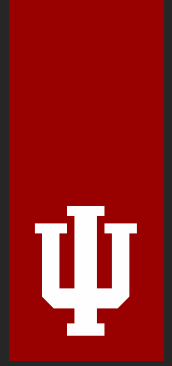


Black Hat 2021

The Case for a National Cybersecurity Safety Board

Understanding the Cyber Threat to Critical Infrastructure

What is ‘Critical Infrastructure,’ Who Should Defend it, and How?

1. How is it defined? Is this evolving?
2. What regulatory requirements come along with the designation?
3. What powers does the U.S. government have in protecting critical infrastructure? Are these too narrow, or too broad?
4. If everything is ‘critical,’ is anything?

Understanding the Cyber Threat to Critical Infrastructure

To Companies

1. Cyber Attacks are **Costly** – ransomware cost per incident was $178,254 in 2020 (Gartner)
2. **Widespread** – Phishing attacks increased by 11% during the pandemic (Verizon)
3. **Easy** – malware is freely accessible on both the common and deep web for as little as $70 (TechRepublic)
4. **Expanding** – Internet of (Every)thing

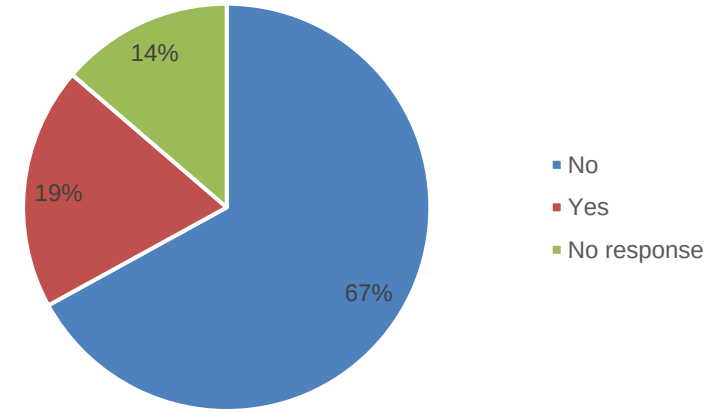
To Countries

- Fear of "Electronic Pearl Harbor" (overblown?)
- Protecting critical national infrastructure

*Source: KAL's Cartoon, Economist, May 7, 2009

State of Hoosier Cybersecurity 2020 Snapshot

To your knowledge, has your organization experienced a successful cyber incident in the past three years?



- Fewer organizations in critical infrastructure sectors reported successful cyber attacks than non-critical infrastructure organizations
  - About 13% of critical infrastructure organizations reported successful attacks
  - About 28% of non-critical infrastructure organizations reported successful attacks

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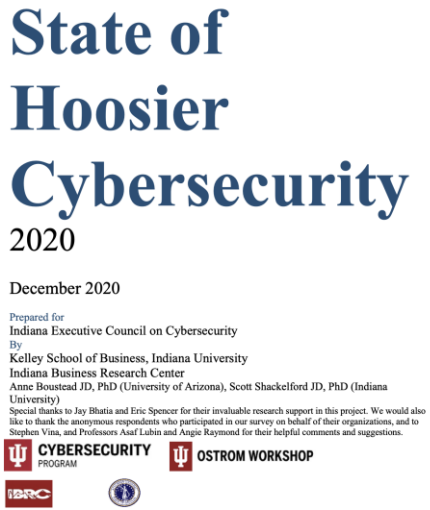
Making a difference in the fight against cyber attacks

Most Indiana Organizations Report Taking Steps to Prevent Cyber Incidents

- Just over 91% of organizations surveyed said they had taken some steps to prevent cyber incidents
- Slightly more critical infrastructure organizations said they had taken steps to prevent cyber incidents, when compared to non-critical infrastructure organizations
  - About 94% of critical infrastructure organizations reported taking cyber incident prevention steps
  - About 88% of non-critical infrastructure organizations reported taking cyber incident preventions steps


State of Hoosier Cybersecurity
2020

December 2020

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Toward a National Cybersecurity Safety Board

Negligence and the NIST Cybersecurity Framework

- **2013 State of the Union Address**
  - Response to failed legislative push
  - Focus on cyber threats to nation's critical infrastructure
- **Executive Order 13636: Improving Critical Infrastructure Cybersecurity**
  - Increase information sharing
  - Ensure privacy and civil liberties protections
  - Develop a voluntary Cybersecurity Framework

