

REPORT DOCUMENTATION PAGE			Form Approved OMB NO. 0704-0188	
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comment regarding this burden estimates or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188), Washington, DC 20503.				
1. AGENCY USE ONLY (Leave blank)	2. REPORT DATE May 2006	3. REPORT TYPE AND DATES COVERED		
4. TITLE AND SUBTITLE Protection Based QoS in WDM Mesh Networks		5. FUNDING NUMBERS ANI 01-21662 ITR ACI 99-84492 CAREER		
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7. PERFORMING ORGANIZATION NAMES(S) AND ADDRESS(ES) Coordinated Science Laboratory University of Illinois 1308 W. Main St. Urbana, IL 61801		8. PERFORMING ORGANIZATION REPORT NUMBER UILU-ENG-06-2204 CRHC-06-01		
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) National Science Foundation 4201 Wilson Blvd. Arlington, VA		10. SPONSORING / MONITORING AGENCY REPORT NUMBER		
11. SUPPLEMENTARY NOTES				
12a. DISTRIBUTION / AVAILABILITY STATEMENT  Approved for public release; distribution unlimited.		12 b. DISTRIBUTION CODE		
13. ABSTRACT (Maximum 200 words)  Quality of service (QoS) provisioning on wavelength division multiplexed (WDM) networks is an increasingly important issue in network design and management. One important performance metric in a QoS optical network is survivability. The choice of protection algorithm directly affects survivability of a network and can be differentiated based on the needs of different clients. Differentiating services based on protection affects both availability and data loss due to a failure. Network operation cost in terms of provisioned capacity (wavelength channels) needs to be considered in QoS routing and resource allocation, and an efficient classification scheme based on protection classes along with optimized capacity assignment algorithms can help reduce costs.  Based on different protection requirements of network clients, a protection based classification scheme for QoS support in optical networks is proposed. We also introduce an optimization technique based on protection resource sharing among two different protection classes. We compare different classification schemes and quantify the benefits of having protection differentiated classes in terms of network capacity cost.  Our results show that, on average over five sample networks, online provisioning with the proposed protection based QoS scheme allows up to 30% savings in terms of capacity cost compared to a network without such classification, and roughly a 7.6% savings compared with a network that provides only two classes while providing better reliability.				
14. SUBJECT TERMS optical communication, optical fiber communication, WDM network, optical network, differentiated services, class of service, QoS, quality of service, protection, survivability		15. NUMBER OF PAGES 6		16. PRICE CODE
17. SECURITY CLASSIFICATION OR REPORT UNCLASSIFIED	18. SECURITY CLASSIFICATION OF THIS PAGE UNCLASSIFIED	19. SECURITY CLASSIFICATION OF ABSTRACT UNCLASSIFIED	20. LIMITATION OF ABSTRACT UL	