# A New Survivability Strategy with Congestion Control In WDM Optical Networks

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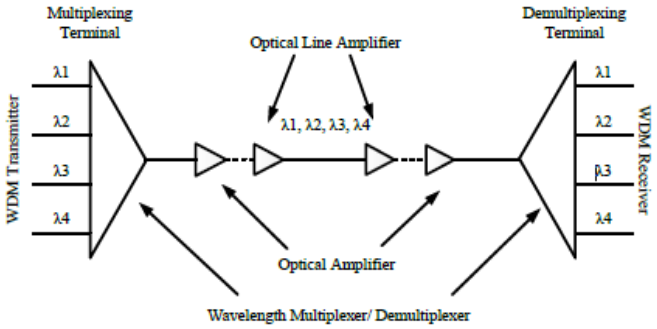
## Abstract

Due to huge usage of internet and growing business, bandwidth required prove to be difficult resource to fulfill with normal structure of networks. Moreover to provide a good level of quality service is also a big concern. One big solution comes in form of Wavelength Division Multiplexing (WDM).Wavelength Division Multiplexing (WDM) is an important technique to exploit the huge bandwidth of the optical fiber. There has been a wide deployment of WDM transmission technology in today's optical networks. WDM is widely used technology in developed countries and is based on the transmission of several light beams of different wavelength simultaneously through an optical fiber. A wavelength typically operates in hundreds of Mbps or even Gbps needs to be utilized better if the connection request is less than 100 Mbps bandwidth, otherwise there is a tremendous wastage of bandwidth in a fiber for data transmission. Though the fiber bandwidth has been improved due to the advancements in fiber-optic technologies and the increase in number of wavelengths in a fiber, there has not been much research in the area of *fault tolerance*, *routing and wavelength assignment*. Due to huge transmission of data through optical fibers, congestion occurred regularly and it became big bottleneck to flow of data in process. To solve congestion issues we are proposing a survivability strategic algorithm with congestion control in WDM optical network which will improve congestion hit network and will provide us with good cost cutting as it can be implemented to developing countries due to low costing factor.

**Keywords:** WDM, congestion control.

## 1. Introduction

The rapid growth of Internet traffic has been the driving force for faster and more reliable data communication networks. Networking is a very promising technology to meet these ever increasing demands. The influence of networking on an organization of the computer systems has been tremendous, especially in the last 30 years. The old model of a single computer catering computation needs of an organization has been replaced by single network in which a number of separate but interconnected computers carry out the job.




Optical wavelength-division-multiplexing (WDM) networks are being increasingly deployed in the next generation wide area, metropolitan, and local area network infrastructures [1]. WDM is widely becoming accepted as a technology for meeting growing bandwidth. It establishes communication between pairs of network nodes by establishing paths and assigning wavelength to each path. No two paths going through the same fiber link use the same wavelength at the same time to observe wavelength continuity constraint [2, 3]. In our research we will propose a new algorithm for better congestion control which commonly used survivability strategy will be presented. We will provide our results with help of simulations to evaluate the performance in terms of congestion control and the results will be compared.

## 2. Problem Formulation

Due to huge transmission of data through optical fibers, congestion occurred regularly and it became big bottleneck to flow of data in process. Our focus will be on developing a better solution to this problem as to solve congestion issues we are proposing a survivability strategic algorithm with congestion control in WDM optical network which will improve congestion hit network and will provide us with good cost cutting as it can be implemented to developing countries due to low costing factor.

## 3. OBJECTIVES

- To analyze and developing a better algorithm for congestion control in Wavelength Division Multiplexing
- Test the proposed algorithm in Matlab or Opnet/ NS2.

## 4. Research Methodology

To achieve the set objectives, our proposal will focus on developing a better fast algorithm for Survivability Strategy with Congestion Control in Wavelength Division Multiplexing Optical Networks. We will propose the algorithm and will test it in MATLAB or OPNET/.NS2 for finding loopholes and will propose the better solutions by comparing it in these simulators.

## 5. Algorithm Functions

**Length of route:** It is the length of the route used by the signal to reach from source node to destination node. It is measured in miles and is the total sum of the distances between each node on that route.

**Maximum possible cost ($C_m$):** It is the maximum cost assumed for the link selected to transfer the signal.

**Maximum route time ($T_m$):** It is the maximum possible time may be taken by the signal to reach from source node to destination node through longest route.**Route time ($T_R$):** It is the exact time consumed by the signal to reach from source node to destination node through route R**Load per link ($L_r$):** It is the load of link r calculated by $L_r = \Lambda^m_r + \varphi\ \Lambda^s_r$, where $\Lambda^m_r$ is the number of wavelengths being used to carry the primary signals and $\Lambda^s_r$ is the number of wavelengths which are being used to carry the backup signals on link r. $\varphi$ is the parameter having value from 0 to 1 as per the weight of backup links on the routes.**Route hops ($N_R$):** This is the number of hops on route R.**Average load ($L^R_A$):** It is used to calculate the average load on route R equals to $1/N_R(\sum L_r)$ for all r belongs to R.**Variance of load ($V_R$):** This is difference of $L_r$ and $L^R_A$ for route R and is calculated by $1/ N_R(\sum L_r^2 - L^R_A{}^2)$ for all link r on route R.

## 6. Scope Of Study

There is an ample scope of research in the stated area. Present study will reflect the importance of congestion control and will provide huge beneficial solution for developing countries as it will be very cost effective in term of implementation and working.

## 7. Conclusion

A brief review of existing studies show emergence of different technologies and WDM is one of the emerging technologies in it so we are proposing a new Survivability Strategy with Congestion Control in WDM Optical Networks. This work will provide us the big solution.

## 8. REFERENCES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