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Welcoming Remarks

Rebecca Bole
EVP & Editor-in-Chief
Advisen

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The **right** hands at

The **right** time

To power *performance*

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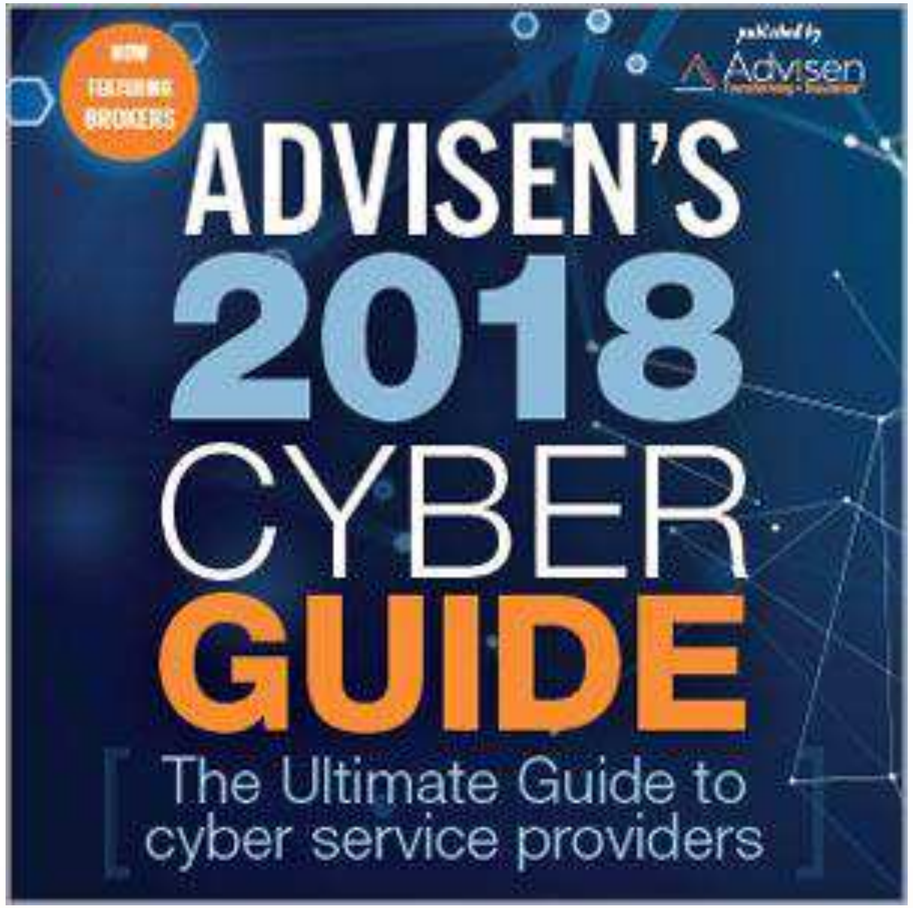

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2018 Advisen Cyber Guide

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Experian

Public or private: **Public**	*Number of clients:* **Tens of thousands**
Annual revenue: **>$1B**	*Client industry focus:* **N/A**
Number of employees: **>1000**	*Revenue range:* **N/A**
CEO: **Craig Boundy**	*Geographic reach:* **Global**
Year founded: **Roots dating back to the early 19th century. Experian name was officially formed in 1996.**	

About Experian:

experian.

Experian Data Breach Resolution, powe
businesses prepare for a data breach a
a decade of experience, Experian Data
highest-profile data breaches in history.
call center support and fraud resolution
credit and identity theft protection prod
Association of Privacy Professionals, A
a founding member of the Medical Iden
databreach.

Michael Bruemmer,
Vice President,
Consumer Protection

- How many net
- How many rec

475 Anton Blvd • Costa Mesa, CA 92626
949-294-8886
Michael Bruemmer

Marsh

Public or private: **Public**	*Number of clients:* **N/A**
Annual revenue: **>$1B**	*Client industry focus:* **All industries**
Number of employees: **>1000**	*Revenue range:* **N/A**
CEO: **John Q. Doyle**	*Geographic reach:* **Global**
Year founded: **1871**	

About Marsh:

