3GPP TSG CT Meeting #28 **CP-0500047**
1st – 3rd June 2005. Quebec, CANADA.

Source: **CT3**

Title: **CRs to Rel-6 on Work Item "Rx Reference point specification for flow based charging"**

Agenda item: **9.25**

Document for: **APPROVAL**

Introduction:

This document contains 9 CRs to Rel-6 on Work Item "Rx Reference point specification for flow based charging" that have been agreed by TSG CT WG3, and are forwarded to TSG CT Plenary for approval.

WG_tdoc	Spec	CR	R	Cat	Title	Rel	C_Ver	Work Item
C3-050413	29.211	002	2	F	Rx Abbreviations	Rel-6	6.0.0	CH-FBC
C3-050317	29.211	003		F	Rx Packet Flows	Rel-6	6.0.0	CH-FBC
C3-050318	29.211	004		F	Rx Reference Model	Rel-6	6.0.0	CH-FBC
C3-050439	29.211	005	3	F	Rx Request of Charging Rule flow	Rel-6	6.0.0	CH-FBC
C3-050396	29.211	007	1	F	Sending AAA after CR provisioning	Rel-6	6.0.0	CH-FBC
C3-050414	29.211	008	2	F	Provision of Service Information at session establishment	Rel-6	6.0.0	CH-FBC
C3-050398	29.211	009	1	F	Clarifications on Binding	Rel-6	6.0.0	CH-FBC
C3-050399	29.211	010	1	F	Unnecessary AVPs in RAA	Rel-6	6.0.0	CH-FBC
C3-050416	29.211	011	3	F	Re-binding of IP Flows at Bearer Removal	Rel-6	6.0.0	CH-FBC

3GPP TSG-CT WG3 Meeting #36
Cancun, Mexico. 25th - 29th April 2005.

Tdoc ⌘C3-050317

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.211** **CR** **003** ⌘ **rev** **-** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Rx Packet Flows
Source:	⌘	Ericsson
Work item code:	⌘	CH-FBC
Date:	⌘	14/04/2005
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:	⌘	Along this specification two different terms are used: IP flow and Packet flow. There is no explicit reason to make this distinction. Packet flow is just a term used to defined the IP flow. The two concepts used without any explanation may lead to a confusion when interpreting the specification.
Summary of change:	⌘	"Packet flow " term is replaced by "IP flow" term.
Consequences if not approved:	⌘	Misalignment amongst different section without any explicit reasons.

Clauses affected:	⌘	5.1.3, 5.1.5, 5.2.1, 5.2.3, 5.2.6

Other specs affected:	⌘	Y	N		⌘
			X	Other core specifications	
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

How to create CRs using this form:
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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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

5.1.3 FBC Gate function

The AF may indicate to the CRF as part of the Media-Component-Description AVP(s) whether the IP~~acket~~ f~~F~~lows should be enabled or disabled at the bearer level. The CRF may receive a separate AA-Request message(s) from the AF to enable or disable IP~~acket~~ f~~F~~lows b~~B~~ased on the received Service Information, the CRF may decide to install or remove the corresponding Charging Rule(s).

5.1.5 Bearer Release

If the CRF receives a CC-Request from the TPF with an indication of bearer termination, the CRF shall check for each of the IP flows from AF Service Information bound to this bearer, if it needs to notify the corresponding AF. The CRF shall notify the AF if, and only if, the IP flow is no longer bound to any existing bearer. The CRF shall use the following procedures to notify the AF:

- If the CRF needs to notify the AF for all IP flows of an AF session, the CRF shall send a~~n~~ Diameter AS-Request. The AF will terminate the corresponding Diameter session at the Rx interface using a Diameter ST-Request.

- If the CRF needs to notify the AF for some, but not all, IP flows of an AF session, the CRF shall send an Diameter RA-Request. Within the RA-Request, the CRF shall set the value for the Specific-Action AVP to INDICATION_OF_TERMINATION_OF_BEARER, shall indicate the affected ~~P~~acketIP flows with the Flows AVP(s) and shall provide the appropriate Abort-Cause AVP value.

5.2.1 Provision of Service Information at session establishment

When receiving an AF session signalling message initiating a new AF session, the AF shall send the Service Information to the network by sending the AA-Request message. The AF shall include the corresponding Media-Component-Description AVP(s) into the message if the information is already available at the AF. The AF may include the Flow-Grouping AVP(s) to indicate a particular way on how the IP~~acket~~ flows described within the service description are distributed to several bearers at the bearer establishment. The AF may also include the Specific-Action AVP to request notification for certain bearer events, e.g., bearer termination or bearer establishment. To allow the CRF to match the described service IP flows in an unambiguous manner with TFT filter information, the AF should supply both source and destination IP addresses and port numbers within the Flow-Description AVP, if such information is available.

5.2.3 FBC Gate function

The AF shall indicate to the network as part of the Media-Component-Description whether the media IP~~acket~~ flow(s) should be enabled or disabled at the bearer level. Depending on the application, the AF may instruct the CRF also during the session when the IP~~acket~~ flow(s) are to be enabled or disabled to pass through the access network. The AF does this by sending the AA-Request message containing the Media-Component- Description AVP(s) that contains the flow status information for the flows to be enabled or disabled.

5.2.6 Bearer Release

Upon the reception of a Re-Auth-Request including an Abort-Cause AVP indicating that some of the IP~~acket~~ f~~F~~lows (included in the Flows AVP) of the AF session are being discontinued (typically PDP_CONTEXT_RELEASE cause), the AF will issue a Re-Auth-Answer as a response to the CRF.

