

Streamlining Help Request Workflow with Slack Automation Tools

Investigating Cryptocurrency Related Crimes Through Silk Road Scandal Case Study

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On my honor as a University student, I have neither given nor received unauthorized aid on this assignment as defined by the Honor Guidelines for Thesis-Related Assignments.

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General Research Problem: Analyzing the Intersections in Security Practices of Cryptocurrencies and Enterprise Software

The popularity of cryptocurrencies has been rising steadily over the past few years. With all the good that has come out of the boom of cryptocurrency, like innovations in blockchain technology, a lot of bad has come out as well. The occurrence of crypto related crimes has been steadily increasing as cryptocurrency has gained more traction. For my STS research, I plan to investigate the Bitcoin Silk Road scandal of 2013, unpack some of the characteristics of cryptocurrencies that make them ideal for exchanging illicit goods, and understand why criminals are more inclined to use them for criminal activity. For my technical research problem, I was tasked with improving a help-request workflow by integrating automation tools in Slack. One of the solutions was building a Slack Bot that helped users retrieve general information about my team's service via slash commands. This project involved verifying HTTP requests with unique signatures and secrets, to ensure that incoming requests to my API endpoint were from my Slack Bot and not any malicious actors. This process is very similar to how transactions are verified in many cryptocurrencies, including Bitcoin. Through gaining knowledge in both my technical and STS research projects, I plan to articulate the intersections in security practices between enterprise software and cryptocurrencies.

Technical Research Problem: Streamlining Help Request Workflow with Slack Automation Tools

For my technical research problem, I was tasked with improving the help request walk-up workflow in my team's Slack channel. Slack is a messaging application for businesses that allows professionals to connect with each other more easily. Our team owned the login service

for our company's platform. This means that any logins or problems with logins, both internally for company use and externally for customer use, went through our team. Obviously, with such an expansive group of users making use of our service, there are bound to be countless problems that people run into. The process for users to submit help requests existed only in the form of sending text messages into a Slack channel with all our team members in it to assist. This process to file a help request was a quite unwieldy and messy process, with little to no structure, leading to overlooked requests, extremely long message threads for simple problems, and a very unappealing looking Slack channel.

To improve the experience for both our team that handled the help requests and the users filing those requests, we planned to use some of Slack's built-in tools to stand up a more structured and automated help request workflow. With the addition of forms, we could ensure that users were sending us the correct amount of information when filing requests, which made the lives of both my team members and our users much better. Automated private messages were also a big part of cleaning up the cluttered channel as solutions were sent directly to the person that initiated the help request instead of being broadcast to the whole channel. In addition to these improvements, I was tasked with building a Slack bot which allowed for a much more expanded suite of solutions. One of the main features of the bot, named Oktavian, was supporting slash commands that helped users more easily access general information about our team's service. With the addition of Oktavian to our channel, we were able to deflect simple questions about the login service to the bot rather than having to worry about answering them ourselves, which greatly improved our productivity in other aspects of our work.

Through this experience I learned a collection of new skills and technologies including working in an Agile software development team, working with AWS CDK, and learning a new

programming language, TypeScript. The addition of Oktavian along with some of the other features in our Slack channel was of great value to both my team and our users. It streamlined an otherwise messy and unordered process that caused headaches for management and the rest of our team.

STS Research Problem: Investigating Cryptocurrency Related Crimes Through Silk Road Scandal Case Study

Cryptocurrency related crime has become quite prominent over the past decade. The use of cryptocurrency can aid cyber criminals in committing a wide variety of crimes including scams, money laundering, and buying and selling illicit goods. I plan to explore this last category of crime, the sale of illicit goods, by looking into Ross Ulbricht's involvement in the Silk Road Bitcoin scandal that happened in 2013. The Silk Road marketplace was founded in 2011 by Ulbricht, who went by the online alias Dread Pirate Roberts (DPR), where users were able to use Bitcoin as a payment method to hide their identities and avoid governmental intervention. The marketplace served as a medium for users to buy and sell illegal items like stolen merchandise, forgeries, hacking devices, and most notably narcotics, which accounted for 70% of the products sold on the Silk Road. The Silk Road prohibited the sale of anything with the intent to harm or defraud including child pornography, assassinations, and weapons, but many other dark web marketplaces, inspired by the Silk Road, did not exercise these prohibitions (Christin, 2013). The goal of my research is to answer the question of how certain characteristics of cryptocurrencies influence crypto related criminal activity, and why criminals are more inclined to use them for illegal transactions. Being able to identify and understand the characteristics that make

cryptocurrencies ideal for illegal transactions is important, as regulators and crypto developers must defend against these exploits when making laws and developing new currencies.

