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1 Title of the Paper

A Comprehensive Robustness Analysis of Storj DCS Under Coordinated DDoS Attack

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3 Abstract

Decentralized Cloud Storage (DCS) is considered to be the future for sustainable data storage within Web 3.0, in which we will move from a single cloud service provider to creating an ecosystem where anybody could be a cloud storage provider. Currently, the cloud storage market is highly dominated by centralized players like Amazon S3, Google Cloud, Box, etc. Decentralized projects like Storj, Filecoin, and Sia have seen rising popularity with the advent of Web 3.0 applications. At the same time, any blockchain network is susceptible to large-scale DDoS attacks. This work focuses on the Storj DCS, where we aimed to analyze the robustness of the system under the influence of a coordinated DDoS attack which can be carried out by an adversary or a group of adversaries taking down a set of storage nodes. The novelty of our work lies in threefold: First, we use statistical methods to mathematically model the content distribution as well as the loss of a file or a segment from the system. Our model captures both the cases where we have homogeneous and non-homogeneous nodes. Secondly, we develop a cost-analytic approach to perform a robustness analysis of the Storj system and implement the proposed model in MATLAB. Finally, we calculate the cost of a DDoS attack that the adversary has to incur in order to be successful with the attack. Also, we propose a set of better parametric choices for erasure piece distribution under which the system has proved to be more robust than the parametric values implemented in Storj DCS.

[1] https://ieeexplore.ieee.org/abstract/document/10476188