MARSH

From the creation of the first cyber policy forms to leading the marketplace in the development of privacy and business interruption coverages, Marsh's Cyber Practice offers unparalleled resources in cyber advisory and risk transfer solutions. With industry know-how spanning decades, Marsh's Cyber Practice helps clients assess, manage, and respond to cyber threats and events. Marsh provides advisory services across diverse areas of cyber risk ranging from financial modeling to coverage analysis to threat intelligence. Marsh helps clients assess their cyber risks and build the right insurance program to meet their unique needs. Marsh continues to lead the market with such innovations as Cyber Risk Assessment: a self-assessment tool mapped to the NIST Framework that provides feedback on a client's relative cyber risk maturity as well as providing a platform for the client to seek insurance coverage for cyber risk; Cyber CAT2.0: a bespoke policy wording embracing the premise that all of an entity's technology risks should be covered; Cyber ECHO: a proprietary excess facility with unique reinstatement options; Cyber IDEAL: designed to identify damages, evaluate, and assess limits for data breaches and technology outages, and Marsh's Cyber Risk Toolkit that enables a client to identify and quantify its cyber risk through a combination of financial and threat modeling tools. Marsh's Cyber Risk Practice is a global team of more than 50 cyber and risk management colleagues possessing an unbeatable combination of hands-on practical know-how and expertise with backgrounds in underwriting, claims, legal, technology, and government.

Tom Reagan,
Cyber Practice Leader

- As of September 30, 2017, approximately how much cyber premium does your brokerage handle? **N/A**
- How many dedicated cyber insurance brokers does your company have handling client cyber risk on a day-today basis? **50+**
- How many standalone cyber claims did your firm's clients file in the last 12 months? **N/A**
- Who are your top 5 cyber insurance trading partners? **N/A**
- How many insurance carriers does your company partner with? **N/A**

Does your company integrate third-party data with your solutions? **Yes**

1166 Avenue of the Americas • New York, NY 10036
212-345-9452
Tom Reagan

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VOTING NOW OPEN!

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THE 2018 AWARD CATEGORIES:

CYBER RISK INDUSTRY PERSON OF THE YEAR- USA
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CYBER RISK EVENT RESPONSE TEAM OF THE YEAR
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CYBER RISK INNOVATION OF THE YEAR
CYBER SERVICE VENDOR OF THE YEAR
CYBER NEWCOMER OF THE YEAR
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CYBER RISK BROKING TEAM OF THE YEAR
CYBER RISK INSURER OF THE YEAR

Voting closes April 20th at 11:45pm ET!

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Opening Remarks

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Presented by our 2018 Conference Co-Chairs

Hans Allnut
Partner
DAC Beachcroft LLP

Shay Simkin
Managing Director
Howden Israel

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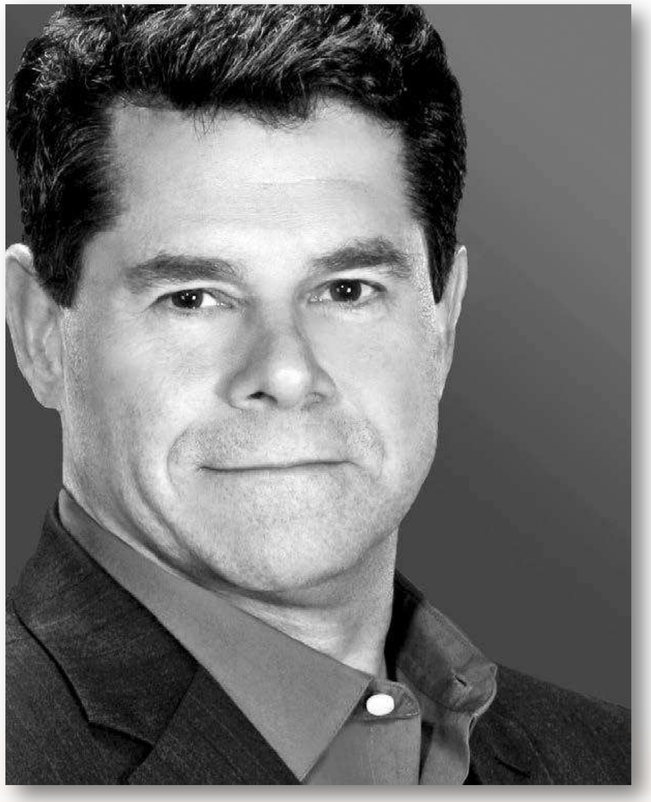
Morning Keynote Address



T. Casey Fleming
CEO
BLACKOPS Partners

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KEYNOTE ADDRESS
THE BIG PICTURE IN CYBER