Proposing a National Cybersecurity Safety Board

- **Idea**: Why not create an NTSB for cyber attacks?
- **Evolution:**
  - **1991 NRC Report: "**Computers at Risk: Safe Computing in the Information Age"
  - **2014 NSF Report:** "Interdisciplinary Pathways towards a More Secure Internet"
  - 2018 Academic Article, and 2019 Wall Street Journal piece
  - 2021 Belfer Center Report: "Learning from Cyber Incidents: Adapting Aviation Safety Models to Cybersecurity
- **2021 Executive Order on Improving the Nation's Cybersecurity**

2021 Executive Order on Improving the Nation's Cybersecurity

1. **Section 5 Mandate**: Establish a Review board "co-chaired by government and private sector leads, that may convene following a significant cyber incident to analyze what happened and make concrete recommendations for improving cybersecurity."
2. **Function**: DHS and AG work together to staff Board to investigate cyber attacks "affecting FCEB Information Systems or non-Federal systems, threat activity, vulnerabilities, mitigation activities, and agency responses."
3. **Board Membership & Timeline**: Private sector & law enforcement, with a report due in June 2021 on Board's scope, responsibilities, structure, "thresholds and criteria for the types of cyber incidents to be evaluated"

Potential Challenges

- *Political*
  - **Scope**: which cyber attacks should be investigated?
  - **Workforce**: identifying the ‘right’ experts
  - **Industry Resistance** (and Support?)
- *Practical*
  - Information Sharing & Confidentiality
  - Defining Access to Data, Hardware & Software
  - Defining Appropriate Terminology
  - Need for Urgency
- *Related Reforms*
  - Major Cyber Incident Investigation Board (CSRB)
  - Bureau of Cyber Statistics
  - A Cyber Safety Reporting System (CSRS)

Lessons from the NTSB

About the NTSB

- Agency led by five Members, nominated by the President, confirmed by the Senate
- Investigate transportation accidents in all modes, determine cause(s), make recommendations to prevent recurrences
- Also investigate undesirable trends (not just single accidents), make recommendations to correct trends
- Advocate for implementation of its recommendations, which are not mandatory (but about 80% are implemented)
- Provide support as “accredited representative” for aviation accidents outside the US

Advantages of Independent Investigator

- Mishaps in regulated industries are usually investigated by the regulator
- Regulator's actions or omissions often play a role in mishaps
- Regulator's investigation report does not usually include its own actions or omissions as part of the cause
  - Its actions or omissions often not perceived as playing a role
  - Regulator unwilling to admit that its actions or omissions contributed to the mishap
- Independent investigation identifies actions or omissions by regulator that contributed to the mishap
  - More NTSB recommendations go to regulators than to any other single party in the industry

History & Evolution of NTSB

- Aviation accidents were investigated by Dept of Commerce for many years; other modes investigated other ways
- Safety for all modes (aviation, rail, highway, maritime, pipeline) was placed under one roof, Dept of Transportation, in 1967
- NTSB was created in 1967 and placed under DOT to investigate accidents in all modes
- Due to awkwardness of NTSB recs going to its ”boss,” DOT, NTSB was separated from DOT and made independent in 1974

How Congress Made NTSB Independent

- Party balance – Only three of the five Members can be of the President's party
- Insulation from political forces – Members are appointed to fixed terms rather than serving at the pleasure of the President
- Knowledge requirement – Three of the five Members must have relevant background or experience
- Staggered five-year terms, one Member's term expires at the end of each calendar year, so new President can only replace Members whose terms have expired, provides institutional continuity
- Purpose of independence – Helps ensure that probable cause determinations and recommendations are based upon the facts, not influenced by lobbying or undue political influence

Impetus for Extraordinary Statutory Independence

- Large percentage of the public is afraid of flying, fear of lack of control
- Most federal legislators fly frequently, e.g., to and from DC

Separation from Litigation

- Facts are public on NTSB website to provide transparency
- NTSB's accident reports are also public, but not admissible in litigation
- Factual portion of the investigation involves all of the "parties" – airline, manufacturers, pilots, mechanics, airport, regulator – as needed for technical support, but not attorneys or passenger representatives
- To ensure independence and avoid party bias, parties are not involved in the analytical portion of the investigation, solely the NTSB
- NTSB investigators can be deposed only once, and then only about the facts (not about analysis or conclusions)
  - Depositions are often unnecessary because facts are public
- Cockpit voice recorder readouts are not public, NTSB removes non-pertinent content before releasing transcript