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CHANGE REQUEST

⌘ **29.211** **CR** **011** ⌘ **rev** **3** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Re-binding of IP Flows at Bearer Removal
Source:	⌘	Siemens
Work item code:	⌘	CH-FBC
Date:	⌘	18/04/2005
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:	⌘	After a bearer removal, IP flows may be bound to other bearers. For GPRS, an IP flow may be bound to another PDP Context if it was previously bound to the removed PDP context due to a higher priority TFT filter and a lower priority TFT filter in another PDP context matches the IP flow. However, this is not reflected in the Call Flow in Clause 8.4.
Summary of change:	⌘	Add actions if IP flows are bound to other bearers in Bearer Removal Call Flow.
Consequences if not approved:	⌘	If IP flows are bound to other bearers at Bearer Removal, actions are not specified. Incorrect charging or disabling of these IP flows may result.

Clauses affected:	⌘	8.4

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

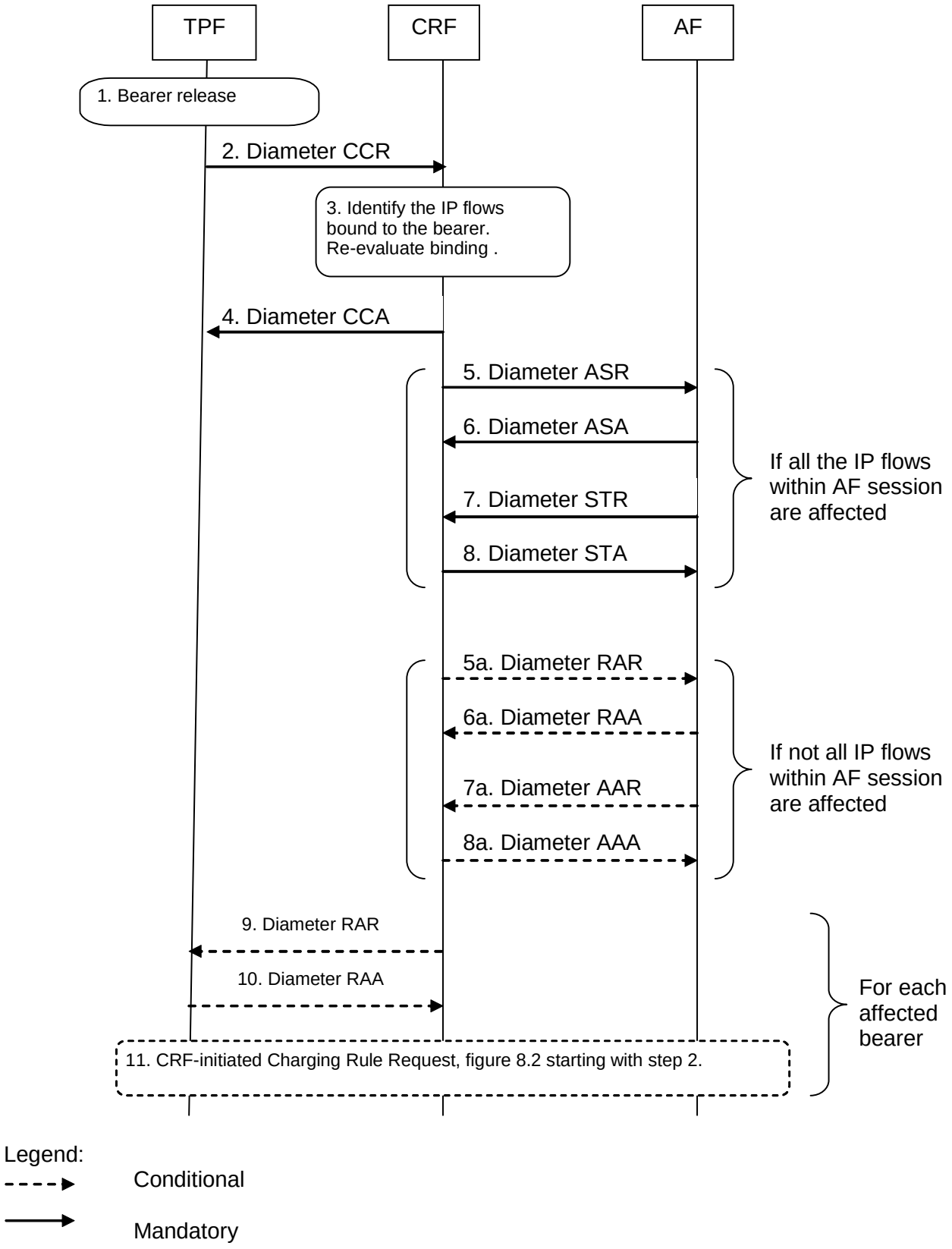
Other comments: ⌘

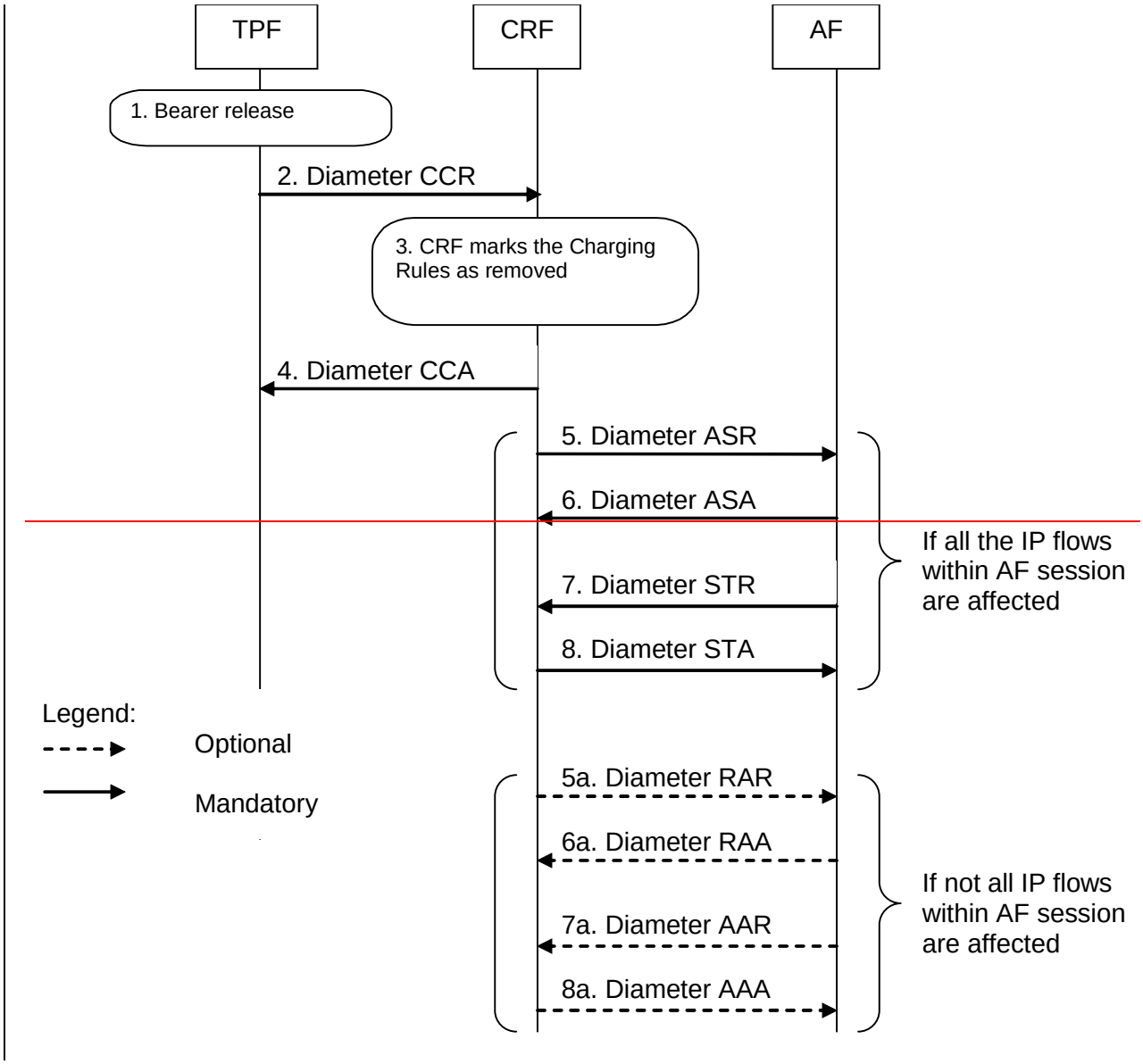
8.4 Bearer Release

This clause covers the bearer release, which may be indicated to the AF. Three cases are covered:

- bearer release that does not cause IP flow(s) within an AF session to be disabled;
- bearer release that causes at least one but not all the IP flow(s) within an AF session to be disabled and
- bearer release that causes all the IP flows within an AF session to be disabled.

Bearer release may not cause an IP flow within an AF session to be disabled if the IP flow is bound to more than one bearer. For GPRS, those bearers may be PDP context(s) within a PDP session. The CRF does not necessary know which PDP context carries the IP flow, thus a release of a PDP context does not necessarily mean that the IP flow is disabled.


TPF
CRF
AF
1. Bearer release
2. Diameter CCR
3. Identify the IP flows bound to the bearer. Re-evaluate binding .
4. Diameter CCA
5. Diameter ASR
6. Diameter ASA
7. Diameter STR
8. Diameter STA
If all the IP flows within AF session are affected
5a. Diameter RAR
6a. Diameter RAA
7a. Diameter AAR
8a. Diameter AAA
If not all IP flows within AF session are affected
9. Diameter RAR
10. Diameter RAA
11. CRF-initiated Charging Rule Request, figure 8.2 starting with step 2.
For each affected bearer
Legend:
Conditional
Mandatory


TPF
CRF
AF
