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Assessment of the probability of a DDoS attack using thematic networks

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Abstract:

This study focuses on assessing the probability of a DDoS attack using thematic networks and determining the minimum number of participants required for a successful attack. The research utilizes three analytical methods: the MVA model (Mean Value Analysis, or multi-phase queue analysis), the Logistic model, and the Boger-Sokolov model. These approaches allow for estimating attack likelihood while considering network traffic distribution, geographical and temporal node distribution relative to the target server, network bandwidth, and current system load. The results provide key metrics for optimizing DDoS attack efficiency by redirecting traffic through more active network nodes. Additionally, the study highlights critical network areas most vulnerable to attacks and identifies potential system bottlenecks depending on various operational parameters.

The findings can be used for risk assessment in network security, helping to identify high-risk zones and improve resilience against distributed cyber threats.

Keywords: DDoS attack, thematic networks, queueing theory, logistic model, Boger-Sokolov model, network security, risk assessment.

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