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Rapporteur Report:
Understanding the Dark Web and its Implications for Policy

May 17 and 18, 2018
Washington D.C and Arlington, Virginia

Abstract:

The Understanding the Dark Web and Its Implications for Policy conference focused on addressing the challenging dilemmas posed by the anonymity created by the "Dark Web" (the unindexed portion of the Internet only accessible through special browsers, such as Tor and I2P). The conference events brought together experts from computer science, sociology, political science, and information sciences to share their research on the Dark Web and cryptocurrencies. Through two distinct sessions – a May 17th briefing of congressional staffers on Capitol Hill and a May 18th conference of academics, government officials, civil society and industry professionals – the researchers were able to present their ideas and foster wider policy-relevant discussion of these issues. These sessions debate and dialogue, and have already spawned additional one-on-one conversations between the researchers, Hill staffers, and industry partners.

The event was supported by the generous sponsorship of a number of organizations, institutes and firms. In no particular order, these groups include:

- The Institute for Society, Culture and the Environment (ISCE), Virginia Tech;
- The Integrated Security Destination Area (ISDA), Virginia Tech;
- The Office of the Vice President (NCR), Virginia Tech;
- The Center for Peace Studies and Violence Prevention, Virginia Tech;
- Bluestone Analytics;
- InfraGuard (NCR);
- The Government Technology Services Coalition (CTSC);
- The Department of Political Science, Virginia Tech.

This short report summarizes the events of the two days.

Hill Briefing – May 17th, 2018 2:30-4:00pm

The first event was a 90-minute Capitol Hill Briefing, organized in conjunction with by Sen. Mark Warner's office. In total, seven of the researchers (three from VT; and one each from James Madison University, Skidmore College, University of Portsmouth, and Bluestone Analytics) briefed twelve distinct Senate and House offices, along with a reporter from the security periodical HSToday.

The briefing presentations covered a broad range of Dark Web topics, such as how and why people use Tor and the uses of cryptocurrency across illegal markets and drug categories.

The focus of these presentations was policy oriented and provided staffers with clear and tangible policy problems as well as actionable policy solutions.

The short presentations by the researchers opened the floor for further discussion, generating much debate and deliberation among the Congressional staffers. The design and development of policy related to the Dark Web was of particular interest, as was the use of cryptocurrencies. The questions and discussions focused considerably on the dual use of these technologies and the specific funding relationship between the State Department and Tor. The State Department provides funds to the Tor project to protect the free flow of information in repressive regimes, yet that same funded technology allows malicious actors to disseminate illegal content, such as child abuse imagery.

Additional focal points for discussion included alternative uses of blockchain technology and the increasing need for cryptocurrency regulation, with emphasis on Bitcoin and Monero. For example, the presenters were asked about their opinions of the current state of cryptocurrency regulations. This lead to a discussion of some of the current policies that are being enacted, such as extension of anti-money laundering legislation (AML) and "know your customer" (KYC) rules.

The briefing lead to media coverage in HSToday and a number of individual follow-up meetings between researchers and select Senate Offices, such as meetings with staffers from the offices of Senators Wyden and Reed.

Conference – May 18th, 2018 9:00am – 4:30pm

The conference hosted nine speakers from a range of universities and was well-attended by academics, industry representatives, civil society and government. The speakers included Dr. Gareth Owenson (University of Portsmouth, UK), Dr. Nicolas Christin (Carnegie Mellon University), Dr. Eric Jardine (Virginia Tech), Dr. Marie Vasek (University of New Mexico), Dr. Aaron Brantly (Virginia Tech), Dr. Andrew Linder (Skidmore College), Dr. James Hawdon (Virginia Tech), and Eric Nunes (Arizona State University), and Dr. Kathleen Moore (James Madison University). The audience consisted of 35-40 attendees from a variety of backgrounds, such as industry, academia, government, civil society and the wider public.

