

CHAPTER 5

CONCLUSIONS AND FUTURE WORK

In this thesis, we address the issue of feedback consolidation for point-to-multipoint connections in ABR service of ATM networks. Several consolidation algorithms have been proposed. The algorithms demonstrate a tradeoff between achieving fast transient response and reducing consolidation noise. Some algorithms have a fairly fast transient response at the cost of higher consolidation noise. Other algorithms may prolong the transient response period to reduce consolidation noise. Even when an algorithm has achieved both objectives, its implementation complexity is high.

In this chapter we discuss the conclusions deduced from the results of the previous chapter and the suggested future extensions.

5.1 CONCLUSIONS

Using simulation experiments, we have compared our proposed algorithm and the new RM ratio control criteria to the previously proposed algorithms. Many points could be concluded:

- Our proposed algorithm doesn't suffer from consolidation noise problem.
- The proposed algorithm exhibits a very fast transient response with accurate feedback in case of high thresholds.
- In case of low thresholds, the proposed algorithm exhibits a relatively fast transient response with accurate feedback.
- From the above two points, we conclude that the transient response of our proposed algorithm is threshold-independent and approaches the optimal performance.
- Due to the fast transient response, the initial queue length is low and bounded even in the worst-case load situations like high ICR.
- The overhead of local congestion check is reduced in our proposed algorithm. It checks only once when a new FRM cell is received.
- The major drawback of our proposed algorithm is the usage of a random number generator.
- The proposed RM ratio control method could be used by any consolidation algorithm that permits the fast overload indication. The method is very straightforward to implement. We have already applied it to Ros et al. algorithm. Results have shown that the new method has the effect of accelerating the convergence of the RM ratio to one.
- When the new RM ratio control method is applied to our proposed algorithm, a slight improvement is indicated.
- From the above two points, we conclude that the improvement is high, as the ability of the algorithm to send more extra BRM cells, or the rate of change of network conditions, is high.
- The handling of non-responsive branches is necessary for all algorithms of the “wait-for-all” technique family. Our proposed algorithm is one of this family.

5.2 FUTURE EXTENSIONS

We suggest the following future extensions to our work:

- Adding a simple and efficient mechanism for handling non-responsive branches.
- Examining the effect of the VS/VD (Virtual Source/Virtual Destination) option (specified in “ATM traffic management Specifications 4.1”[5]) on the point-to-multipoint

connections and on the feedback consolidation algorithms. The coupling of both should be studied.

- The various feedback consolidation algorithms should be able to interoperate with each other if no one algorithm is standardized. It seems that all the algorithms can interoperate smoothly with each other, but the performance of a network with different algorithms at the different branch points, and point-to-multipoint VCs that branch at several branch points with different algorithms, will need further study if a consolidation algorithm is not standardized.
- Examining the effect of ABR source parameters and ABR source rules on multipoint connections and developing formulae and guidelines for setting these parameters to achieve the best performance.