

TLR: A Traffic-Light-Based Intelligent Routing Strategy for N GEO Satellite IP Networks

ABSTRACT:

We present TLR, a traffic-light-based intelligent routing strategy for N GEO satellite IP networks. In TLR, a set of traffic lights are used to indicate the congestion status at both the current node and the next node. When a packet travels along a pre-calculated route to the destination, it may adjust the route dynamically, according to the real-time color of traffic lights at each intermediate node. Through the combination of preliminary planning and real-time adjustment, each packet can eventually get an approximately optimal transmission path. The multi-path routing mechanism in TLR can help achieve a good distribution of traffics when the network traffic increases. The Public Waiting Queue scheme in TLR can fully utilize free spaces of the buffer queues and lower the packet drop rate. While the concept of TLR has many advantages, it may result in endless-loop of routing. To eliminate this phenomenon, a defense scheme is incorporated in the design of TLR. A set of simulations are conducted using the Network Simulator (version 2) to verify the good performance of TLR, in terms of lower packet drop rate, better distribution of traffics and higher throughput, over the entire satellite constellation.