

Thesis Portfolio

sned – An End-to-End Encrypted File Transfer Service
(Technical Report)

**Domestic Surveillance in the United States Post-9/11: The Role of Legislation and Large
Technology Corporations**
(STS Research Paper)

An Undergraduate Thesis

Presented to the Faculty of the School of Engineering and Applied Science
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Bachelor of Science, School of Engineering

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Sociotechnical Synthesis

As the Internet becomes an increasingly important aspect of our lives, issues of data privacy are becoming more relevant. My technical project was very privacy-focused; its goal was to allow users to send files to one another securely, even if they did not trust the server they were using. My STS research paper focused on domestic surveillance, and sought to determine why the US intelligence community was turning more and more to large internet corporations to conduct the lion's share of its domestic surveillance. Issues of privacy are linked very closely with domestic surveillance conducted by the US government. My research paper will focus mainly on domestic surveillance as conducted by the federal government, and not on issues of data privacy that are limited to relationships between technology companies and users.

My technical project aims to provide end-to-end encryption for users wishing to transfer files among one another. This is distinct from standard encryption, in which the server which acts as the intermediary between two users is able to decrypt messages intended to be read only by either of the two users. End-to-end encryption ensures that, even if the server is taken over by a malicious actor, the integrity and security of the data remains. This goal was achieved by building a web service on top of Amazon Web services which users could register for and transfer files, and using standardized asymmetric and symmetric encryption schemes to encrypt and decrypt files as they are sent and received.

My research paper took an in-depth look at the domestic surveillance programs and efforts undertaken by the US intelligence community, primarily the NSA. Many of these programs were revealed by Snowden in 2013. For this paper, I was interested in determining

why the NSA made such extensive use of large technology companies to gather intelligence. I also researched the legislation which allowed for these programs to exist, and discussed the most relevant ones. In addition to the policy analysis of legislation allowing for domestic surveillance, I conducted an Actor-Network theory analysis of the federal government and agencies like the NSA, large internet corporations, and internet users based in the United States, in order to answer this question.

I acquired and honed a variety of skills while working on my technical project. In using Amazon Web Services as the infrastructure for my app, I learned a lot about cloud technologies as well as managing servers in the cloud. I also learned about state-of-the-art encryption techniques on protocols, and how they are meant to be properly implemented in software. Doing research for my STS research paper taught me much about how domestic surveillance is conducted in the United States, as well as legislation that allows for surveillance. Additionally, I learned about the history and role of the NSA, and also the impact that large technology companies have on data privacy issues.