Maximum capacity path interdiction problems

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This presentation focuses on a special type of network interdiction problems, called the maximum capacity path interdiction. The problem contains several users, for which there are specific arc capacity vectors. They wish to find an st-path with maximum capacity to flow their commodities along it. However, there is an attacker which would like to prevent the users from achieving their goals as much as possible. He enables to choose an st-cut for covering all st-paths, and decreases some of its arc capacities with fixed costs. The problem is a Stackelberg game, in which the attacker is the first-level player and the users are at the second level. The aim of the attacker is to minimize an objective function in terms of the maximum capacities of the users under a budget restriction. The problem is considered for two different types of objective functions: the bottleneck type and the sum type. The first (second) case is to minimize the weighted maximum amount (the weighted sum) of capacities which users can move. In the first case, a polynomial-time algorithm is stated to solve the problem. In the second case, it is proved that the problem is NP-hard. Then, a row-generation algorithm is presented to solve the problem in the general case.