or

-   a non transparent access to the Intranet/ISP. In this case the Packet Domain, i.e. the GGSN, takes part in the functions listed above.

The mechanisms for host configuration and user authentication described in this section and its sub-sections are only applicable to the activation of the first context activated for a specific PDP address (using the 'PDP Context Activation Procedure'). The activation of any subsequent PDP contexts for that PDP address, using the 'Secondary PDP Context Activation Procedure', as well as the use of TFTs, is described in 3G TS 23.060.

CR-Form-v4

CHANGE REQUEST

| ⌘ | **29.061** CR **020** | ⌘**rev** | **-** | ⌘**Current vers** | **4.0.0** | ⌘ |

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

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

Title: ⌘	Set the use of PPP between the MT and TE as an option when interworking with MIPv4	
Source: ⌘	TSG_CN WG3	
Work item code: ⌘	GPRS	*Date:* ⌘ May 14, 2001
Category: ⌘ **A**		*Release:* ⌘ REL-4

Use <u>one</u> 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 <u>one</u> 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: ⌘	When interworking with MobileIPv4, the use of MobileIPv4 in the TE should not mandate the use of PPP between the MT and TE. This CR sets PPP as an optional layer two protocol between the MT and the TE, when interworking with MIPv4.
Summary of change: ⌘	Text added describing that the scenario given is an example of MIPv4 interworking.
Consequences if not approved: ⌘	Interworking with MIPv4 does not mandate the use of PPP between the MT and TE. 3G TS 29.061 shall clarify this to avoid any inconsistencies.

Clauses affected: ⌘	11.2.1.3

Other specs affected: ⌘	☐ Other core specifications ⌘	
	☐ Test specifications	
	☐ O&M Specifications	

Other comments: ⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

11.2.1.3   Access to Internet, Intranet or ISP with Mobile IPv4

General

A way to allow users to roam from one environment to another, between fixed and mobile, between public and private as well as between different public systems is to use Mobile IP [30]. Mobile IP (MIP) is a mobility management protocol developed by IETF. The Mobile IP Foreign Agent (FA) [30] is located in the Core Network in the GGSN. MIP also uses a Home Agent (HA) [30] which may or may not be located in a GSM/UMTS network.

