

## A token-passing variable buffer model for a double-layered hierarchical WDM all-optical network

### ABSTRACT

Presents a hierarchical all-optical network, employing wavelength division multiplexing for multiple channel transmission. A double-layered network with multiple sub-network implementation which provides for spatial wavelength reuse is considered. The piggybacked token-passing medium access protocol as a fair and non-contentious access scheme is studied for performance. The average delay in getting access to the network medium is determined from the semi-Markov process. The performance of the protocol model design with variable buffer sizes of the transmitter is analysed. It is shown from the double-layered hierarchical network that alternative route for data transmission can be implemented to improve on performance.

**Keyword:** Semi-Markov process; All optical network; Piggybacked token-passing; Performance evaluation; Wait time; Queue length