1. Bearer release
2. Diameter CCR
3. CRF marks the Charging Rules as removed
4. Diameter CCA
5. Diameter ASR
6. Diameter ASA
7. Diameter STR
8. Diameter STA
If all the IP flows within AF session are affected
Legend:
Optional
Mandatory
5a. Diameter RAR
6a. Diameter RAA
7a. Diameter AAR
8a. Diameter AAA
If not all IP flows within AF session are affected

1. A bearer is deactivated. For GPRS, the SGSN deactivates the PDP context carrying IP flow(s) of by sending the Delete PDP Context Request message to the GGSN.
2. The TPF sends a Diameter CCR message to the CRF, indicating bearer termination.
3. The CRF ~~marks the Charging Rules for the terminated bearer as removed~~identifies the IP flows bound to the removed bearer and updates the stored bearer information. The CRF re-evaluates the binding of IP flows, as IP flows may now be bound to other bearers. For GPRS, an IP flow may be bound to another PDP Context if it was previously bound to the removed PDP context due to a higher priority TFT filter, and a lower priority TFT filter in another PDP context matches the IP flow.
4. The CRF acknowledges the bearer termination by sending a Diameter CCA message.

The following steps 5 to 8 or 5a to 8a apply for the case where at least one IP Flow within an AF session is being disabled, i.e. ~~. They apply only if the affected~~ if the IP Flow is not bound to any other bearer that is still established. The steps shall be performed separately for each ongoing AF session that is affected by the bearer release as explained below.

If all IP flow(s) within the AF session are ~~discontinued~~ disabled by the bearer release:

5. The CRF indicates the session abort to the AF by sending a Diameter ASR message to the AF.
6. The AF responds by sending a Diameter ASA message to the CRF.
7. The AF sends a Diameter STR message to the CRF to indicate that the session has been terminated.
8. The CRF responds by sending a Diameter STA message to the AF.

If at least one but not all of the IP flow(s) within the AF session are ~~discontinued~~ disabled by the bearer release, and the AF has requested notification of bearer removal:

5a. The CRF indicates the release of the bearer by sending a Diameter RAR to the AF.
6a. The AF responds by sending a Diameter RAA to the CRF.
7a. The AF may send an AAR to the CRF to update the session information.
8a. If step 7a occurs, the CRF responds by sending a AAA to the AF.

