

Secret Sharing for Cloud Data Protection  
(Technical Report)

The Privacy Struggle: How Consumers Advocate for Change  
(STS Research Paper)

An Undergraduate Thesis Portfolio  
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by

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## Preface

How can the loss incurred from cyber breaches be reduced? For corporations, a successful cyberattack may cause millions of dollars in damage, but the impact extends far past the financial effects. For consumers, entrusting their data to companies may expose themselves to leaks of sensitive data such as health records or bank information.

How can data be distributed to prevent system breaches from becoming data breaches? In 1979, Shamir and Blakley independently introduced innovative secret sharing algorithms to secure private data in a distributed way. For decades, secret sharing has been studied by academics, but considered impractical for large scale data security purposes due to its efficiency issues. Secret sharing done in addition to current forms of symmetric and asymmetric encryption provides more security guarantees than traditional data protection methods, which are still susceptible to re-encryption attacks and quantum attacks. Continued evolution of secret sharing schemes, advancements in distributed computing, and reduced costs for storage have prompted new interest in this area. Some companies, such as SplitByte Inc., have developed secret sharing based frameworks for data protection on the cloud and even have commercial pilots.

How do consumers who care about data privacy organize to advocate for interests? How consumers organize to challenge the most intrusive data practices has evolved significantly since the advent of the internet in 1990. Privacy advocacy efforts have transformed from disparate groups of activists to a worldwide privacy movement led by advocacy group coalitions. These coalitions influence new legislation such as GDPR and CCPA, which in turn create a fast-growing market for privacy tech companies. Concerned consumers, privacy advocates, privacy professionals, and government regulators must work together to keep pace with technological innovation and hold corporations accountable.

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