TSG Services and System Aspects
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Source:	**Nortel Networks**
Title:	**Reasoning for revised eTFO WID**
Document for:	**Decision**
Agenda Item:	**7.4**

1.   Introduction

This paper is provided in order to support the proposed eTFO Work Item by providing information on eTFO status in 3GPP and highlighting the benefits of its standardisation.

2.   eTFO status

The original eTFO WID (SP-020684) was agreed at TSG-SA4#24, however it was not approved at the subsequent TSG-SA#18 plenary meeting, as the content, benefits and impacts were not felt yet clear. SA2 was tasked to study the impacts and benefits of eTFO. It was agreed that the WID could be re-submitted at TSG-SA#19, where it would be considered together with the study report from SA2.

The updated WID (SP-030082) was agreed at TSG-SA4#25bis with minor changes (see S4-030157) to address the questions that were raised at TSG-SA#18 and to update the schedule.

3.   eTFO impacts

Substantial discussions regarding the system impacts and benefits of eTFO have taken place at both SA2#29 and SA2#30 resulting in a detailed LS to SA reporting the findings of the study (SP-030066).

The work in SA2 has provided a clearer understand of the proposed eTFO solution, which will enable quicker progress of its standardization. It is agreed that eTFO will impact mainly the Nb interface (CN3) and the existing TFO specification (SA4), which will need to be extended to be bearer independent.

An overview of eTFO has already been presented to SA4, CN3 and CN4. Draft CRs to TFO stage 1 and 2 have also been presented to SA4 for information.

The impact of the introduction of eTFO is expected to be limited to the MGW, which would require a software upgrade to evolve from TFO to eTFO.

4.   Relationship with TrFO

3GPP decided in 2000 to standardize both TFO and TrFO; this is an existing situation that the evolution of TFO to eTFO does not propose to change.

The TFO and TrFO harmonisation work was reported to the CN plenary in June 2000 (NP-000374), and made the point that:

"The most important difference between TFO and TrFO is: the whole transport network control layer must be aware that coded speech is transported."

It is proposed to continue this principle with eTFO and therefore nothing changes in terms of the fundamental differences between the two and their ability to coexist.

The proposed work item should be viewed as a step to align and complete TFO with the packet network possibilities.

Bandwidth and resource savings achievable with eTFO may be marginally less than those achievable with TrFO, however if the operator requires VQ enhancements, then resource utilisation in the MGW for TrFO and eTFO is comparable.

5.   Example eTFO scenarios

Two example scenarios are described where eTFO could be used.

Scenario 1: TCME – TFO Circuit Multiplication Equipment

TCMEs are covered in TS 28.062 being described as GSM specific Digital Circuit Multiplication Equipment. TCMEs reduce transmission costs without degrading speech quality by only transporting compressed speech and TFO control messages.

To obtain bandwidth savings with packet based TCMEs eTFO could be used. An example of a TCME call scenario is shown in figure 1
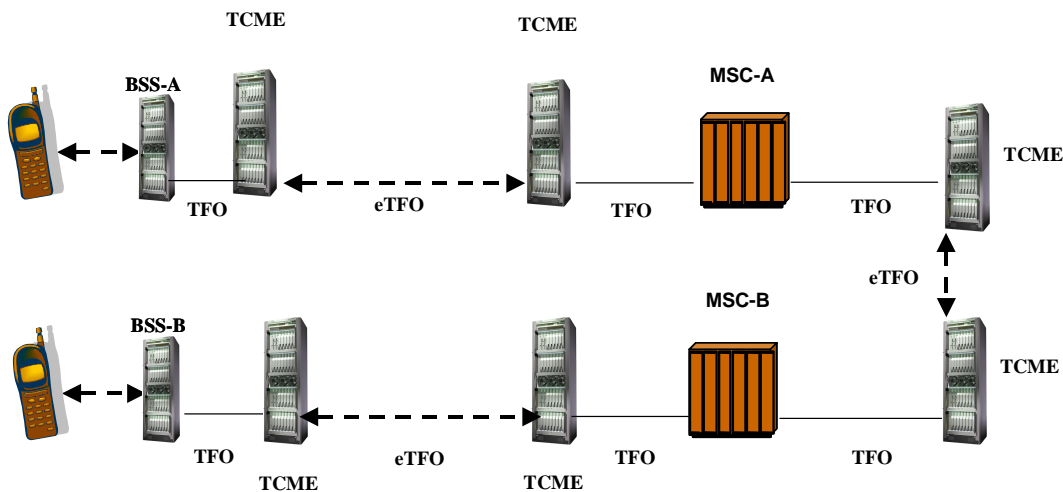