Interworking model for MIP

A FA is located in the GGSN. The interface between the GGSN and the FA will probably not be standardised as the GGSN/FA is considered being one integrated node. The mapping between these two is a matter of implementation. Each FA must be configured with at least one care-of address. In addition a FA must maintain a list that combines IP addresses with TEIDs of all the visiting MSs that have registered with the FA. IP packets destined for the MS are intercepted by the HA and tunneled to the MS's care-of address, i.e. the FA. The FA de-tunnels the packets and forwards the packets to the MS. Mobile IP related signalling between the MS and the FA is done in the user plane. MIP registration messages [30] are sent with UDP.
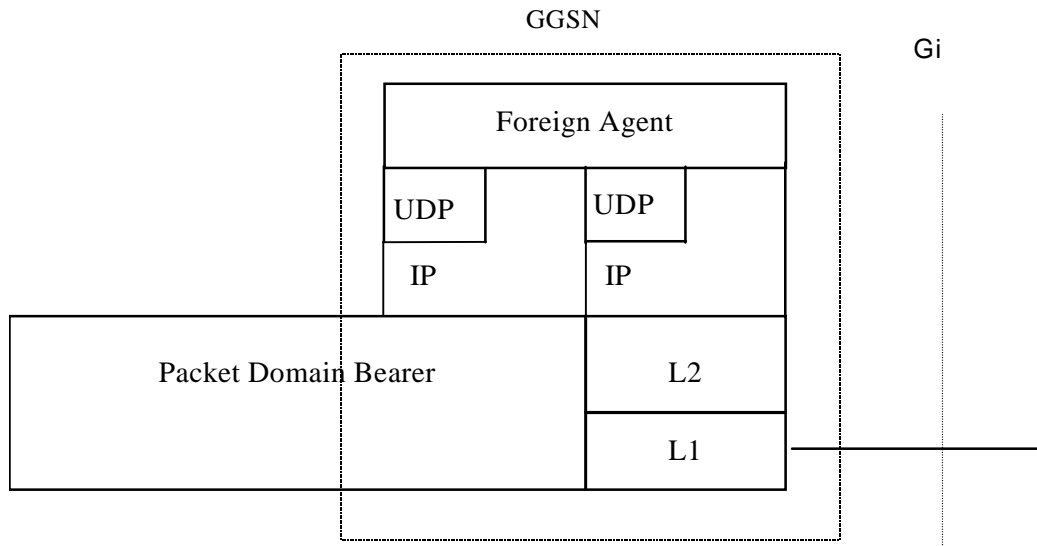
Figure 11c: The protocol stacks for the Gi IP reference point in the MIP signalling plane
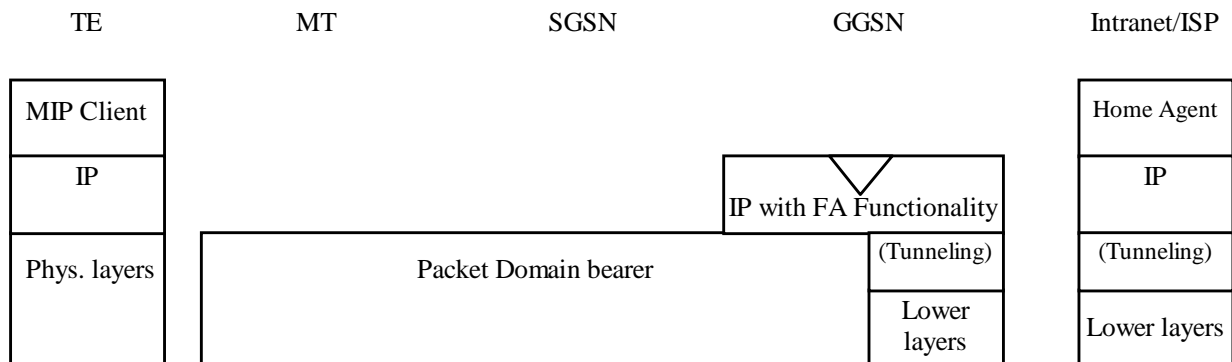
Figure 11d: Protocol stacks for user access with MIP

In figure 11d: "(Tunneling)" is intended to show asymmetric traffic flow. Tunneling (IP-in-IP) is only used in the direction from the ISP towards the MT.

Authentication of the user is supported in Mobile IPv4. This authentication mechanism may involve communication with an authentication server (e.g. RADIUS), although this is not shown in figure 11d.

Address allocation - at PDP context activation no IP address is allocated to the MS indicated by 0.0.0.0. in the "Requested PDP Address" field. If the MS does not have a static IP address which it could register with the HA, it will acquire a dynamic IP address from the HA [25]. After completion of the PDP activation the SGSN is informed of the assigned IP address by means of the GGSN initiated PDP Context Modification Procedure.