‘New’ Global Competitive Model

Asymmetrical Hybrid Warfare

London 06.03.2018

T. Casey Fleming
CEO, BLACKOPS Partners Corporation

BLACKOPS PARTNERS CORPORATION PROPRIETARY

Critical Factors

- Cybersecurity has historically been fundamentally dysfunctional and broken
- Cyber industry and message driven by highly fallible products
- The big picture must be mastered before Cyber can be corrected
- Must intimately know adversaries' strategies before we can begin to fix Cyber
- All families and companies are engaged with the New Global Competitive Model
- Key concept to master is Asymmetrical Hybrid Warfare (AHW)
- Adversarial intelligence is key to AHW and correcting Cyber (vs. threat intelligence)
- Proactive Intelligence-based vs. Reactive product-based Cyber
- The largest long-term threat to every organization, family, and national security

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New Global Competitive Model
Asymmetrical Hybrid Warfare

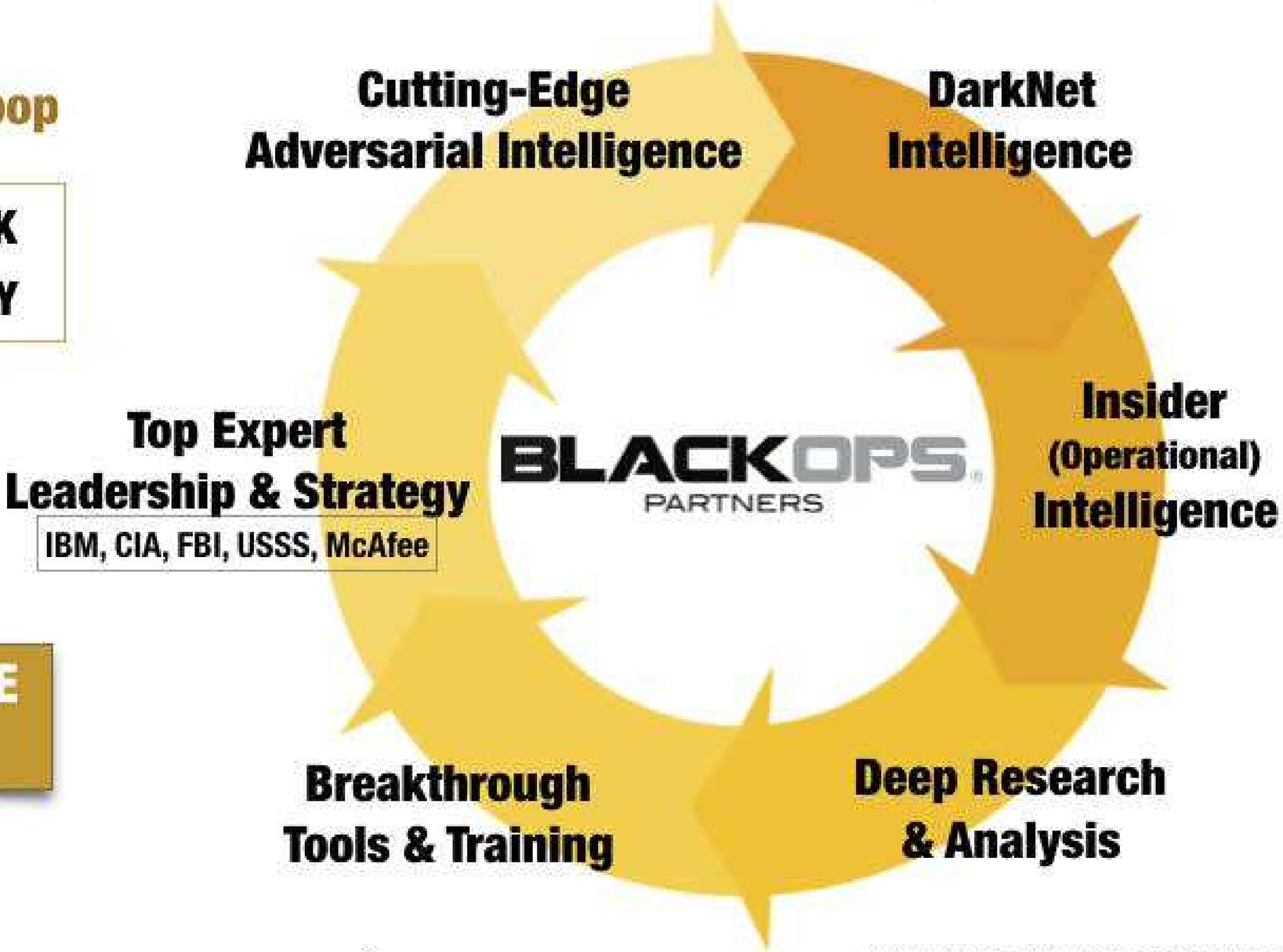
- Why you care
- ‘Don’t know what you don’t know’
- The New Global Competitive Model (Program 863: Asymmetrical Hybrid Warfare)
- War declared on all sectors and citizens (asymmetrical) of the US economy
- One-third of U.K. GDP stolen each year due to economic espionage
- Compound damages: Theft powering China plus sold back to UK at 45%-50%
- ‘The greatest transfer of wealth in history’ (Gen. Keith Alexander, 2012)
- ‘Death by a thousand cuts’ - estimated 750 cuts today

