The Evaluation of the Probabilistic Packet Marking for Path Bifurcation *

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ABSTRACT

At present the algorithm of probabilistic packet marking for IP trace back is used to handle the Denial of Service, and its assumption is that the attack traffic along an attack path is uniform. But this assumption is not always true because of routing asymmetry and exploiting source-routing, which results in the path bifurcations. In this paper, two cases of path bifurcations are investigated, and the relationship between the convergence capacity and the bifurcating probability of traffic is presented. Furthermore, the bifurcating probability of traffic is determined when the attack capacity is minimized. Especially when the traffic on some bifurcation path is sparse, the quantity of attack packets for the reconstructing the path will increase rapidly. Finally, our experimental results demonstrate the distribution of the bifurcating probability of traffic and the convergence capacity. Besides, its optimal bifurcating probability increases with the growth of the length of a bifurcating path, but its optimal marking probability decreases for this path. At the same time, these conclusions are consistent with theoretical value.

Keywords: IP traceback, Probabilistic packet marking, Path bifurcation, Denial of Service, Network security.

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