

Congreso Latino-Iberoamericano de Investigación Operativa Simpósio Brasileiro de Pesquisa Operacional

NETWOK TOPOLOGY

ABSTRACT

The Internet is a collection of interconnected networks whose topology is unknown because of its decentralized and unregulated growth. However the knowledge of the topology of the Internet is the basis for network tomography algorithms and it is important to develop more sophisticated and ambitious traffic control protocols and dynamic routing algorithms. Since we cannot count on the cooperation of all the internal network device, the ideal is to infer the network topology using only end-to-end network measurements, such as loss measurements or delay variance. With this limited information only the logical topology can be inferred. The key idea is to use measurements at pairs of receivers to identify the logical topology defined by the branching points between paths to different receivers. Given the distances between pairs of points and eventually the position of some points, we are interested in determining the position of all unknown points. This is a NP-Hard problem, and depending on the structure that is planned for the underlying network, several specific applications can be considered.

In this poster we present mixed-integer linear programming models to infer the logical topology of a network, using end-to-end network measurements, which are compiled in a distance matrix. Some computational experience is also presented.

KEYWORDS. Topology Discovery. End-to-end measurements. Communication network.