'Drone' View of the Cyber Battlefield

Critical 360° Intelligence Loop

INTELLIGENCE ▪ THINK TANK
STRATEGY ▪ CYBERSECURITY

DIRECTLY ADDRESSING THE CYBERSECURITY GAP



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THE CRITICAL ROLE OF INTELLIGENCE (ADVERSARIAL INTELLIGENCE)

- Espionage yields intelligence. Intelligence wins wars.
- Intelligence provides critical business decision support

Data	Information	Intelligence
•Swimming pool, lake	•Garden hose / tap	•Coca-Cola™
•Non-consumable	•Consumable	•Consumable
•Bugs, leaves, chlorine, algae, dirt, etc	•Plentiful, no taste	•Refined, syrup, effervescent
	•Non-defined	•Perishable, expires
	•Non-perishable	

Adversaries: Cybersecurity is at the Strategy Level

'NEW' GLOBAL COMPETITVE MODEL ASYMMETRICAL HYBRID WARFARE'

Asymmetrical Hybrid Warfare (AHW) is characterized as unconventional, non-military, multi-method strategic warfare based on deception; void of any rules between countries where economic and military power, strategy and tactics differ significantly.

The attacking country exploits characteristic weaknesses through numerous uneven and unrelated warfare methods designed to destabilize the unwitting target country. The ultimate goal is ultimate and complete takeover both economically and militarily until permanent capitulation is achieved. Extensive use of misinformation and plausible deniability are used to deceive and deflect suspicion of the strategy or its methodical advancement.

Hybrid warfare is a military strategy that blends conventional warfare, symmetric warfare, irregular warfare, offset warfare, non-linear warfare and cyber warfare. Asymmetrical hybrid warfare is rooted in unrestricted warfare (war without rules and "everything is fair play") also described as "anything warfare."

Source: BLACKOPS Partners Corporation

New Global Competitive Model

ASYMMETRICAL HYBRID WARFARE

The Modern Battlefield is Everywhere

Unrestricted Warfare

NON-MILITARY	TRANS-MILITARY	MILITARY
Economic Warfare*	Espionage Warfare*	Biological Warfare
Financial Warfare*	Information Warfare*	Chemical Warfare
Transaction Warfare*	Intelligence Warfare*	Ecological Warfare
Trade Warfare*	Industrial Warfare*	Space Warfare / EMP
Resources Warfare*	Resources Warfare*	Electronic Warfare
Regulatory Warfare*	Pirating Warfare*	Guerrilla Warfare
Legal Warfare*	DarkNet Warfare*	Terrorist Warfare
Education Warfare*	Smuggling Warfare*	Conventional Warfare
Technological Warfare*	CYBER WARFARE	Kinetic 'Smart' Warfare
Sanction Warfare	Drug Warfare*	Nuclear Warfare
Media Warfare	Infiltration Warfare*	
Propaganda Warfare	Deterrence Warfare*	
Culture Warfare	Psychological Warfare	
Ideological Warfare	Diplomatic Warfare	
Religious Warfare	Subversion Warfare	
Poisioning Warfare	Environmental Warfare	

"ANYTHING WARFARE" ABSENT OF ANY RULES

Espionage is the core focus and fabric of AHW

* Related to Economic and Transaction Warfare

Cyber Warfare functions as the key accelerator to all warfare methods

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United Kingdom
- **$1 trillion each year**
- **1/3 of UK GDP**
- **Espionage is fabric**
- **Foreign investment is a weapon**
- **Innovation**
- **Trade secrets**
- **Sensitive data**
- **Pricing**
- **Customers**
- **Employees**
- **PII**
- **Other**

ASYMMETRICAL HYBRID WARFARE / EXAMPLES

Industrial Warfare

- Solar Panels
- Windmills / Energy (AMSC)
- Steel dumping
- Inferior aluminum
- Technology (Nortel)
- Manufacturing
- Many others