If IP Flow(s) were bound to other bearer(s), Charging Rules at these bearer(s) may need to be installed or modified. The following steps are performed for each of these bearers. For GPRS, an IP flow may be bound to another PDP context if it was previously bound to the removed PDP context due to a higher priority TFT filter, and a lower priority TFT filter in the other PDP context matches the IP flow.

9. The CRF sends Diameter RAR to trigger the TPF to request Charging Rules for the other bearer.
10. The TPF sends RAA to acknowledge the RAR.
11. The TPF will request Charging Rules for the bearer identified in step 9, as described in figure 8.2 starting with step 2.

Figure 8.4: Bearer Release

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CHANGE REQUEST

⌘ **29.211** **CR** **008** ⌘ **rev** **2** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Provision of Service Information at session establishment
Source:	⌘	Siemens
Work item code:	⌘	CH-FBC
Date:	⌘	18/04/2005
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:	⌘	1. In Clause 5.2.1, the AF is mandated to immediately inform the CRF of AF session establishment even if no media information is available, but it is unclear how CRF should then react. Specific Action value SERVICE_INFORMATION_REQUEST, as used on the Gq interface, is not allowed at the Rx interface. On Gq, this is used to allow the CRF to request an authorisation token only. This is not applicable at Rx. 2. Clause 5.2.2 and 5.2.4 on the AF procedures for session modification contain the same content. Clause 5.2.2 fits to the order of CRF procedures.
Summary of change:	⌘	1. AF informs CRF about AF session establishment only after service information is available. 2. Clause 5.2.4 is removed.
Consequences if not approved:	⌘	1. Unclear how CRF should react on new Rx session without session information. Unnecessary signalling load. 2. Duplicated Clause

Clauses affected:	⌘	1. 5.2.1 2. 5.2.4

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments: ⌘	

5.2.1 Provision of Service Information at session establishment

When a new AF session is being established~~receiving an AF session signalling message initiating a new AF session~~ and media information for this AF session is available at the AF, the AF shall send the corresponding Service Information to the ~~network~~ CRF by sending the AA-Request message. The AF shall include the corresponding Media-Component-Description AVP(s) into the message ~~if the information is already available at the AF~~. The AF may include the Flow-Grouping AVP(s) to indicate a particular way on how the Packet flows described within the service description are distributed to several bearers at the bearer establishment. The AF may also include the Specific-Action AVP to request notification for certain bearer events, e.g., bearer termination or bearer establishment. To allow the CRF to match the described service IP flows in an unambiguous manner with TFT filter information, the AF should supply both source and destination IP addresses and port numbers within the Flow-Description AVP, if such information is available.

5.2.2 Session modification

During the AF session modification, the AF shall send an update for the session description information to the CRF. The AF does this by sending the AA-Request message containing the Media-Component-Description AVP(s) containing the updated Service Information.

5.2.3 FBC Gate function

The AF shall indicate to the network as part of the Media-Component-Description whether the media Packet flow(s) should be enabled or disabled at the bearer level. Depending on the application, the AF may instruct the CRF also during the session when the Packet flow(s) are to be enabled or disabled to pass through the access network. The AF does this by sending the AA-Request message containing the Media-Component- Description AVP(s) that contains the flow status information for the flows to be enabled or disabled.

5.2.4 ~~Session modification~~Void

~~During the AF session modification, the AF shall send an update for the session description information to the CRF. The AF does this by sending the AA-Request message containing the Media-Component-Description AVP(s) containing the updated Service Information.~~

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Tdoc ⌘C3-050413

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CHANGE REQUEST

⌘ **29.211** **CR** **002** ⌘**rev** **2** ⌘ Current version: **6.0.0** ⌘

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

Title:	⌘	Rx Abbreviations
Source:	⌘	Ericsson
Work item code:	⌘	CH-FBC
Date:	⌘	14/04/2005
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)*
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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:	⌘	There are some abbreviations that are defined and not used. And there are even some others that are already defined in 3GPP TR 21.905 and therefore not needed.
Summary of change:	⌘	Removal of OCS, DCC and SDI abbreviations since are not used Removal of CSCF, IMS, P-CSCF, QoS since they are already defined in 3GPP TR 21.905 Add missing abbreviations.
Consequences if not approved:	⌘	There will be misaligment between the abbreviations used and not used. There would be some other whose definition is not needed.

Clauses affected:	⌘	3.2

Other specs affected: ⌘	Y	N		⌘
		X	Other core specifications	
		X	Test specifications	
		X	O&M Specifications	

Other comments:	⌘	

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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.

3.2 Abbreviations

For the purposes of the present document, the abbreviations given in 3GPP TR 21.905 [1] and the following apply:

AAA	AA-Answer
AAR	AA-Request
AF	Application Function
ASA	Abort-Session-Answer
ASR	Abort-Session-Request
AVP	Attribute-Value Pair
CCA	Credit-Control-Answer
CCR	Credit-Control-Request
CRF	Charging Rules Function
~~CSCF~~	~~Call Session Control Function~~
~~DCC~~	~~Diameter Credit Control~~
FBC	Flow Based Charging
IANA	Internet Assigned Numbers Authority
IM	IP Multimedia
~~IMS~~	~~IP Multimedia CN Subsystem~~
~~OCS~~	~~Online Charging System~~
~~P-CSCF~~	~~Proxy-CSCF~~
~~QoS~~	~~Quality of Service~~
~~SDI~~	~~Session Description Information~~
RAA	Re-Auth-Answer
RAR	Re-Auth-Request
STA	Session-Termination-Answer
STR	Session-Termination-Request
TPF	Traffic Plane Function

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CHANGE REQUEST

⌘ **29.211** **CR** **010** ⌘ **rev** **1** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Unnecessary AVPs in RAA
Source:	⌘	Siemens
Work item code:	⌘	CH-FBC
Date:	⌘	18/04/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

Use one of the following categories:
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R99	*(Release 1999)*
Rel-4	*(Release 4)*
Rel-5	*(Release 5)*
Rel-6	*(Release 6)*
Rel-7	*(Release 7)*

Reason for change:	⌘	In the RAA message described in Clause 7.3.4, Media Component Description and Flow Grouping AVPs used to encode service information are contained. Unlike the Gq interface, where service information is provided in the RAA for specific action SERVICE_INFORMATION_REQUEST, service information is not required in the RAA for the Rx interface, as the specific action "SERVICE_INFORMATION_REQUEST" is not applicable.
Summary of change:	⌘	Media Component Description and Flow Grouping AVPs are removed from RAA.
Consequences if not approved:	⌘	Unnecessary AVPs in message. No procedures how to supply or handle them are defined.