An example of a signalling scheme, shown in figure 11e, is described below. In this example the MS is separated into a TE and MT, with AT commands and PPP used in-between (see 3G TS 27.060). The PS attach procedures have been omitted for clarity.
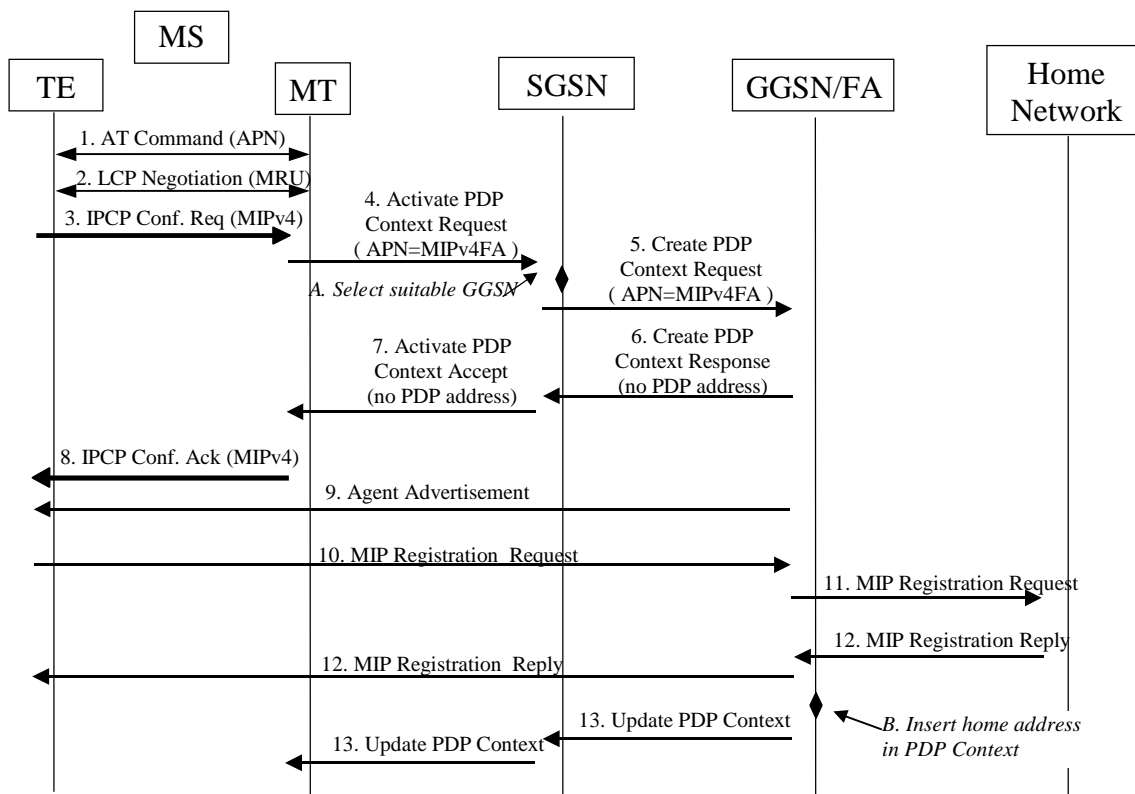
IPv4 - Registration UMTS/GPRS + MIP , FA care-of address

Figure 11e: Example of PDP Context activation with Mobile IP registration (the PS attach procedure not included)

1. The AT command carries parameters that the MT needs to request the PDP Context Activation. The important parameter here, is the APN (Access Point Name), see clause A below. The AT command is followed by a setup of the PPP connection between the MT and the TE.

2. As part of the PPP connection, LCP negotiates Maximum-Receive-Unit between the TE and the MT. No PPP authentication is required when using MIPv4.

3. As part of the PPP connection, the TE sends an IPCP Configure Request using the MIPv4 configuration option (see [37]). The TE sends either its Home Address or a null address (i.e. 0.0.0.0) if the Network Address identifier is used (see [25]).

4. The MT sends the "Activate PDP Context Request" to the SGSN. The message includes various parameters of which the "APN" (Access Point Name) and the "Requested PDP Address" are of interest here. The TE/MT may use APN to select a reference point to a certain external network or to select a service. APN is a logical name referring to the external packet data network or to a service that the subscriber wishes to connect to. The "Requested PDP Address" should be omitted for all MS's using Mobile IP. This is done irrespective of if the TE has a permanently assigned Mobile IP address from its Mobile IP home network, a previously assigned dynamic home address from its Mobile IP home network or if it wishes the Mobile IP home network to allocate a "new" dynamic home address.

A. The SGSN will base the choice of GGSN based on the APN that is given by the MS.

5. The SGSN requests the selected GGSN to set up a PDP Context for the MS. The PDP address and APN fields are the same as in the "Activate PDP Context Request" message.

6. A Create PDP Context Response is sent from the GGSN/FA to the SGSN. If the creation of PDP Context was successful, some parameters will be returned to the SGSN, if not, an error code will be returned. If the GGSN has been configured, by the operator, to use a Foreign Agent for the requested APN, the PDP address returned by the GGSN shall be set to 0.0.0.0. indicating that the PDP address shall be reset by the MS with a Home Agent after the PDP context activation procedure.

7. The Activate PDP Context Accept message is sent by the SGSN to the MT and contains similar information as the Create PDP Context Response message.

