

Simulation of the Floyd-Warshall Algorithm Using OMNeT++ 4.1

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Abstract

This article focuses on the Floyd-Warshall All-Paths algorithm and its use in network engineering. Firstly, we present the principles, followed by the domains of implementation. Routing protocols such as Open Shortest Path First (OSPF) and Intermediate System-to-Intermediate System (IS-IS) have proven to give difficulties in optimizing the link weights, whereas the newer protocol Penalizing Exponential Flow Splitting (PEFT) avoids these shortcomings. Moreover, in the case of wireless sensor networks, a much longer network lifetime is obtained through Traffic-Aware Energy Efficient Routing Protocol (TAEE). This routing protocol exploits the traffic load information and nodes power levels in order to keep them functional for a longer period of time. The massive increase in mobile devices, the frequently changing parameters and low transmission powers have forced development towards the Zone Routing Protocol (ZRP). This brings higher reliability and performance at the cost of increased complexity. After the appearance of ZRP, the Energy Dependent Participation (EDP) scheme came as an extremely useful addition, dealing with nodes energy consumption. Lastly, the testbed chosen for the OMNeT++ implementation is presented giving details on this approach. Finally, the results of the simulation show the benefits of using the Floyd-Warshall routing algorithm.