

# **Socio-technical Cybersecurity: *Misalignment of Incentives in a Complex Multi-stakeholder Setting***

**Rebecca Wright  
Rutgers University and Barnard College**

**AAAS Annual Meeting  
Washington, DC  
February 16, 2019**



**Computer Science**  
BARNARD COLLEGE

**RUTGERS**  
School of Arts and Sciences

# Today's Cyber Landscape



## The Cloud



## Web browsers and other apps



## Smartphones and tablets



## Embedded computing and Internet of Things (IoT)



## Social media



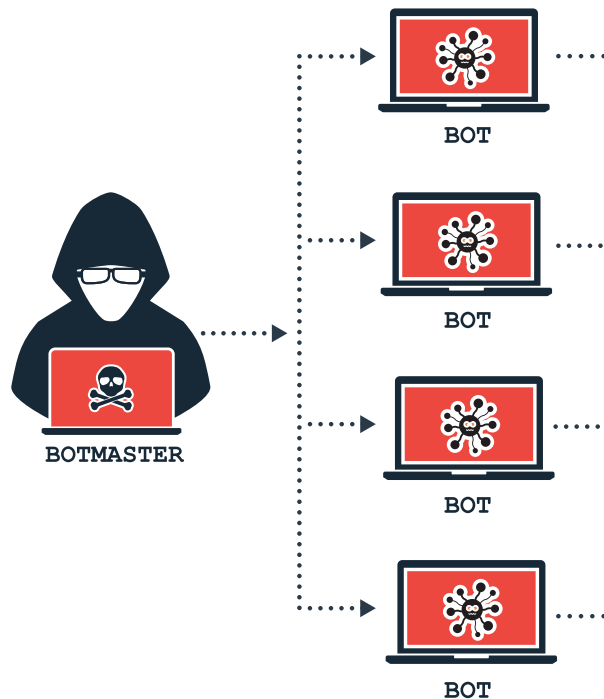
- The cyber threat has evolved to reflect the increased importance and extensiveness of cyber activities:
  - hobbyists and those seeking notoriety or status
  - profit-seeking criminals (identity theft, spam)
  - organized crime, cyber espionage (intellectual property, government intelligence)
  - cyber warfare and cyber terrorism
- Cyber security is a multidisciplinary endeavor requiring advances in computer science and engineering, public policy, psychology, criminology, and more.



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# Example: Bot Net



## Worm Infects M

GARRETT M. GRAFF SECURITY 12.13.17 03:55 PM

## HOW A DORM ROOM

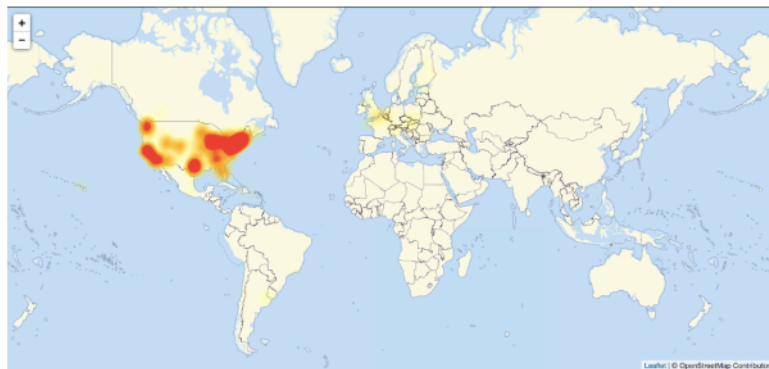


WIRED

The New York Times

By JOHN MARKO

### Hackers Used New Weapons to Disrupt Major Websites Across U.S.



A map of the areas experiencing problems, as of Friday afternoon, according to [downdetector.com](http://downdetector.com).

By Nicole Perlroth

Oct. 21, 2016



SAN FRANCISCO — Major websites were inaccessible to people across wide swaths of the United States on Friday after a company that manages crucial parts of the internet's infrastructure said it was under attack.

