TSG-CN meeting #10
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Agenda Item:

Source: **Alcatel**

Title: GTP Tunnel Addressing at GGSN (R99)

Document for: Approval

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1 Introduction

This contribution is intended to discuss the contradictions between 23.060 and 29.060 as it was described in the LS from RAN WG3 to CN WG4 (issue 1 of R3-002874, "R99 Lossless Relocation for UMTS").

In the response LS from CN4 to RAN3 (N4-001120), we can read:
"There was a heavy debate on the R99 Lossless Relocation for UMTS but no consensus has been reached. Most of the companies in CN4 preferred the solution 2 [one single address], but one company wanted to have solution 1 [different addresses]."

Since the decision of TSG CN has impacts on the RAN WG3 specifications for R99, as explained in the LS, the decision should be taken at TSG CN as soon as possible.

2 Discussion

In R99, for lossless relocation, during a significant period, two GTP tunnels per RAB are established towards the Target RNC: one tunnel between Target SGSN (SGSN2) and Target RNC for DL data coming directly from GGSN, and one tunnel between Source RNC and Target RNC for DL data forwarded by the Source RNC.
In 23.060, it is clearly stated that these two tunnels have the same at Target RNC.

For the UL direction, a similar issue exists. The GGSN may receive UL data from the same user via two GTP tunnels: the GTP tunnel coming from the Source SGSN (SGSN1) and the GTP tunnel coming from the Target SGSN (SGSN2).

Furthermore, in LS from CN4 to RAN3 (N4-00943), following text from 29.060 is mentioned:
*The TEID in the GTP-U header is used to de-multiplex traffic incoming from remote tunnel endpoints so that it is delivered to the User plane entities **in a way that allows multiplexing of different users**, different packet protocols and different QoS levels. Therefore no two remote GTP-U endpoints shall send traffic to a GTP-U protocol entity using the same TEID value.*
It is clear that this text concerns different users, and it means that two different remote entities **managing two different users** must not take the same GTP-U protocol entity at GGSN since it concerns two different users. This is perfectly normal.
But the present case refer to the same user. And it seems logical that, since the GTP-U protocol entity is used to distinguish an user against an other user, there should be only one single GTP-U protocol entity per user in GGSN.

Therefore, we propose the same approach should be taken for both Target RNC and GGSN.

This approach has following advantages:

1. The number of IP addresses and Access Boards is decreased:
   Different IP addresses means that the GTP Tunnels should terminate on different Access Boards: generally one access board in an IP network refers to one IP address.
   Having several IP addresses per Access Boards at GGSN side is not needed and even non-sense since the number of IP addresses is limited.
   Having one Access Board per connected SGSN at GGSN side is also a non-sense.

2. Performances are improved:
   In such a case, combining flows arriving from both sources cannot be combined in the Access Boards. Whereas, having the same couple (IP address, TEID) allow the combining function in the Access Board. This obviously leads to better performances. Having different TEID with same IP address is not useful.

3. "Trunking Effect" is improved:
   Using the same IP address for both GTP tunnels at Target RNC side allows a better use of bandwidth since there is no split of available bandwidth among the different Access Boards. This is particularly true in an ATM-based environment where fix bandwidth has to be configured per PVC.

4. It is not necessary to update the PDP context in GGSN for UL traffic. PDP Context at GGSN should be updated only for DL traffic. And this can be done without delay constraints since the DL traffic is forwarded via source SGSN (SGSN1) and source RNC as long as the PDP Context in GGSN is not changed.
   Since the Target SGSN (SGSN2) is not obliged to wait the answer from GGSN, it can initiate the Relocation Execution towards the Source RNC (via Source SGSN) immediately.
   This is particularly important when the UTRAN has initiated a "Combined Cell-Reselection / SRNC Relocation" procedure. This is the case when the mobile initiated a Cell Reselection (by sending a Cell Update Request to the UTRAN) because the mobile has to wait for the confirmation (Cell Update Confirm): this confirmation cannot be sent back to the mobile as long as the Relocation is not complete.

3 Proposal

For all these reasons, Alcatel proposes to change 29.060 specifications to mandate the same (IP address, TEID) for the two GTP tunnels coming from the Source SGSN and the Target SGSN, for a given user. The related CR is N4-001022, and was submitted at last CN4 meeting.

4 References

[1.] R3-002874, LS from RAN3 "R99 Lossless Relocation for UMTS"
[2.] N4-001120, LS on R99 Lossless Relocation for UMTS to TSG_CN, CN4
[3.] N4-000943, Proposed LS back to RAN3 on R99 Lossless Relocation for UMTS, CN4
[4.] N4-001022, CR 155r1 to 29.060, Adding Uplink TEID for Data I and user plane GGSN address to PDP Context IE, Nokia, Alcatel, Siemens