TRON: The TOOLKIT for ROUTING in OPTICAL NETWORKS

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Abstract

The Toolkit for Routing in Optical Networks (TRON) is a freely available library developed to facilitate research experiments on OSPF-based routing protocols for optical networks. Currently, TRON supports the *LightWave-OSPF* routing protocol, which is our adaptation of the optical extensions to OSPF proposed in the internet drafts of Kompella et al. [7] and Wang et al. [9]. TRON is implemented in C++ using the Component Architecture for Simulating Network Objects (CASiNO). TRON software can be used in either simulation or emulation mode. It has permitted us both to simulate *LightWave-OSPF* routing in large optical networks, as well as to emulate routing on a live optical switch. In this paper, we describe *LightWave-OSPF* and the architecture of the TRON software.

1   Introduction

In wavelength division multiplexing (WDM) networks, communication between optical cross-connect (OXC) switches takes place along all-optical WDM channels, commonly referred to as *lightpaths*. A routing protocol for WDM must therefore facilitate two basic tasks: (1) the computation of a path for each pair of source-destination switches wishing to communicate, and (2) the assignment of a wavelength on each optical fiber link along the computed path.

Significant efforts are being made (e.g [2, 4, 7, 9]) to adapt existing routing protocols for use in the WDM domain. In [3], the authors evaluated these efforts and concluded that the OSPF-based proposals being developed offered the greatest potential for success, promising a scalable solution that takes into consideration the goals of Traffic Engineering (TE) and Quality of Service (QoS). Since then, the authors have implemented *LightWave-*

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