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A REPORT FOR THESIS OF A MASTER
DEGREE IN COMPUTER ENGINEERING

BURST ASSEMBLY CONTROL AND QoS IN WAVELENGTH ROUTED OPTICAL BURST-SWITCHED (WR-OBS) NETWORKS

SUBMITTED BY

KHALID H. ALOMRAN

SUPERVISOR

Dr. NASSER EDDINE RIKLI

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Kingdom of Saudi Arabia

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Abstract

The bandwidth offered by optical wavelength-division-multiplexing (WDM) technology is promising to be the primary means for transporting the internet traffic which are doubling every year. The future Optical Burst Switching (OBS) networks are expected to be an efficient transport networks that will accommodate dynamically varying internet traffic with different Class of Service (CoS), as they allow the optimization of network resources combined with low, predictable packet delays and packet loss rate (PLR). However, until now the conventional OBS networks (e.g. just-enough time - JET) has failed to guarantee acceptable levels of PLR and packet delays as a function of the network load. Nevertheless, the wavelength-routed optical burst-switched (WR-OBS) scheme has been receiving some recognition on recent literature as a good candidate scheme that will alleviate certain limitations of the previously suggested OBS schemes. In the WR-OBS model, all processing and buffering are concentrated at the network edge nodes and that bursts are routed over an optical transport core using dynamic wavelength assignment, a centralized or distributed control node will keep track of network status and decide the proper route (lightpath). Also, the WR-OBS assumes no buffering or wavelength conversion in core network.

This report outlines the results of a study that was conducted to evaluate a WR-OBS model that can provide a guaranteed CoS in the presence of dynamic and bursty traffic loads. The presented results show the performance gain achieved by using a novel burst size scheme “Adaptive Burst Size Scheme ABS” on the burst aggregation process. In this study we used different lightpath trigger policies to differentiate between different CoS classes. The performance gains were in terms of a high wavelength utilization, low PLR, and a low average total packet delay.