The social implications of an online marketplace, like the Silk Road, backed by cryptocurrency, like Bitcoin, expand vastly across many different areas. For one, a marketplace like this makes illicit goods, especially narcotics, extremely easily accessible. With the current state of the drug market around the world and the damage it is doing to communities, easily accessible drugs via online anonymous transactions accelerates the amount of drugs going into circulation. Another social implication of crypto use for illicit transactions is the fact that cryptocurrencies are very loosely regulated by the government. With cryptocurrency only rising to popularity over the last decade or so, its novelty lends itself to its lack of regulation, allowing criminals a lot more space to operate without breaking laws (Valdeolmillos et al., 2020). The novelty of cryptocurrency also means that authoritative actors, like the FBI for example, need to formulate new techniques to discover and catch these cyber criminals. Undercover sting operations, rather than taking place in an isolated parking lot in the middle of the night, now must take place on dark web chat forums, behind a keyboard and screen.

This scandal involving DPR, the Silk Road, and Bitcoin shined the light on the darker side of crypto and exposed some of the weak points of cryptocurrency that could be exploited to aid criminal acts. One of the weak points that I want to focus on is the anonymous nature of crypto transactions. Little to no personal identifying factors are tied to a crypto wallet, making them ideal for criminals who want to stay under the radar. The loss of individuality and self-awareness due to perceived or total anonymity through using cryptocurrencies can lead people to act in more deviant ways. This relates to a phenomenon called deindividuation, which states that when a person believes that they cannot be personally identified, they lose all self-awareness and

begin to act in impulsive and sometimes violent ways (Bray, 2016). This is an important theory to understand when discussing cyber-crime, as it can help provide some insight on a criminal's motives and why the sense of anonymity promotes criminal behavior. The anonymous nature of cryptocurrency transactions makes them ideal for the sale and purchase of illicit goods, as you cannot be easily identified by the government or other regulating actors.

Another aspect of cryptocurrency that can be exploited by criminals is the fact that it is very challenging for third parties to seize crypto from criminals. In regard to the Silk Road scandal, Dread Pirate Roberts was able to keep a hold of millions of dollars' worth of his Bitcoin shares for almost a decade after the Silk Road was shut down. The FBI's approach to the online sting that led to the arrest of DPR was very slow and methodical. Over the course of a couple of years, the FBI arrested multiple Silk Road buyers and vendors. Ultimately, DPR was arrested in a library and was indicted on the charges of narcotics conspiracy, money laundering, and solicitation of murder for hire. After his arrest, the FBI began sifting through the Bitcoin wallets of DPR to collect his illegally obtained wealth. Seizing cryptocurrency from a wallet is a much trickier process than seizing cash from a safe. Once the cash is taken, it is no longer in the possession of the perpetrator. Bitcoin transactions must be validated by the rest of the community, so a multimillion-dollar transaction by the FBI to seize a criminal's fortune may look quite fishy to people verifying the transactions into the official block chain (Shamir, 2014). As a result, criminals can take advantage of this window of time where they still have access to their trove of cryptocurrency and transfer it to other accounts. The FBI was eventually able to find nearly 70,000 Bitcoin that had been transferred to a private wallet shortly after Ulbricht's arrest, which paid the \$183 million dollars that Ulbricht owed as restitution for his involvement in the Silk Road (Adler, 2018).

For my research, I plan to gather a collection of articles that help articulate some of the points above. For one, I feel that it would be useful to understand the entire Silk Road scandal from its inception to its operation, downfall, and lasting impact. This would most likely come in the form of a news article, blog post, or court case that outlines specific details and actors in the case. I plan to use these sources primarily to obtain background information about the Silk Road, how Bitcoin was used for illegal transactions on the marketplace and learn more about the perspectives of both Ulbricht and the FBI during the shutdown of the Silk Road. There is also some scholarly literature regarding the Silk Road marketplace, which provides a measurement analysis of transactions that happened across the Silk Road during its operation. The more specific details in this article regarding Silk Road transactions could prove to be useful in understanding the motives of crypto criminals. It also may be useful to understand technical limitations in cryptocurrencies that make them more susceptible for uses by criminals. I also plan to find research papers that explore the current challenges faced by cryptocurrencies and blockchain technologies, which I can use to further leverage my argument.

Conclusion

Through my research, I plan to gain a better understanding of the characteristics of cryptocurrencies that make them ideal for criminal activity by fully unpacking the Silk Road scandal of 2013. Identifying and analyzing these characteristics will also help articulate the elements of the sociotechnical system revolving around cryptocurrency and crime. I plan to use a variety of sources including news articles, court cases, and scholarly articles to conduct my research, expand my knowledge of the scandal, and interpret how the events and technologies behind the scandal affected the many groups involved, like criminal organizations, crypto developers, and regulating committees. By gaining more technical understanding of

cryptocurrencies and leveraging that knowledge with my experience from my technical research problem, I aim to express some of the intersecting security practices in both cryptocurrencies and enterprise software.

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