Proposal to the Consortium for Embedded and Internetworking Technologies

Packet Processing in a QoS Constrained Environment

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1. Project Summary

The four main tasks of a network processor are *packet classification*, *packet modification*, *queue/policy management* and *packet forwarding*. The techniques used for the implementation of these tasks are extremely critical, because they determine the performance of the network processor in a high-speed environment. As these tasks have a direct bearing on the throughput/delay performance experienced by the network clients, success or failure of a network processor may depend to a large extent on the efficient execution of these tasks. In this project, we propose to investigate three of these tasks: packet classification, queue/policy management, and packet forwarding. First, we propose to examine and compare the performance of the existing algorithms for these tasks under realistic network traffic conditions (e.g., non-Poisson traffic in practical multi-hop network settings). Such a study will provide an in-depth understanding of the interaction between various issues and will help to identify the bottlenecks. This will lead to the development of new techniques to overcome the bottlenecks. The novel techniques developed as part of this project - for packet queuing and scheduling, and for packet classification and forwarding - will be evaluated through simulations and formal analysis.

The deliverables of this project include simulation codes developed for the evaluation of the packet classification and forwarding algorithms, and for the packet queuing/scheduling algorithms.

Through the direct involvement of graduate students in the project and through the incorporation of the research results of this project into courses taught by the PIs at ASU, the project will have a significant positive impact on education and on the human resource base in the Phoenix metropolitan area.