

SUMMARY OF Ph.D. DISSERTATION

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Title A study on the bulk transfer protocol in the next generation optical network		
Abstract <p>The explosive growth of Internet Protocol (IP) traffic on the Internet is driving the demands for new high-speed transmission and switching technologies. Also, due to the development of the Internet, various services, such as Peer-to-Peer Application, video sharing site, and GRID network, have been created. Therefore, it is very important to realize the large capacity network and to handle a wide variety of traffic and support the communication quality. In this dissertation, the high-performance bulk transfer protocol using optical technologies are studied.</p> <p>In Chapter 1, the purpose and researches of this dissertation is summarized. In Chapter 2, the background of this dissertation is stated. And, this chapter introduces the architecture and main problems of an optical network, the conventional works, and the position of this dissertation.</p> <p>In Chapter 3, a new burst dropping technique is proposed, which configures the threshold for determining whether the head-dropping (HD) technique is applied or not. The HD technique is the burst dropping technique which reduces packet loss due to burst contention in OCBS. According to computer simulations, it is shown that the proposed scheme can achieve the fair packet loss probability regardless of the number of hops to the destination edge router compared with a conventional one.</p> <p>In Chapter 4, a route selection scheme is proposed, which reduces the probability of burst contention by controlling the route at an edge router. Each edge router learns a suitable route to the destination edge router autonomously by using newly employed feedback packets and search packets. Due to the self-learning at each edge router, the traffic load is distributed in an OBS network. According to computer simulations, under nonuniform traffic, the proposed scheme can reduce approximately one decade smaller burst loss probability compared with the conventional shortest path routing method.</p> <p>In Chapter 5, in GRID-based optical network, a novel lightpath route selection scheme is proposed. The route priority is introduced as a new parameter for the lightpath route selection. Each source node updates the route priority according to the results of the lightpath setup, and uses the route with a high route priority. Also, in setting the lightpath, each source node sends PATH messages for the lightpath setup on several routes. And, each PATH message collects the link usage information of the route. The destination node selects the route to reserve the wavelength based on the information of PATH messages. The proposed scheme can distribute the traffic by considering the past empirical information and current link usage information. Using simulation for non-uniform traffic, the proposed scheme can reduce nearly 20-50 percent lower blocking probability as compared with the conventional shortest path routing scheme.</p> <p>In Chapter 6, conclusion of this paper is denoted.</p>		