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Abstract

Optical Fiber Link Failure Prediction System Based on Long-Period Fiber Grating Mechanical Sensor [†]

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High data rate optical fiber links are usually deployed in core IP networks to transport bulky information from router to router. In this context, failure prevention mechanisms are highly important since any short-time failure may represent bulk data loss and additional delay. Although link failures can be caused by multiple factors, in some scenarios, these failures are preceded by mechanical movement of the physical medium.

In this context, we propose an optical fiber link failure prediction system for high-speed optical networks based in along-period grating (LPG) sensor. The proposed system uses a LPG sensor to monitor mechanical changes in an optical fiber link and, in the case that relevant mechanical deformation is detected, the system re-routes packets through a redundant copper cable, instances before the communication is disrupted in the main link.

The proposed system was tested under multiple network loads using a set of failure scenarios, where the optical link disruption is preceded by mechanical changes. In these conditions, the results show that the proposed system effectively reduces the packet loss to the minimum observed for the best case scenario of continuous connectivity.