3GPP TSG-SA WG2#12
6 March – 9 March 2000
Tokyo, Japan

S2-372

Agenda Item: 7

Source: Motorola

Title: Separation of Control and Bearer Signalling in the Packet Domain in the Reference Architecture in TR 23.821

Document for: Approval

Overview of Contribution

This contribution proposes a clear separation between control and bearer signaling be stated in the Reference Architecture. As is already described in the Circuit Domain with the Mc interface, there needs to be a separation of reference points to support the control signaling and bearer signaling independently. This contribution proposes the identification of the Iu-ps reference point into control signaling between the UTRAN and the SGSN and bearer signaling between the UTRAN and the GGSN. This focuses the SGSN functionality on mobility management and core network resource control, while routing the bearer traffic directly to the GGSN where it can be acted upon as IP routed traffic. This parallels the Circuit Domain architecture of MSC server and MGW.

Discussion of Proposal

This contribution addresses a shortcoming in the current model with respect to support of separate bearer and signaling paths for the packet domain. This separation is important in promoting the independent growth of signaling and bearer information in terms of quantity and type. Such separation is already acknowledged with the Circuit Domain by the separation of the Iu-cs reference point to be connected with the MSC server and the MGW.

Separation of signaling control and bearer data paths allows improved control of applications in multimedia networks. In this model the SGSN provides the mobility management and the resource control for the packet bearer paths. Signaling from the UTRAN to the SGSN allows the assignment of bearer resources to the GGSN. Since the SGSN is responsible for resource allocation in 2G systems, it is consistent to continue to use this network element for this purpose in 3G systems. The major change from the 2G systems is the bearer path does not logically transit through the SGSN. The mobility management of the bearer is still managed by the SGSN. The tunneling and security of the bearer channel is also retained, only, in this proposal, the logical connection is between the UTRAN and the GGSN. The signaling between the SGSN and GGSN for

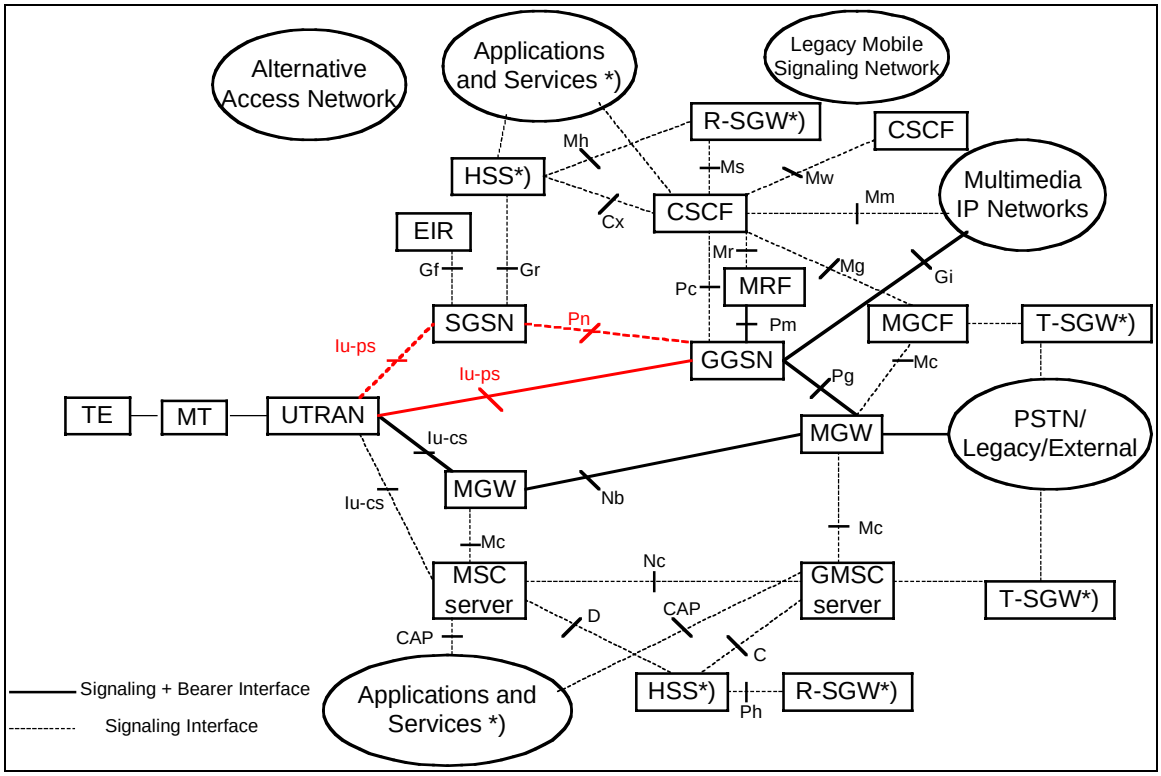
resource control are moved from the Gn reference point, to the Pn reference point where only control signaling is done. This enables the bearer signaling to be independent of the control signaling and as the volume of bearer traffic grows the control path and bearer path can evolve independently. This does not preclude the Iu-ps refernce point and the Pn reference point from sharing the same physical transport, but allows the independent evolution of the control protocols and the bearer protocols

Proposed Text Changes

Changes to the Reference Architecture Figure

The proposed change to the Reference Architecture Figure include:

- Changing the SGSN to a control signaling network element only.
- Iu-ps reference point (control signaling messages) is between the SGSN and the UTRAN
- Iu-ps reference point (bearer data packets) is between the GGSN and the UTRAN in conjunction with the tunneling aspects of the Gn interface for security and mobility aspects.
- Pn reference point signals between the SGSN and GGSN manage the resource allocations for the bearer data packets.



Additions to the Functional element descriptions in Section 5.3

5.3.12 SGSN (changes to capabilities)

- The SGSN is responsible for control signaling of the packet resources between the UTRAN and the GGSN.
- The SGSN communicates with the UTRAN (using the Iu-ps reference point) and GGSN (using the Pn reference point) for the establishment of bearer paths.
- The SGSN is responsible for mobility of the bearer paths among UTRANs. (existing responsibility)

5.3.13 UTRAN (changes to capabilities)

- The UTRAN communicates with the SGSN (using the Iu-ps reference point for control signaling) and directly with the GGSN (using Iu-ps bearer path signaling and tunneling aspects of Gn reference point).

5.3.14 GGSN (changes to capabilities)

- The GGSN communicates with the UTRAN (using the Iu-ps reference point for bearer path signaling and tunneling aspects of the Gn reference point).
- The GGSN communicates with the SGSN (using the Pn reference point for the control signaling to manage resources and mobility between the GGSN and the UTRAN.

Additions to Reference Point Descriptions

5.4.13 Iu Reference Point

Changes to description of signaling

- Iu-ps b~~B~~etween UTRAN and GGSN~~SGSN~~, transport of user data is IP based.
- Iu-ps b~~B~~etween UTRAN and SGSN, transport of signaling is based on IP ~~or SS#7~~. Additional information on content aware QoS is also communicated across this reference point.

5.4.14 Pn Reference Point (new reference point)

This is the reference point between the SGSN and the GGSN. This reference point is realized by an interface to signal resource management between the UTRAN and the GGSN.

Conclusion and Proposal

The additions to the reference model proposed in this contribution are important for enabling separation of control and bearer within the core network. These changes to the Architecture Principles for Release 2000 Report should be adopted. Modifications to the proposed text may be appropriate to make the intent clear in the document.