3GPP TSG-SA WG2#12
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Agenda Item: 7

Source: Motorola

Title: On enabling a "Content Aware" UTRAN

Document for: Approval

Overview

It is important to enable the UTRAN and core network in the Release 2000 Reference Architecture to support the varied characteristics of multimedia call streams in the packet Domain. "Content Aware" UTRAN enables the provisioning of functions required for improving spectrum efficiency over the air interface.

Further, it is expected that the R 00 core network being standardized will provide access to a variety of radio access technologies such as EDGE. Note that it was recently agreed that the “Iu-ps” interface will be used to provide connectivity between the PS domain and the GERAN (GPRS EDGE RAN). Further, it was agreed that (see document G00-021.doc from the 3GPP TSG S2/SMG12/SMG2 joint workshop on EDGE):

- A GERAN connected to the CN via the Iu-ps interface shall on legacy transceivers as a minimum be ableto support conversational class for the following speech codecs: FR, HR, EFR, AMR (provided that the legacy transceiver supports the corresponding circuit switched channels).

This requirement can be met only if a content aware GERAN is made possible.

This contribution proposes a logical interface between the CSCF and the SGSN to provide the required signaling to enable a "content aware" radio access network (UTRAN, GERAN).

Discussion of Proposal

In order to achieve the desired spectrum efficiency (at least spectrum efficiency that is no worse than what is possible for existing CS voice applications), it is important to use “content awareness” of the application in the UTRAN to manage the resources most efficiently for both the application and the network.

For example, when a Mobile Station (either TE in the relay model or the MT in the network model of signaling) sends a SIP "invite" message or an H.323 "fast setup" message, only the MS and the CSCF know of the application’s needs, such as codec type,

bandwidth, suppression, etc. This occurs because the resources are requested at an application level and can be unique for each "call" or bearer stream within a user's session. The architecture allows for multiple streams for multimedia applications. The architecture also needs to support signaling that enables "content aware" UTRAN.

There are two distinct mechanisms to make the UTRAN "content aware":

1. The MS could inform the UTRAN
2. The SGSN inform the UTRAN

In the first case, the MS informs the UTRAN of the media type being transported on the individual radio bearers. In the second case, the CSCF relays the media type information to the SGSN, which then requests the RAN to provide appropriate radio access bearers.

Note that in case 1, if the UTRAN were to receive information about the media types being supported on any given radio access bearer, this information would have to be communicated to the CSCF for handling and authorization before the UTRAN would take any action because the CSCF is a more trusted element than the MS. A logical path to the CSCF is needed from the SGSN in order to minimize delay in getting the correct parameters for allocation of bearer resources and communication back to the UTRAN for air interface resource allocation.