Clauses affected:	⌘	7.3.4			
Other specs affected:	⌘	**Y**	**N**		
			X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	
Other comments:	⌘				

7.3.4 Re-Auth-Answer (RAA) command

The RAA command, indicated by the Command-Code field set to 258 and the 'R' bit cleared in the Command Flags field, is sent by the AF to the CRF in response to the RAR command.

Message Format:

```
<RA-Answer> ::=  < Diameter Header: 258, PXY >
                 < Session-Id >
                 { Auth-Application-Id }
                 { Origin-Host }
                 { Origin-Realm }
                 [ Result-Code ]
                 [ Experimental-Result ]
                *[ Media-Component-Description ]
                *[ Flow-Grouping ]
                 [ Origin-State-Id ]
                 [ Error-Message ]
                 [ Error-Reporting-Host ]
                *[ Failed-AVP ]
                *[ Proxy-Info ]
                *[ AVP ]
```

3GPP TSG-CT WG3 Meeting #36 ***Tdoc ⌘ C3-050398***

Cancun, Mexico. 25th - 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.211** **CR** **009** ⌘ **rev** **1** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Clarifications on Binding
Source:	⌘	Siemens
Work item code:	⌘	CH-FBC
Date:	⌘	18/04/2005
Category:	⌘	**F**
Release:	⌘	Rel-6

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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:	⌘	In Clause 6., some formulations may be misinterpreted to imply that a Charging Rule needs to correspond only to a single IP flow as described in the AF service information. Furthermore, the binding mechanism using IMSI or MSISDN, as decribed in stage 2, is not mentioned.
Summary of change:	⌘	A NOTE is added that the mechanism of deriving Charging Rules from AF service information is not fully specified, and a Charging Rule installed at a bearer can also contains Service Data Flow Filter(s) matching IP flow(s) not bound to this bearer. IMSI or MSISDN are added as optional binding criteria. Some formulations about binding methods are made more precise.
Consequences if not approved:	⌘	Meaning of Binding and usage of Charging Rules may be misunderstood.

Clauses affected:	⌘	6

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	O&M Specifications	

Other comments:	⌘	

6 Binding the AF Session Information to the Bearers

Binding refers to the CRF process of associating IP flows described in AF Service Information with bearers. The association of IP flows with bearers shall reflect in which bearers an IP flow may be transported. An IP flow described in the AF session information can be bound to multiple bearers, as the CRF does not necessarily know which bearer is transporting this IP flow.

NOTE: IP flows described in many AF sessions may share the same bearer(s). Separate IP flows of a single AF session may be transported over different bearers.

If an IP flow described in the AF Service Information is bound to a bearer, the CRF shall install a Charging Rule for this bearer with a Service Data Flow Filter matching this IP flow.

NOTE: The CRF process of deriving Charging Rules from AF service information and Gx information about bearer(s) depends on operator preferences and is not fully specified, but the binding of IP flows to bearers can be taken into consideration. This does not preclude that a Charging Rule installed at a bearer also contains Service Data Flow Filter(s) matching IP flow(s) not bound to this bearer, e.g. if a single Charging Rule is used for multiple IP flows of the same service bound to different bearers.

Upon the release of a bearer or other bearer events, the CRF notifies AF(s) about IP flows bound to this bearer, as described in Clauses 5.1.5 and 5.1.6.

The following ~~mechanisms shall be used~~methods for binding are available:

- For all bearer types, the UE IP Address shall be used for binding purposes. For IPv6, if the CRF is only notified about the address prefix at the Gx interface, it shall compare this prefix with the prefix of the UE IP address provided at the Rx interface.

- For all bearer types, other UE identity information (e.g. IMSI or MSISDN) may be used for binding purposes if the AF provided such information.

- In particular, for GPRS, it is also recommended to use TFT filters (from TPF via Gx) and Flow-Description AVPs ~~IP Flow Filters~~ provided within the service information (from AF via Rx) to select the Changing Rules matching to a PDP context. The flow grouping AVP(s) of the Service Information may be used for further analysis.

  Also for GPRS, the QoS information (negotiated QoS ~~negotiated~~ from the TPF and ~~Requested Bandwith~~QoS information derived from the service information ~~from~~ provided by the AF) may be used for further analysis.

  The GPRS binding mechanism does not necessarily identify a single PDP context for an IP flow described in AF Service Information, therefore the same Charging Rule ~~for an AF Session IP Flow~~ may be installed over several PDP contexts, even if it corresponds only to a single AF session IP flow.

3GPP TSG-CT WG3 Meeting #36 ***Tdoc ⌘ C3-050396***

Cancun, Mexico. 25th - 29th April 2005.

