



Dissertation Defense

Benjamin VanderSloot

Enhancing System Transparency, Trust, and Privacy with Internet Measurement



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3:00 pm – 5:00 pm

<https://bluejeans.com/298086794> (Digital only)

ABSTRACT: While on the Internet, users participate in many systems designed to protect their information's security. Protection of the user's information can depend on several technical properties, including transparency, trust, and privacy. Preserving these properties is challenging due to the scale and distributed nature of the Internet; no single actor has control over these features. Instead, the systems are designed to provide them, even in the face of attackers. However, it is possible to utilize Internet measurement to better defend transparency, trust, and privacy. Internet measurement allows observation of many behaviors of distributed, Internet-connected systems. These new observations can be used to better defend systems they measure.

In this dissertation, I explore four contexts in which Internet measurement can be used to the aid of end-users in Internet-centric, adversarial settings. First, I improve transparency into Internet censorship practices by developing new Internet measurement techniques. Then, I use Internet measurement to enable the deployment of end-to-middle censorship circumvention techniques to a half-million users. Next, I evaluate transparency and improve trust in the Web public-key infrastructure by combining Internet measurement techniques and using them to augment core components of the Web public-key infrastructure. Finally, I evaluate browser extensions that provide privacy to users on the web, providing insight for designers and simple recommendations for end-users.

Internet measurement enables improvements to transparency, trust, and privacy in widely deployed systems critical to end-user security and privacy.

Chair: Prof. J. Alex Halderman