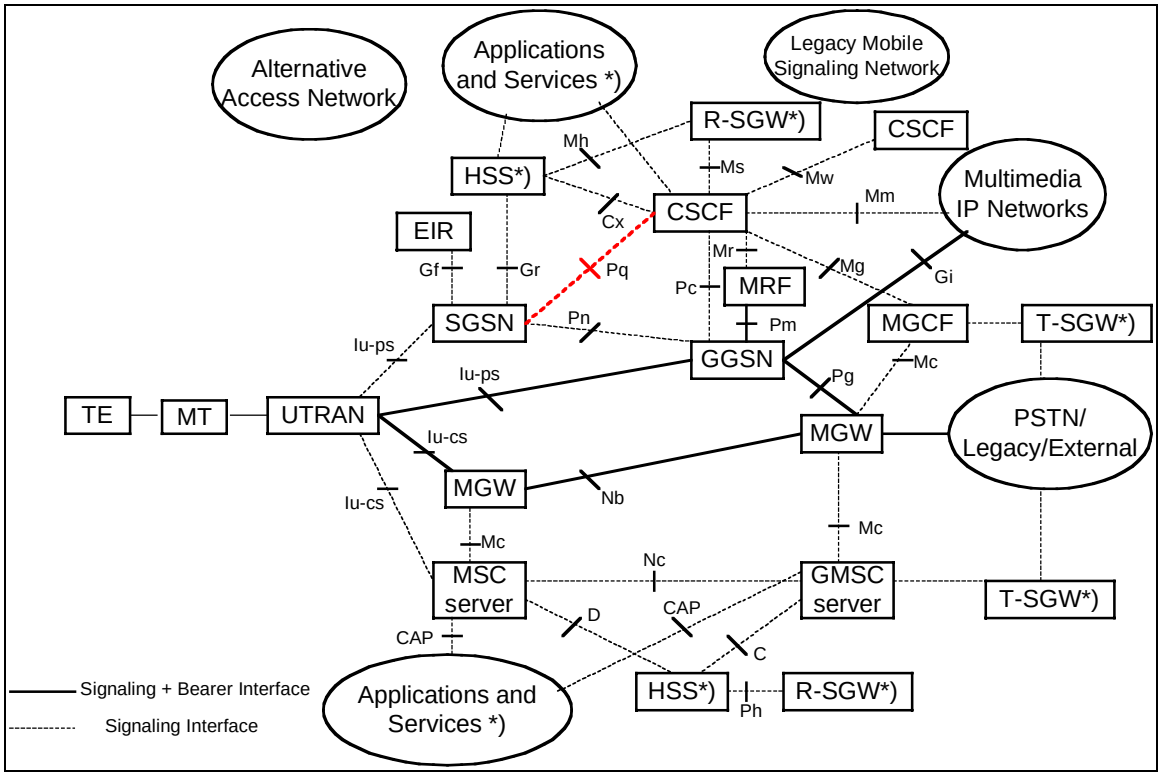
In the second case, by relying on the CSCF to provide this information to the SGSN the network can be assured the resources requested are authorized for use within the scope of the user’s profile. The SGSN can determine the core network resources needed to provide the QoS for the application. In the case of multi-media applications for the same user, the SGSN and UTRAN can provide the best mix of resources to meet the user’s needs.

The addition of a new reference point to the reference model is needed to enable this content aware SGSN and UTRAN. This reference point is between the SGSN and the CSCF. Already existing in the reference model is the Mc reference point between the MSC server and the MGW. The proposed new reference point between the SGSN and the CSCF is comparable. This new reference point would allow for the management of resources based on the media type being transported on any given bearer.

Proposed Text Changes

Changes to the Reference Architecture Figure

The proposed change to the Reference Architecture Figure include addition of the Pq interface signals between the SGSN and CSCF enable the content aware information to be sent to the SGSN and relayed on the UTRAN. Note that the interface is logical only and it may physically be transported through the GGSN. Note that the specification of this interface will require standardization of only appropriate signaling messages between the CSCF and the SGSN



Additions to the Functional Element descriptions in Section 5.3

5.3.1 Call State Control Function

Additional functionality:

- Communicate the media types being supported to the SGSN for enabling of content aware resource allocation. (A media type refers, for example, to AMR voice or GSM Full Rate, or GSM Enhanced Full Rate. Note that this is no more than the addition of an additional information element in the list of QoS attributes of the bearer being requested by the CSCF.)

5.3.12 SGSN (addition to capabilities)

- The CSCF communicates with the SGSN (using the Pq interface) to indicate tot he SGSN the media types being supported on a given bearer in order to maximize spectrum efficiency in the UTRAN. (A media type refers, for example, to AMR voice or GSM Full Rate, or GSM Enhanced Full Rate.)

5.3.13 UTRAN (addition to capabilities)

- The UTRAN communicates with the SGSN to enable the exchange of media type.

Additions to Reference Point Descriptions

5.4.15 Pq Reference Point

This is the reference point between the SGSN and the CSCF. This reference point is realized by an interface to signal content aware information between the CSCF and the SGSN. Note that the interface is logical only and it may physically be transported through the GGSN. Note that the specification of this interface will require standardization of only appropriate signaling messages between the CSCF and the SGSN.

Conclusion and Proposal

We propose that the following is agreed as a working assumption:

- A content aware RAN shall be enabled by the R 00 Reference architecture.
- A logical interface between the SGSN and the CSCF is introduced.
- The proposed text from this contribution be added into Chapter 5.3 and 5.4 of TR 23.821.