CR-Form-v7.1

CHANGE REQUEST

⌘ **29.211** **CR** **007** ⌘ **rev** **1** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Sending AAA after Charging Rule provisioning
Source:	⌘	Siemens
Work item code:	⌘	CH-FBC
Date:	⌘	18/04/2005
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:	⌘	According to Clause 8.1, the CRF sends Rx Diameter AAA message after installation of charging rules. According to Clauses 5.1.1., CRF sends AAA immediately. In Clause 5.1.2., the moment when the AAA is sent is left open. Sending the AAA after charging rule installation is preferable, as it enables AF to avoid race conditions, e.g. AF start sending media (and possibly charging for them), but media are still blocked at GGSN due to missing charging rules.
Summary of change:	⌘	Clauses 5.1.1. and 5.1.2 are alligned with Clause 8.1: the CRF sends Rx Diameter AAA message after installation of charging rules.
Consequences if not approved:	⌘	Contradiction between Clauses 5.1.1. and 5.1.2 and Clause 8.1

Clauses affected:	⌘	5.1.1, 5.1.2

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	O&M Specifications

⌘

Other comments: ⌘

5.1 CRF

5.1.1 Initial Provision of Session Information

When receiving an initial AA-Request from the AF, the CRF shall check if it contains the Media-Component-Description Attribute-Value Pair(s) (AVP(s)) and if so, the CRF shall store the received Service Information.

If the Specific Action AVP is present in the AAR command the CRF shall store ~~take into account~~ the requested notification for the related bearers.

~~After storing the received Service Information, the CRF shall send back an AA-Answer to the AF.~~ The CRF shall check whether the received Service Information requires Charging Rules to be provisioned towards existing bearer(s). The CRF identifies suitable bearers using the binding mechanisms described in clause 6.

If the CRF identifies that Charging Rules need to be provisioned, the CRF shall immediately send a Diameter RA-Request to the TPF for each of the affected bearer(s) to trigger the TPF to request Charging Rules using a Diameter CC-Request. The CRF shall provide the Charging Rules to the TPF within the CC-Answer.

The CRF shall then send an AA Answer back to the AF. If the CRF needs to terminate the Rx session before it has sent the AA Answer, the CRF shall send the AA Answer immediately and before the AS Request.

5.1.2 Modification of Session Information

If the AA-Request from the CRF is received for a Diameter session already active (due to an AF session modification), the CRF shall update the Service Information with the new information received. Due to the updated Service Information, the CRF may send a Diameter RA-Request to the TPF for each of the affected bearer(s) to trigger the CRF to request Charging Rules using a Diameter CC-Request. The CRF shall use the CC-Answer to install new Charging Rules and/or, to modify or remove the currently installed Charging Rules as required due to the updated Service Information. The CRF shall then send an AA Answer back to the AF. If the CRF needs to terminate the Rx session before it has sent the AA Answer, the CRF shall send the AA Answer immediately and before the AS Request.

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Tdoc ⌘C3-050318

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CHANGE REQUEST

⌘ **29.211** **CR** **004** ⌘**rev** **-** ⌘ Current version: **6.0.0** ⌘

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

Title:	⌘	Rx Reference Model update
Source:	⌘	Ericsson
Work item code:	⌘	CH-FBC
Date:	⌘	14/04/2005
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:	⌘	There is a misalignment between the CRF and TPF boxes of the two drawings included in this spec. This complicates the understanding. There is a "*" next to the name of "Online Charging System" that do not apply for this specification. 3GPP TS 23.125 has been lately updated using the name "Offline Charging System" while this spec shows more detailed description that may be misleading
Summary of change:	⌘	Alignment of the boxes names Removal of the "*" next to "Online Charging System" in the figure Alignment with latest changes in 3GPP TS 23.125
Consequences if not approved:	⌘	Misalignment amongst the boxes in the drawings and with stage 2 specification.

Clauses affected:	⌘	4.2

		Y	N		
Other specs affected:	⌘		X	Other core specifications	⌘
			X	Test specifications	
			X	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/specs/CR.htm.
Below is a brief summary:

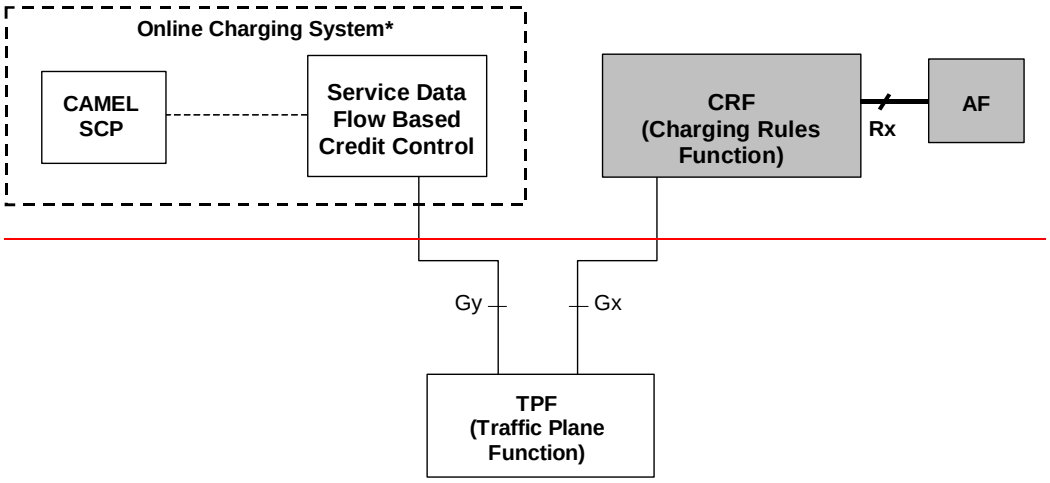
1) Fill out the above form. The symbols above marked ⌘ contain pop-up help information about the field that they are closest to.

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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

4.2 Rx reference model

The Rx interface is defined between the CRF and the AF. The CRF is in the same PLMN as the TPF. The relationships between the different functional entities involved are depicted in figure 4.1a and 4.1b..