ZDNet



## Fake crypto ransomware pay up

Fake cryptocurrency  
installing what rese  
delivery techniques



By Danny Palmer | January 21

Tim

00:00

[How to pay](#)  
[Contact us](#)

9,324 views | Jun 22, 2018, 03:00pm

# Scammers Attack Email Inboxes With A Ransomware Protection Racket



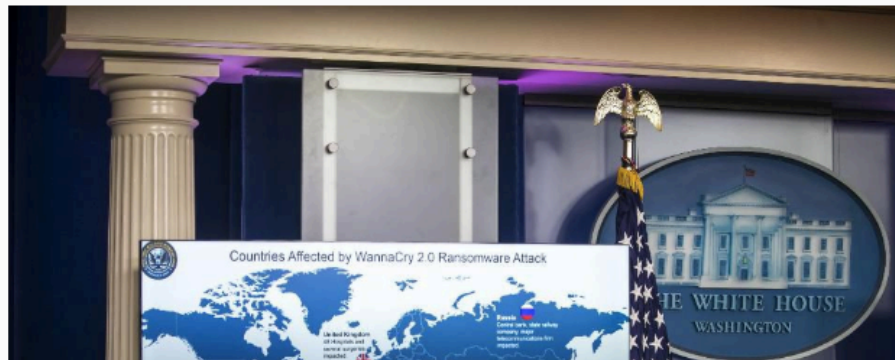
Lee Mathews Contributor

Security

Observing, pondering, and writing about tech. Generally in that order.

- f Security researchers have spotted a new wave of ransomware attacks, but there's something different about this one. It seems as though there's no
- twitter actual ransomware involved.

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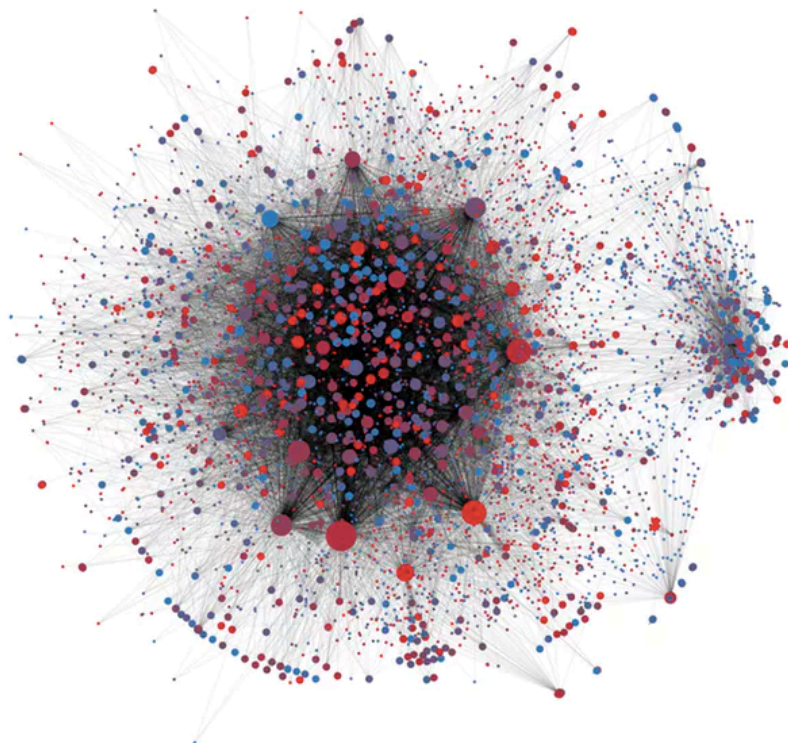
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In this visualization of the spread of the #SB277 hashtag about a California vaccination law, dots are Twitter accounts posting using that hashtag, and lines between them show retweeting of hashtagged posts. Larger dots are accounts that are retweeted more. Red dots are likely bots; blue ones are likely humans. Onur Varol, CC BY-ND

DARPA Twitter Bot Challenge  
V.S. Subrahmanian et al.  
IEEE Computer, 2016

- Dots are Twitter accounts posting using the #SB277 hashtag about a California vaccination law.
- Lines between them show retweeting and size reflects number of retweets
- **Blue dots** are likely humans
- **Red dots** are likely bots

# Toward Solutions



- Better design of technical systems can help, but won't solve all problems. Need to move beyond a zero-sum game mentality and false dichotomies.
- Carefully designed regulation can help align incentives, drive investment.
- Thinking about users, uses, and usability is critical.
  - Includes recognizing that different parties have different goals and values.
  - A better understanding of the actors in the system, their incentives, and how they may be better aligned to build security, is a critical piece in making progress.
- Insights gained lead to more informed choices and better system design.
- Education and raising awareness can help.
  - But need to avoid blaming the user.





# Conclusions



- Today's technology creates huge opportunities for value, but also for security breaches and privacy invasion.
- In the complex sociotechnical ecosystem, cybersecurity is unlikely to be achieved without fully embracing the broad social and physical contexts in which computing takes place.
- Technology, policy, and education must work together.