Drug Warfare

- Opioid crisis
- Mexican cartels
- U47700
- Cryptocurrency

Propaganda Warfare

- Social media
- Wanda Group
- Obama trip
- Many others

Poisioning Warfare

- eCigarettes
- Jewelry
- Child makeup / Claire's
- Lumber Liquidators

Information Warfare

- Social media
- Election hacking
- Espionage
- Many others

REUTERS

"Trump Adviser Says U.S. in Economic War with China"

Reuters, August 17, 2017

ASYMMETRICAL HYBRID WARFARE

THE TOP THREAT TO NATIONAL SECURITY

CHINADAILY

"China invests in over 25% of US startups"

China Daily, December 15, 2016

The Washington Times

"China's $360M Gift to Harvard"

The Washington Times, August 16, 2017

Asymmetrical Hybrid Warfare

Around the Clock - High Order Espionage - Only a Few Examples

- "Free" Wi-Fi
- Home Wi-Fi
- Smartphones
- Banking Apps
- Apps
- Insider Threat & Spies
- New Hires / Interns
- Offshoring
- Conferences
- Dating Sites
- Appliances (All)
- Snowden
- Job Sites
- Unsecured Printers
- Washers, Dryers
- Cadillac, Buick
- Suspicious Activity
- Alarm Clocks
- Project 863
- No more VPN's

- Business in China
- Contractors
- Room Sensors
- Lighting Fixtures
- Travel to China
- Sharing Passwords
- Weak Passwords
- Employees
- Printers
- Phishing
- Linked-In, Facebook
- Suppliers
- Conference Rooms
- Unsecured Routers
- Conference Phones
- CYA, Complacency
- Software and Updates
- Malware and APT
- Any & All Electronics:
- "Made in China"
- Nortel, AMSC, etc.

- Travel Agents
- Front Desks, Hotel Rooms
- Hotel Housekeeping
- Car / Limo Service
- Ex-Employees
- AutoCAD, Adobe PDF
- Drugs: Legal & Illegal
- China
- Honeypots
- Russia, North Korea, Iran
- India, France
- Internet of Things: IoT
- Prescriptions
- Law Firms
- Hardware Back Doors
- Girlfriend, Boyfriend, Spouse, Other
- Cyber & The DarkNet
- Vendors, Suppliers
- Acquisitions
- NYSE, Airlines, etc.

- USB Chargers & eCigarettes
- Chargers, Power Strips
- Aircraft, Airports
- Lounges, Bars
- H1-B Visas
- XBox, PS4
- Anti-Virus
- U.S. & International Travel
- 304K US Univ. Student 'Spies'
- iPhones, Androids "On"
- Game and Flashlight Apps
- Greenfield Sites in U.S.
- Lenovo, Huawei, ZTE, others
- USB Drives, CD's, DVD's
- Junior IT Staff
- US Travel
- Computer/Phone Cams "On"
- Business in U.S.
- Toxicity in Products: Food
- Jewelry, Flooring, Sheetrock
- Much, Much, Much More…

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Cybersecurity / Today

- Still fundamentally dysfunctional and broken
- Still focused on perimeter that no longer exists
- Overconfidence and false sense of security
- Product-driven with less than 5% protection
- One-third of attacks are successful[1]
- Cyber attacks doubled from 2016 - 2017
- Cybersecurity: $1 trillion industry by 2021[2]
- Zero AHW awareness - ‘fighting a ghost’
- Zero focus on adversarial intelligence

CIO - CISO - CSO - CRO - CDO

[1]Bloomberg, 11.2016; [2]Cybersecurity Ventures

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Cybersecurity / Corrected

- 95% business risk issue vs. 5% IT issue
- 100% human problem
- Culture, policy, funding allocation change
- Led by CEO and board, supported by C-levels
- Compliance is only the starting point
- Focus required on adversarial intelligence
- ‘Cyber risk management is expected to go enterprise-wide in 2018’ (Advisen: Aon report)
- SEC requiring ‘clearer’ cyber risk disclosure
- Cyber hygiene at personal <u>and</u> corporate level

NACD 2017-2018 PUBLIC COMPANY GOVERNANCE SURVEY*

- 4 of the 7 'Major Findings' directly affected by the New Global Competitive Model:

#1 Boards Are Concerned About Growing Industry Disruption, but Environmental and Social Issues Seem to Matter Less

#3 External Volatility and Uncertainty Drive a Desire for Deeper Board Involvement With Strategy