Figure 1. Packet based TCMEs

Scenario 2: Packet cores that do not support TrFO and/or OoBTC

Figure 2 shows a core network (MSC-A, MSC-B, MGW-A and MGW-B) that does not support TrFO or OoBTC. eTFO is implemented over the Nb interface. eTFO/TFO operates to provide bandwidth savings and reduced delay in addition to the improved speech quality that is achieved by tandem free operation. This scenario is attractive to GSM operators with TFO that would like to migrate part of the core network to packet switched.
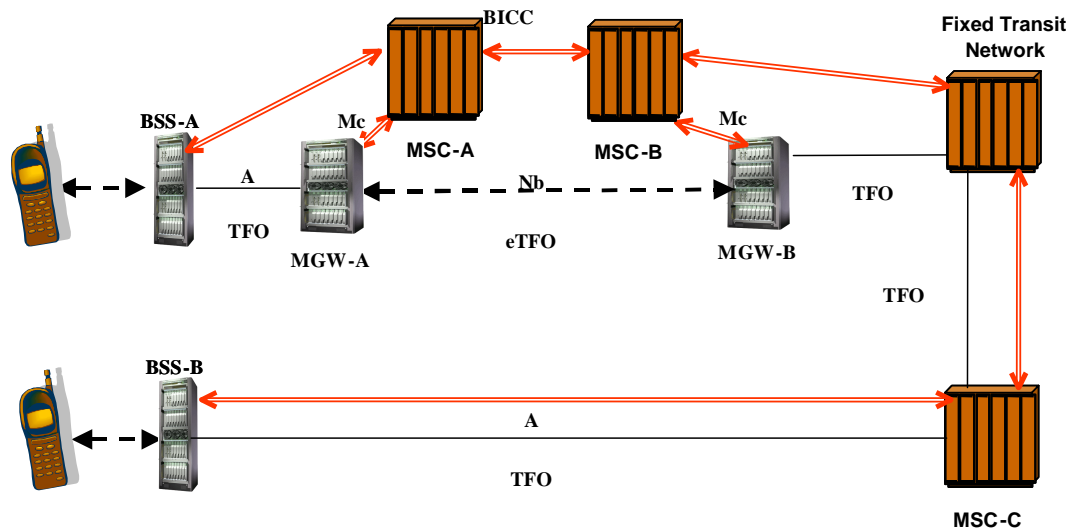

Figure 2. Packet cores that do not support BICC and/or OoBTC

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5.   eTFO benefits

The benefits of evolving TFO to eTFO include:

- Reduced transmission bandwidth requirements over packet networks
- Reduced transmission delay due to removal of transcoding
- Reduced processor load in transcoder due to removal of transcoding

Where TFO has been used in part of a network, the benefits of theTFO/eTFO combination over the TFO/TrFO combination, for the Bearer Independent Core Network scenario include:

- Impact is limited to the TC/TRAU/MGW (software upgrade from TFO to eTFO), and does not extend to the call servers
- No changes to inter-call server signalling, no need for complex TrFO Interworking
- Faster fallback to G.711 for services that subsequently require transcoding
- Builds on TFO which is a proven technique that is in service today

6.   Recommendations

It is recommended to approve the work item in order to enable operators to take advantage of the full possibilities of in-band codec negotiation mechanisms, which are in service today.