TSG-RAN Working Group 3 meeting #1
Bonn 2nd - 5th February 1999

TSGW3#1(99)049
(same as SMG2 UMTS-ARC 397/98)

Agenda Item: 8.1, General UTRAN Architecture
Source: Siemens, Italtel
Title: **Maximum Branch Delay of user data in case of inter-RNC Soft Handover**
Document for:

1 INTRODUCTION

The radio frames of a radio access bearer service experience different transmission times on diversity branches between the UE and the SRNC. Especially in case of inter-RNC soft handovers both the absolute data delay and the delay difference of identical data on distinct diversity branches can be significant.

Figure 1 shows a scenario of an inter-RNC soft handover which is seen as one possible scenario with maximum absolute delays and delay difference between data of different diversity branches.

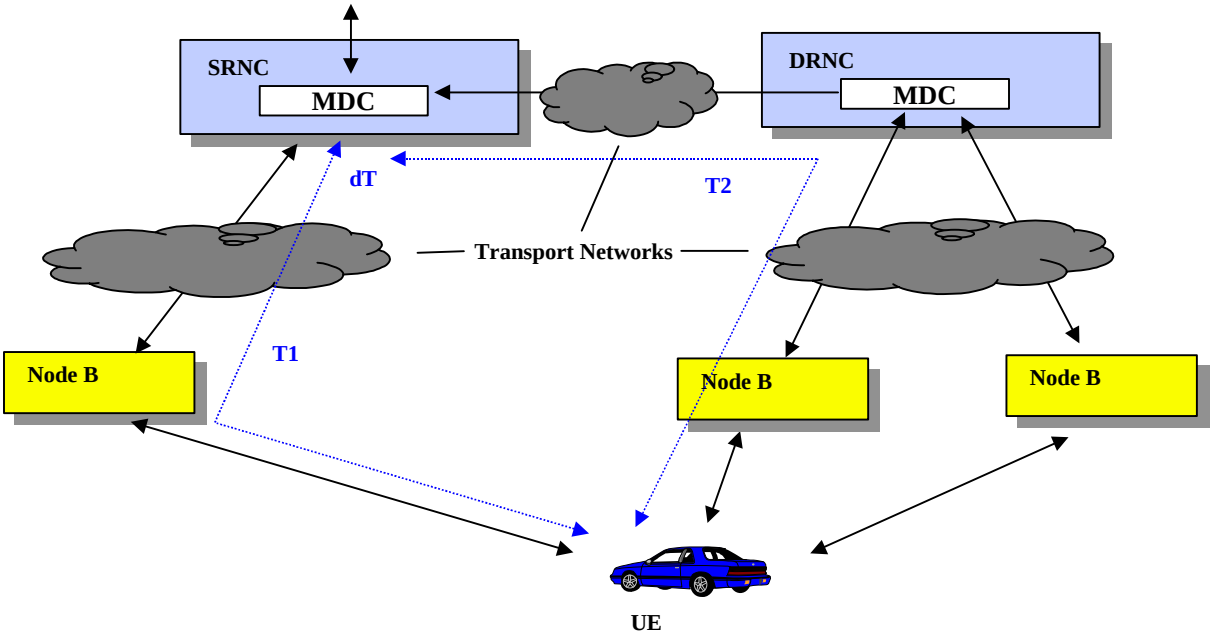

Figure 1: Transmission delays on distinct diversity branches in case of inter-RNC soft handover

The difference $\Delta T = T2 - T1$ is caused by :

- different propagation times on the air interface
- different processing times in the Node B (esp. in case of different vendors‘ Node Bs)
- different transmission times on the Iub – Interface (considering the transport network between Node B and RNC)
- additional delay due processing in the DRNC (e.g. if selection combining is performed in the DRNC)
- additional delay due to the transmission on the Iur Interface (considering the transport network between SRNC and DRNC)
- Cell delay variations (CDV) due to transmission over asynchronous transport networks

The maximum absolute delay occurs at most on a branch where:

- processing in the DRNC (e.g. if selection combining is performed in the DRNC) is performed
- data are transmitted on the Iur Interface (considering the transport network between SRNC and DRNC)

2 REFERENCES

[1] UMTS ZZ.01, v0.1.0, 1999-01, UTRAN Architecture Desription

2 DISCUSSION

This contribution proposes to put a requirement on the maximum latency allowed on a branch. Radio frames arriving at the Selection Combining Unit of the SRNC with a higher delay may not be considered by the selection combining algorithm.

The reasons for specifying a maximum branch delay are:

- a maximum overall delay of user data within the URAN can be determined. This is mandatory especially for real time bearer services tolerating only a limited transmission delay like speech.
- Manufacturers are able to design network elements (e.g. buffers, processing times) according to this requirement.
- Operators are able to set up network plans (e.g. transmission networks used) according to this requirement.

A further requirement can be put on the delay introduced by every single node: in a multi-vendor URAN with RNCs and Node Bs of different suppliers it is important to define requirements to allow the combination of different design solutions and to satisfy at the same time minimal requirements on UTRAN.

2 CONCLUSION

It is proposed to insert in [1] a new sub-chapter ‘8.2 Performance Requirements’ with the following text:

“8.2.1 UTRAN Delay requirements
The maximum transmission delay of a diversity branch and the maximum processing delay introduced by single UTRAN network elements shall be defined.”