

Broadband-Network Failure Early Warning System Design

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ABSTRACT

The fuzzy controller, the core of the ADSL broadband network failure early warning system, is the subject of this study which develops on the basis of the fuzzy theory. The basic framework of the controller includes two inputs, incoming and outgoing traffic values from the DSLAM (Digital Subscriber Line Access Multiplexer) of ADSL network equipment towards the Remote terminal of ADSL Tranceiver Unit (ATU-R), one output set has two respective modes of different traffic type, network communication status and subscriber circuit board status. According to statistical analysis, the membership function defines the traffic value of the inputs into three fuzzy subsets of HIGH, MED, LOW, and the operation status of the output into three fuzzy subsets of BUSY, ACT, and DOWN. The system first receives DSLAM-to-ATU-R incoming and outgoing traffic values, then feeds the data into the fuzzy controller, and finally uses the relative relationship between the incoming and outgoing traffic values to reason the output result applying fuzzy rules. According to the definition of the membership function, an output result of BUSY indicates system in high traffic, ACT indicates system in operation, and DOWN indicates a failure condition.

The failure early warning system of this study is mainly designed to monitor an abnormal status of the upstream equipment of DSLAM—ATM, and ISP, and the IP layer of network communications. It provides speedy failure information and alerts to network administrators through an early warning mechanism in order to elevate the efficiency of repair and ensure a good communication quality. In addition, the failure early warning system of this study is to make improvement on failure detection function to ensure a reduced time for failure discovery and increased client satisfaction, in unusual situations when DSLAM system's fail to alarm of subscriber circuit board irregularities.

Keywords : Digital Subscriber Line Access Multiplexer(DSLAM)、 failure early

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