Accidents are Fundamentally Different from Cyber Attacks

- Transportation accidents are almost always caused by inadvertent error
  - Objective of investigation is not to blame, but to propose improvements to prevent recurrences
  - Investigation is very collaborative because everyone wants to prevent recurrences
  - Outcome of investigations is recommendations to whomever can take needed corrective actions, including regulators
  - Investigation is very transparent to demonstrate to public that conclusions and recommendations are from the facts and evidence
  - When evidence of criminal activity or intentional wrongdoing is found, e.g., 9/11, NTSB asks FBI to lead, whereupon NTSB provides technical support, investigation transparency ends

Fundamental Differences (con't)

- Cyber attacks are intentional
  - Combines need to find perpetrator (as in criminal investigations) along with need to improve mishap defenses (as in NTSB investigations)
  - Transparency is probably undesirable, would give important hacking clues to potential perpetrators
  - Challenge is developing and implementing recommendations for improved defenses without revealing important secrets to potential perpetrators

NTSB in Other Applications?

- E.g., healthcare, major financial mishaps
- General recommendations
  - Use exhaustive NTSB-type investigation for rare mishaps that surprise even the experts
    - Investigations are very thorough, usually take a year or more
  - For mishaps that occur frequently, use collaborative “System Think” approach to identify and address systemic issues

Advice for the Biden Administration Based on NTSB Experience

- Problems that occur frequently indicate systemic shortcomings: suggest investigating trends rather than individual events, with focus on systemic issues
- Aviation analogy – Commercial Aviation Safety Team, voluntary govt-industry collaborative effort to improve safety
- Problems that are rare and surprise even the safety experts indicate shortcomings that are more unique to the situation: suggest NTSB-type in-depth investigation of the individual circumstances

Conclusions

One size does not fit all

-- but --

Some NTSB processes, e.g., active participation by the parties for technical support, may be transferable to help cyber attack investigations identify protection gaps and develop remedial recommendations

Thank You!!!

Questions?

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SECTION 2

Global Note

Global NIST CSF Uptake

	UK	Italy	EU	Japan	South Korea	Australia
Overall NIST Framework Implementation Status	No new, updated strategy has been released since the NIST Framework was released. However, intent to harmonize NIST and UK practices has been announced formally by US and UK leaders. The recent release of 10 Steps: Advice Sheets track elements of NIST Framework.	General intention to identify international best practices announced. No specific mention of NIST harmonization or implementation, but certain language overlaps imply NIST influenced Italian cybersecurity strategies.	NIS Directive still in flux, but is close to implementation. At least one meeting was held regarding the merits of standardizing NIST and NIS Platform, and results of latest NIS Working Group meeting indicate implementation is likely.	Pending[1]	Pending[2]	Pending[3]
Overlap with NIST Framework Approach	Emphasis that implementation of framework may be variable depending on the business, and is adaptable over time. Enables internal risk management processes, implementation variable based on risk appetite.	Espouses best practices in the language of the NIST Core: analyzing, preventing, mitigating, and reacting to cyber threats.	Exact language of NIST core has been proposed for formal adoption into NIS Directive.	Emphasis on voluntary standards and public/private cooperation.	Utilizes some market-developed standards.	General emphasis on voluntary standards and public/private cooperation, and risk management.
Differences with NIST Framework Approach	Not broken down by Function, etc. Rather, collected in "Advice Sheets" intended to assist firms. Compliance is required to achieve Cyber Essentials certification.	Broken down in a pyramid structure, with risk analysis, management, and mitigation forming the base, and identifying training, awareness and "empowerment" as the capstone. Emphasis on preventing cybercrime.	Less focus on responding to cyber threats, and does not emphasize public relations and reputational damage caused by incidents. Steps for detecting and protecting against intrusions sometimes overlap.	(Unavailable at this time.) Potentially a greater reliance on government incentives than risk management.	Mandatory. Standards primarily government developed. More top-down than NIST Framework.	(Unavailable at this time.) Potentially a greater reliance on private/private partnerships.

GDPR Operational Impacts & NIS Directive

1. Cybersecurity & Data Breach Requirements
2. Mandatory Data Protection Officer
3. Consent
4. Cross-Border Data Transfers
5. Profiling
6. Data Portability
7. Vendor Management
8. Pseudonymization
9. Codes of Conduct & Certifications
10. Consequences of Non-Compliance

*Source: IAPP

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