Like the Capitol Hill briefing, the topics covered by the speakers and panels were diverse in nature and orientation. As the first presenter of the day, Dr. Owenson provided an overview of the Dark Web and its contents. He spoke to the size of the Dark Web and the type of content that is generally found on Tor-hosted hidden services. In particular, he noted that although child abuse imagery sites made up only around two percent of the total number of hidden services hosted during 2014-2015, some 80 percent of recorded site visits went to this illegal content. Focusing on policy, Dr. Owenson suggested that the Tor Project should employ a Hidden Services blacklisting page to flag child abuse content so that it could be blocked or removed. He noted that this policy option is not supported, thus far, by the people behind the Tor Project.

The second speaker, Dr. Christin focused on the popularity and use of specific illegal markets on the Dark web, showing the general overtime increase in Dark Web market activity and covering important measurement concerns. The latter included measuring actual sales activity on illegal markets rather than simply posted listings and parsing reservation prices, where people raise the price of their offered content so that no one will buy it. His findings suggest that dark web markets are highly resilient: while takedowns might slow activity for a time, another market will develop to serve the purpose of the original forum.

The two three-person panel discussions focused on “Bitcoin and Cryptocurrencies,” and “Malware Markets and the Public use of Tor.” The Bitcoin panel featured Dr. Jardine (VT), Dr. Vasek (University of New Mexico), and Dr. Brantly (VT), and addressed issues of bitcoin and cryptocurrencies in Ponzi schemes, drug markets, and terrorism, respectively. Several actionable policy insights followed from this discussion, including the idea that to counter the sale and purchase of specific drugs policymakers might need to focus on currencies other than Bitcoin which are more widely associated with specific narcotics. Monero, for example, is associated over 100 percent more often with fentanyl than Bitcoin.

The panel on the public use of Tor and malware markets featured Dr. Linder, Dr. Hawdon (VT), and Mr. Nunes (Arizona State University). This panel covered a range of topics, including whether individuals use Tor in response to perceptions of political abuses/overreach by the US government (revealed via the Snowden disclosures), proliferating extremist content on online platforms and the relationship between Dark Web hacker markets and the exploitation of so-called zero-day vulnerabilities.

The final speaker was Dr. Moore, whose presentation focused on the issues that arise when teaching the next generation of Dark Web analysts. Dr. Moore showed that while there is a large employment demand among governments, private corporations and civil society for individuals with cybersecurity training, advertisements for these positions rarely mention Dark Web threat analytics. In a dynamic manner, Dr. Moore solicited opinions from the crowd on skills that they would like their new hires to have. Paradoxically, knowledge of the technical operation and policy implications of the Dark Web was a valued asset, even if not explicitly found in many employment adverts. She also explored the challenges of teaching sensitive subject matter and techniques that could be used for ill to students.

Across all of these various panels and sessions, audience questions and comments were thoughtful and provoking. Generally, these comments fell into four themes. First, a number of speakers were asked about their methods, particularly in regards to building web-scrappers that could measure Dark Web content (an environment where it is incredibly challenging to do so), and how to index an enviroment that changes unusually quickly. Second, there were many questions about who uses the Dark Web, why, and what makes them different from the average user. The panel regarding malware markets and the public use of Tor, in particular, drew such questions, and was useful in creating a discussion about what might be done by government and platforms to minimize harmful outcomes from the anonymity of the Internet and the Dark Web. Third, there was again an acknowledgement of Tor’s “dual use” and the challenges the Dark Web creates. Finally, there was a robust debate after Dr. Moore’s session on skills training and employment, as well as what ought to be taught in post-secondary curricula. Both Dr. Eric Jardine and Dr. Kathleen Moore were able to highlight some of the challenges they faced in teaching classes about the Dark Web at their respective institutions and what are they currently doing to overcome them.

Conclusions

In short, thanks to the generous support of our various sponsors within Virginia Tech, private industry and civil society, both the Capitol Hill briefing and the main conference provided valuable opportunities for individuals of diverse backgrounds to hold interdisciplinary discussion about the Dark Web, leading to a better understanding of its dynamics and challenges. The briefing highlighted the considerable interest in Dark Web and cryptocurrency issues on Capitol Hill. The main conference was similarly well-attended and spawned a number of new partnerships and a deeper understanding of the Dark Web and its implications for policy.