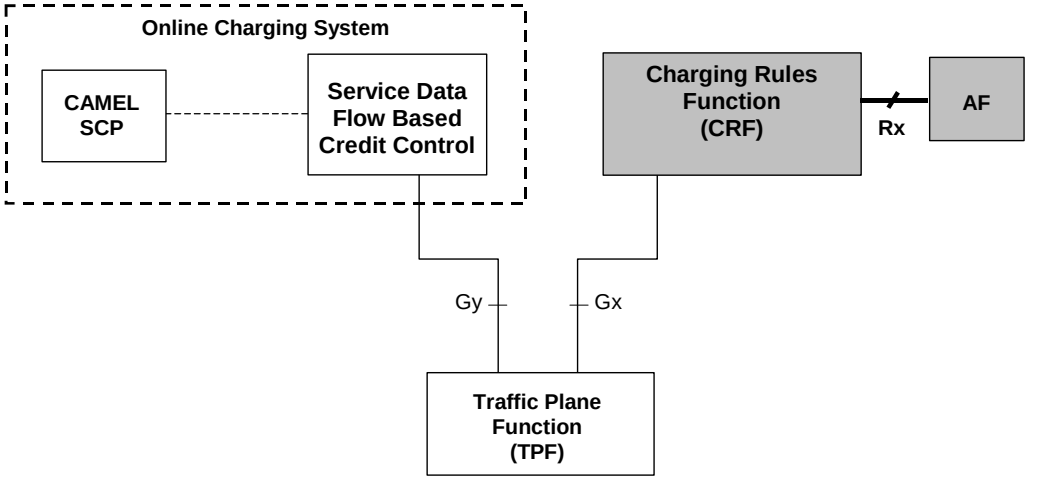


Figure 4.1a: Rx interface architecture model for service data flow based online bearer charging

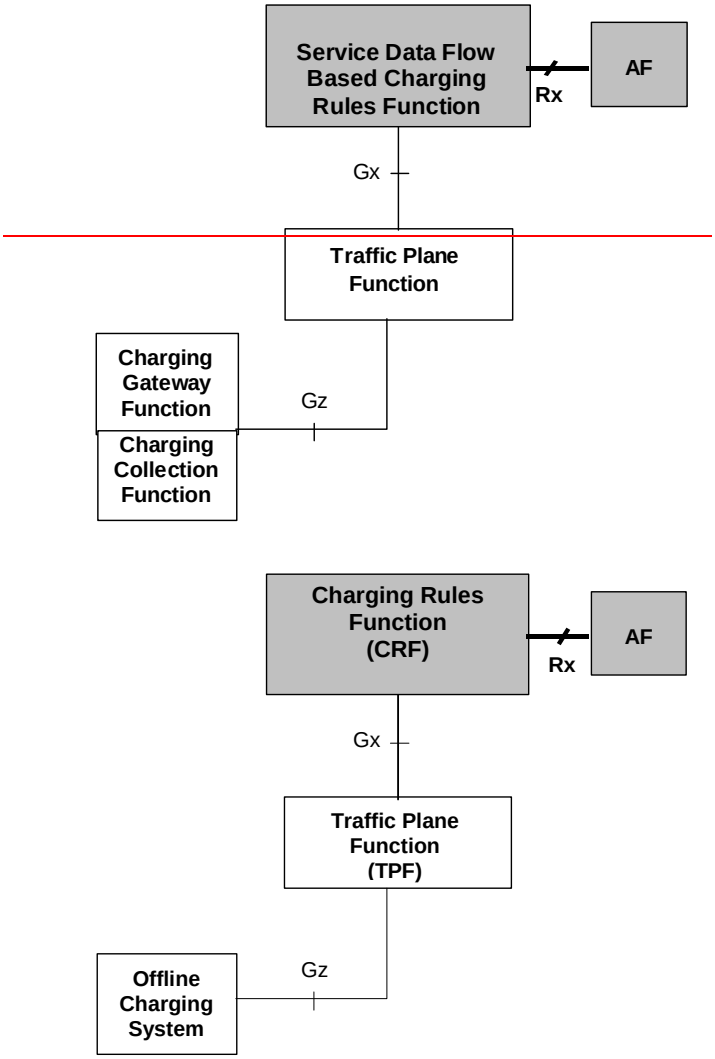


Figure 4.1b: Rx interface architecture model for service data flow based offline bearer charging

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CHANGE REQUEST

⌘ **29.211** **CR** **005** ⌘**rev** **3** ⌘ Current version: **6.0.0** ⌘

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

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

Title:	⌘	Rx Request of Charging Rule Flow
Source:	⌘	Ericsson
Work item code:	⌘	CH-FBC
Date:	⌘	28/04/2005
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)*
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Use one of the following releases:

Ph2	*(GSM Phase 2)*
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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:	⌘	The “Request of Charging Rule” signaling flow includes several cases. The explanation of those cases is scarce and can lead to misunderstandings.
Summary of change:	⌘	A more detailed introduction is proposed.
Consequences if not approved:	⌘	The procedure description will be incomplete.

Clauses affected:	⌘	8.2

Other specs affected: ⌘	Y	N	
		X	Other core specifications
		X	Test specifications
		X	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/specs/CR.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://ftp.3gpp.org/specs/ For the latest version, look for the directory name with the latest date e.g. 2001-03 contains the specifications resulting from the March 2001 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.

