



**A SCALABLE APPROACH TO JOINT
CYBER INSURANCE AND SECURITY-
AS-A-SERVICE PROVISIONING IN
CLOUDCOMPUTING**

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ABSTRACT

- As computing services are increasingly cloud-based, corporations are investing in cloud-based security measures. The Security-as-a-Service (SECaaS) paradigm allows customers to outsource security to the cloud, through the payment of a subscription fee.
 - However, no security system is bulletproof, and even one successful attack can result in the loss of data and revenue worth millions of dollars. To guard against this eventuality, customers may also purchase cyber insurance to receive recompense in the case of loss. To achieve cost effectiveness, it is necessary to balance provisioning of security and insurance, even when future costs and risks are uncertain.
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- To this end, we introduce a stochastic optimization model to optimally provision security and insurance services in the cloud. Since the model we design is a mixed integer problem, we also introduce a partial Lagrange multiplier algorithm that takes advantage of the total unimodularity property to find the solution in polynomial time. We also apply sensitivity analysis to find the exact tolerance of decision variables to parameter changes. We show the effectiveness of these techniques using numerical results based on real attack data to demonstrate a realistic testing environment, and find that security and insurance are interdependent.



EXISTING SYSTEM

- Despite the variety of security options available, it is inevitable that they will eventually be circumvented. Cyber insurance is used to provide explicit cover in the event that malicious activity leads to financial loss. Insurance coverage may be first- or third-party with first-party insurance covering eventualities such as theft of money and digital assets, business interruption, and cyber extortion.
- Third-party insurance may cover problems such as privacy breaches, loss of third-party data (e.g. user account information), and public relations expenses .



- Major insurers, such as Allianz or QBE offer cyber insurance policies that cover a range of first- and third-party risk. Cyber insurance is an important and growing field, but carries some unique features that makes it challenging.

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DISADVANTAGES

- Financial losses due to cyber risks

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