8. The MT sends an IPCP Configure Ack to the TE in order to terminate the PPP connection phase.

9. The Agent Advertisement [30] is an ICMP (Internet Control Message Protocol) Router Advertisement message with a mobility agent advertisement extension. The latter part contains parameters of the FA that the mobile node needs, among those are one or more care-of addresses that the FA offers. This message should be sent, in the Packet Domain user plane, as an IP limited broadcast message, i.e. destination address 255.255.255.255, however only on the TEID for the requesting MS to avoid broadcast over the radio interface.

10. The Mobile IP Registration Request is sent from the mobile node to the GGSN/FA across the Packet Domain backbone as user traffic. The mobile node includes its (permanent) home address as a parameter [30]. Alternatively, it can request a temporary address assigned by the home network by sending 0.0.0.0 as its home address, and include the Network Access Identifier (NAI) in a Mobile-Node-NAI Extension [25], [31].

11. The FA forwards the Mobile IP Registration Request to the home network of the mobile node, where a home agent (HA) processes it. Meanwhile, the GGSN/FA needs to store the home address of the mobile node or the NAI and the local link address of the MS, i.e. the TEID (Tunnel Endpoint ID).

12. The Registration Reply is sent from the home network to the FA, which extracts the information it needs and forwards the message to the mobile node in the Packet Domain user plane. As the FA/GGSN knows the TEID and the NAI or home address, it can pass it on to the correct MS.

B. The GGSN/FA extracts the home address from the Mobile IP Registration Reply message and updates its GGSN PDP Context.

13. The GGSN triggers a "GGSN initiated PDP Context modification procedure" in order to update the PDP address in the SGSN and in the MT.

CR-Form-v4

CHANGE REQUEST

| | ⌘ | **29.061** CR **018** | ⌘rev | **-** | ⌘Current vers | **4.0.0** | ⌘ |

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

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

Title:	⌘	Clarifications on the non-transparent access mode
Source:	⌘	TSG_CN WG3
Work item code:	⌘ GPRS	*Date:* ⌘ May 14, 2001
Category:	⌘ **A**	*Release:* ⌘ REL-4

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

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

Reason for change:	⌘	When interworking with IP networks using the non-transparent access mode, the GGSN performs authentication on behalf of the MS. However this access mode only relates to the primary PDP Context Activation procedure.
Summary of change:	⌘	Clarifications added in section 11.2.1
Consequences if not approved:	⌘	3G TS 23.060 that host configuration or user authentication is only applicable to the first PDP Context Activation procedure for a given PDP address, and not to the Secondary PDP Context Activation procedure. This shall be clarified in 3G TS 29.061 to avoid any inconsistencies

Clauses affected:	⌘	11.2.1
Other specs affected:	⌘	☐ Other core specifications ⌘ ☐ Test specifications ☐ O&M Specifications
Other comments:	⌘	

How to create CRs using this form:
Comprehensive information and tips about how to create CRs can be found at: http://www.3gpp.org/3G_Specs/CRs.htm. Below is a brief summary:

1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

2) Obtain the latest version for the release of the specification to which the change is proposed. Use the MS Word "revision marks" feature (also known as "track changes") when making the changes. All 3GPP specifications can be downloaded from the 3GPP server under ftp://www.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2000-09 contains the specifications resulting from the September 2000 TSG meetings.

3) With "track changes" disabled, paste the entire CR form (use CTRL-A to select it) into the specification just in front of the clause containing the first piece of changed text. Delete those parts of the specification which are not relevant to the change request.

11.2.1 Access to Internet, Intranet or ISP through Packet Domain

The access to Internet, Intranet or ISP may involve specific functions such as : user authentication, user's authorization, end to end encryption between MS and Intranet/ISP, allocation of a dynamic address belonging to the PLMN/Intranet/ISP addressing space, etc.

For this purpose the Packet Domain may offer:

- either direct transparent access to the Internet; or

- a non transparent access to the Intranet/ISP. In this case the Packet Domain, i.e. the GGSN, takes part in the functions listed above.

The mechanisms for host configuration and user authentication described in this section and its sub-sections are only applicable to the activation of the first context activated for a specific PDP address (using the 'PDP Context Activation Procedure'). The activation of any subsequent PDP contexts for that PDP address, using the 'Secondary PDP Context Activation Procedure', as well as the use of TFTs, is described in 3G TS 23.060.