Source:	**Nortel Networks**
Title:	**Allowing 2 remote endpoints in GTP**
Document for:	**Discussion**
Agenda Item:	**7.13**

Introduction

A liaison from CN4 has been received (Tdoc xxxx) on lossless relocation in R99. CN4 requests some guidance from the plenary on an issue that has two proposed solutions. There is reference to the fact that Nortel Networks preferred one solution (2 tunnels), while some other companies preferred the other (GTP Y shape).
This paper explains the concerns that Nortel Networks raised on the GTP Y shape solution. The implications of the GTP Y shape are not well understood.
This is why Nortel Networks was supporting the 2 tunnels solution, for which the impacts are well understood.

Concerns and questions

The proposal to allow a GTP endpoint to receive data from 2 remote endpoints, is a change from the GPRS and UMTS specifications. It is possible that current implementations have restrictions in place, which would mean that allowing this has an impact on the existing implementations (RNC, SGSN and GGSN).

While we see it possible to allow this change, we would like to understand why this is added, and how it would work, before introducing such a change in R99 at a very late date.

If approving the Y shape in GTP leads to further changes to the specifications, then this should be made clear at this stage. A problem has been detected with GTP sequence numbers.

It is stated in 29.060, chapter 9.1., that:

The sending GSN shall use 0 for the value of the Sequence Number of the first T-PDU in a tunnel and shall increment the Sequence Number for each following T-PDU. […]
When a dialogue is opened between GSNs, the receiving GSN shall set the content of a counter to zero. When the receiving GSN receives a valid T-PDU, it shall increment this counter by one. This counter shall wrap to zero after 65535. It defines the 'Expected Sequence Number'.
Based on the received and Expected Sequence Number values, the receiving GSN may decide whether or not to discard the received T-PDU. Annex B (Informative) describes a method to determine whether a received T-PDU is valid.

At the target RNC, here are the possible consequences if this is applied in case of allowing GTP Y shape, instead of using 2 TEIDs:
The target RNC receives data from the source RNC via the data forwarding tunnel. The target RNC knows which GTP sequence number to expect as this was sent in the Relocation commit message.
Then, the target RNC starts receiving data from the target SGSN. The GGSN and thus the target SGSN will start the GTP numbering from 0. Therefore if the rules defined in 29.060 (annex B) are applied, the received T-PDUs may be considered invalid, in which case the data from the new Iu leg will be discarded.

This concern is also valid if the GTP Y shape is applied to other nodes, e.g. at the GGSN during relocation:

When the new serving RNC sends T-PDUs to the new SGSN and to the GGSN, the SRNC will use 0 for the value of the GTP Sequence Number of the first T-PDU. The receiving GGSN may decide to discard the received T-PDU, because the sequence number is different from the 'Expected Sequence Number'.

Note that as per 23.060 (chapter 12.7.2.1.1), *the SRNS and SGSN shall tunnel PDUs without changing the GTP-U sequence numbers*.

Conclusion

Nortel Networks would like to understand how these issues will be handled, or if they are not issues, would like to understand why. If a clear answer can be given on these points, there is no reason to object. Otherwise, it is proposed to postpone the decision to when these items have been clarified.