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TELETRAFFIC ASPECTS OF VOICE/DATA INTEGRATION

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The following remarks are a short supplement to the considerations presented in [1]. The scepticism presented therein concerning the practical utility of voice/data integration concepts for the core network (eg. hybrid switching, packet switching, burst switching intensively discussed in literature) is based mainly on traffic arguments - economical terms are treated fragmentarily. Here we enhance the latter viewpoint and combine it with traffic arguments.

As discussed in [1] the fraction of voice information throughput in the total information throughput in future integrated networks (both public and private) is not likely to fall below v/d = 95% (even if a great increase of data traffic and low voice digitalization rates are foreseen). We believe that smaller v/d values may be expected only in special eg. military networks which we do not consider here.

From this v/d evaluation it follows that any switching concepts proposed for voice/data integration must, in the first place, prove that it is well suited (justified from traffic and economical viewpoints) for telephony. Clearly, advanced voice processing and switching (APS) (eg. speech interpolation and burst or packet switching) will result in some improvement in transmission capacity utilisation (i.e. in decrease of transmission costs) but in the same time may result in processing and switching costs. We thus arrive at a cost optimisation problem which we treat below in a simplified but comprehensive way.

Let C = L+S+T be the total cost of a classically circuit switched (CCS) telephone network; L denotes the cost of the access layer, S and T denote switching and transmission costs respectively. Similarly, let C' = L'+S'+T' denote the cost of this network when realised with some APS; for convenience we include all voice processing costs (eg. talk spurts detection) in L'. The cost ratio

$$C'/C = l\cdot(L'/L) + s\cdot(S'/S) + t\cdot(T'/T)$$

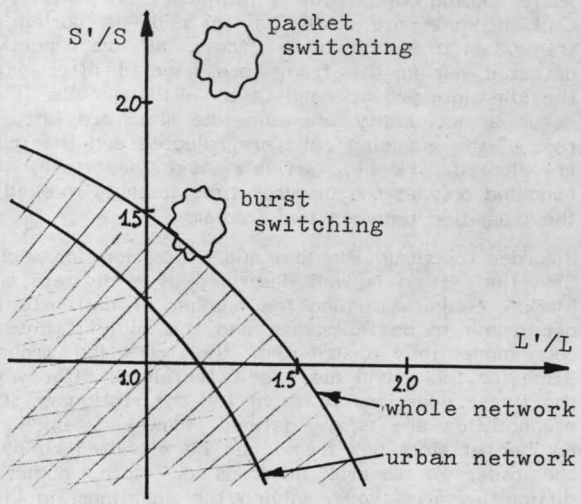
where: l=L/C, s=S/C, t=T/C.

We are looking for conditions on which $C'/C \leq 1$.

We assume usual cost proportions: l=s=t=.33 for the network as a whole and l=.45, s=.4, t=.15 for its urban part. The speech activity factor equals approximately .4, thus we can expect at most twice better transmission capacity utilization as the result of even most sophisticated APS (with respect to CCS). Since transmission costs are approximately proportional to capacity utilization we assume T'/T = .5.

Taking account of the above said one obtains the results depicted in the figure. The shaded area corresponds to $C'/C \leq 1$. As can be seen there is not much hope in obtaining cost savings as a result of APS (compare "clouds" on figure indicating foreseable areas for packet and burst switching). Consequently, CCS proves to be the most resonable solution.

Now, since v/d .95 then clearly CCS remains also the most resonable solution for voice processing and switching in integrated networks. This, together with the results from [1], implies that voice/data integration based on eg. hybrid switching or packet switching can not be justified by traffic and/or economical arguments. Concluding, we believe that the future lies in "coexistence" rather than "integration" of switching in core network.



[1] S.Debaille, J.Lubacz: Delay and throughput comparisons of switching techniques in integrated networks. Proc. of the ICCC'84, Sydney 1984