

A Comparative Analysis of the Effects of Dynamic Optical Circuit Provisioning on IP Routing

Abstract:

We analyze the effects of dynamic optical circuit setup on IP routing in general and on two routing mechanisms in particular, i.e., explicit routing and shortest-path-first routing. We present analytical models for computing the size and placement of optical circuits and propose model adaptations driven by the IP router system design. The results show that without careful consideration of intrinsic capabilities of IP routing protocol and forwarding, the size and location of optical circuits used can be vastly underestimated, also leading to significant disruptions in real **networks**. We present the Optical Bypass mechanisms and show that these methods, unlike traditional IP routing-based solutions, affect a comparatively lower number of IP routes and can be computed near-optimally, even under unknown traffic matrix conditions, making them effective and feasible.