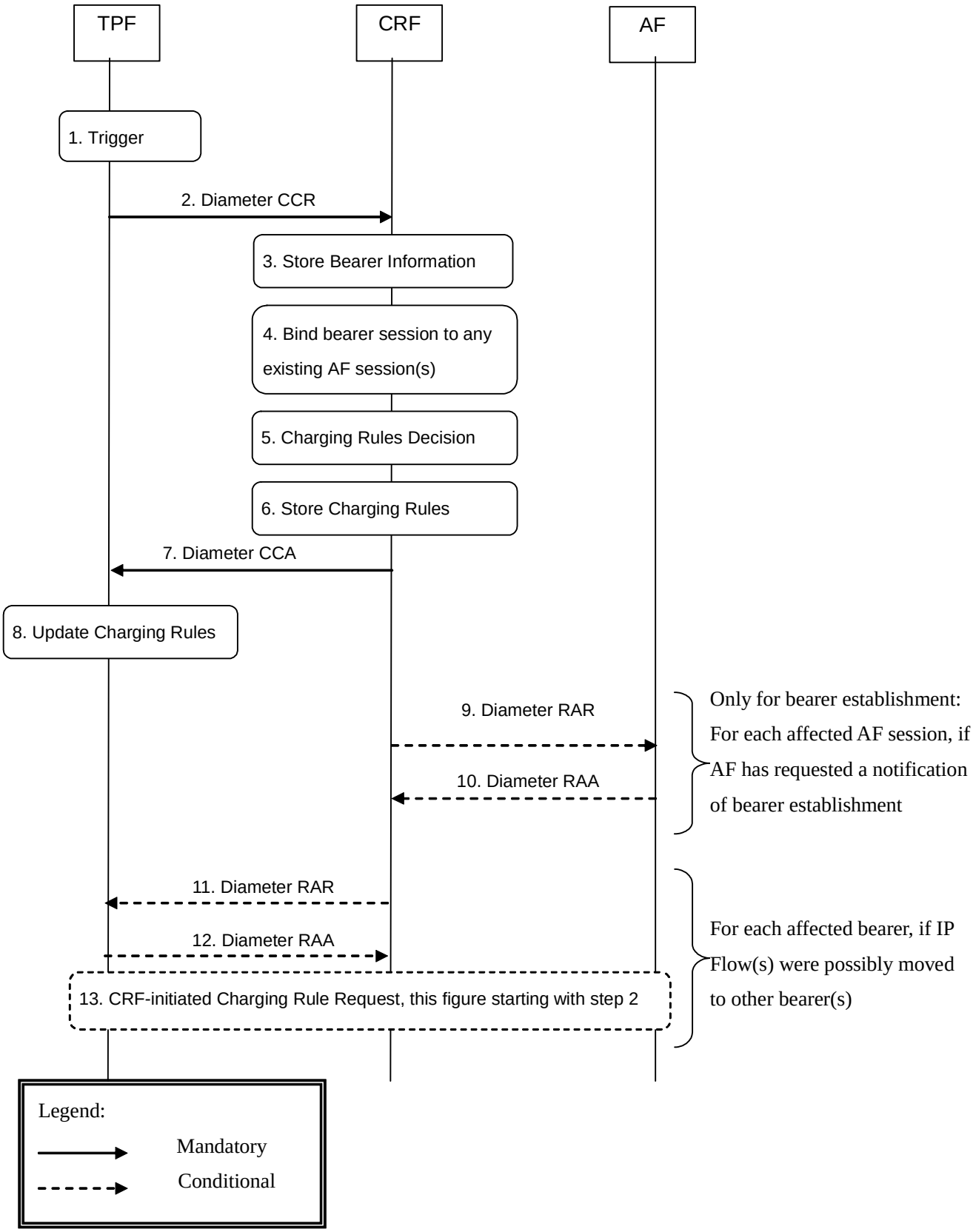
8.2 Request of Charging Rule

This clause covers two cases:

~~the CRF-initiated and bearer-event-initiated Request of Charging Rules by the TPF.~~

- A bearer-event-initiated Request of Charging Rules occurs when a new bearer is established or when an existing bearer is modified. For GPRS, these are PDP Context Activation(s) or Modification(s). A bearer modification triggers a Charging Rule request only if the CRF has previously requested a Charging Rule Request for the given bearer modification event.

- A CRF-initiated Request of Charging Rules is triggered by a~~n~~ Diameter RAR sent from the CRF to solicit a Request of Charging Rules from the TPF. The RAR request may occur in several scenarios, as depicted in Figures 8.1 – 8.4. A CRF-initiated Request of Charging Rules may also happen as a consequence of a bearer-event-initiated Request of Charging Rules, as shown in figure 8.2.



1. The TPF receives a trigger for a Charging Rule Request, such as the establishment or modification of a bearer or an RAR from the CRF.
2. The Charging Rules are requested by the TPF, using the Diameter CCR. The TPF also provides information about the bearer within the request.

3. The CRF stores the received bearer information in the Diameter CCR, e.g. TFT filters and UE IP address (prefix).
4. The CRF binds the bearer to all matching IP flow(s) of existing of AF session(s) using the bearer information received from the TPF and the Service Information received from the AF(s).
5. The CRF defines new Charging Rule(s) to be installed for the identified bearer. For a modified bearer, the CRF can also identify existing Charging Rules that need to be modified or removed. The Charging Rules may relate to any of the matching AF sessions identified in step 4 or that may exist in the CRF without matching to any AF session.
6. The CRF stores the selected Charging Rules for the bearer.
7. The Charging Rules are provisioned by the CRF to the TPF using Diameter CCA. The CRF may also provide event triggers listing bearer events for which the CRF desires Charging Rule Requests.
8. The TPF installs the received Charging Rules. For a modified bearer the TPF may also have to modify or remove previously installed Charging Rules.

If the trigger in step 1 was a bearer establishment, steps 9 and 10 are executed separately for each affected AF session for which the AF has requested notification of bearer establishment.

9. The CRF sends a Diameter RAR to the AF to inform it about the bearer establishment.
10. The CRF sends RAA to acknowledge the RAR.

If IP f~~F~~low(s) were possibly moved to other bearer(s), other bearer(s) may need to be modified. The following steps are performed for each of these bearers. For GPRS, an IP flow may be possibly moved if a higher priority TFT filter in the modified PDP context was removed and a lower priority TFT filter in another PDP context matches the IP flow.

11. The CRF sends Diameter RAR to trigger the TPF to request Charging Rules for the other bearer.
12. The TPF sends RAA to acknowledge the RAR.
13. The TPF will request Charging Rules for the bearer identified in step 11, as described in the present figure starting with step 2.

Figure 8.2: Charging Rule Request.