#5 Boards Are Less Confident About Cyber-Risk Preparedness

#7 Boards Are Slow in Adapting to Increased Expectations About Continuous Improvement of Their Skills, Practices, and Processes

*National Association of Corporate Directors

For Risk Officers

- Directors and C-Levels are prime targets for espionage and most at risk
- Engage boutique Cyber Law firm for board and company
- Hold CISO, CIO, CRO, CFO, GC, CTO, CHRO, and CEO accountable
- Demand annual data breach exercises documented by qualified third-party
- Demand CISO, CIO, and CEO present Cyber in terms of ‘Risk’
- Update corporate strategy with Asymmetrical Hybrid Warfare (AHW)
- Board to receive annual AHW strategy briefings
- C-levels to engage annual AHW war games exercises
- Board and C-levels to vet speakers, vendors, messaging with jaundiced eye
  (Adversarial intelligence, DarkNet feeds, insider, no products, human focus)

Ten Questions For Risk Officers to Boards and C-Levels

1. Do we conduct an annual data breach exercise* with actual breach scenarios and all group and department heads? Is it mandatory for all C-levels and department heads? Is it conducted by a highly qualified third-party and documented by staff? Do we measure and improve damages, timing, notifications, and results? Does the CEO champion the exercise? Does the board receive a summary briefing on the results? (*aka: tabletop exercise and TTX)
2. What are the three most likely data breach types our company is likely to experience? Please quantify the expected extent, damages, and mitigation efforts underway. Do we practice them?
3. What do we consider our most valuable assets? How are we protecting them, how are we limiting electronic and physical access to them? Do we classify our data?
4. Does our Cybersecurity strategy map to Asymmetrical Hybrid Warfare and is it been updated annually? May we have a copy?
5. Are all C-levels aware of the New Global Competitive Model (Asymmetrical Hybrid Warfare) and it's effect on company strategy, customers, employees, partners and suppliers? What are our mitigation efforts pertaining to Asymmetrical Hybrid Warfare with our corporate and Cyber strategy?

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Ten Questions for Risk Officers to Boards and C-Levels

6. Have we modeled all data breaches in our industry and effectively communicated lessons learned to all C-levels and department leaders? Have we inserted the lessons learned into our annual data breach exercise?
7. Is our insider threat program a priority in our Cybersecurity policy? Is it considered cutting-edge? Why? Do we require bi-annual certifications? Do we extend this to our entire vendor and supply chain?
8. Do we have a cyber expert or qualified third party expert acting on our board? Current and former CIO, CISO, CTO, and CSO are not ideal. Do we have the correct Cyber and D&O insurance coverage? Are the levels reviewed annually?
9. Do our CIO and CISO report separately to the CEO? Do they brief the board separately and privately?
10. Are we actively monitoring the DarkNet for nefarious activity and stolen data with respect to our customers, employees, suppliers and company? Is there a rapid response plan to engage experts and law enforcement for immediate remediation? Do we have active operatives scanning the DarkNet vs. ’scraping algorithms’?

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RESOURCES

- Army Cyber Institute: Cyber Defense Review, Fall 2017: “The Secret War Against the United States”
- Rand Corporation:
  “Stretching and Exploiting Thresholds for High-Order War” and “The Defender’s Dilemma”
  “How Russia, China, and Iran Are Eroding American Influence Using Time-Tested Measures Short of War”
- Michael Pillsbury, Author: The Hundred Year Marathon
- New York Post: “China’s Secret Plan to Topple the US as the World’s Superpower”
- James Scott, Senior Fellow: Institute for Critical Infrastructure Technology
- Joshua Philipp, Senior Research Analyst: The Epoch Times
- Amar Manzoor, Author: The Art Of Industrial Warfare; Co-Author of SPECTRE AHW Warfare Exercise
- Ian Bremmer PhD, President, Eurasia Group
- General James Mattis, United States Secretary of Defense, Irregular Warfare and Future Wars
- Peter Navarro, PhD: White House Director for National Trade Council
  Author: Crouching Tiger: What China’s Militarism Means for the World
- United States Cybersecurity Magazine, winter 2017
  “Asymmetrical Hybrid Warfare - Cybersecurity: Why We Can’t Get it Right,” page 59
- ‘Follow Us’ on BLACKOPS Partners Company page on LinkedIn
- BLACKOPS Partners website Home and Insight pages
- Contact: BLACKOPS Director hotline +1.202.888.4991 or contact(at)blackopspartners(dot)com
- Other resources

The Buyer's Perspective

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The Buyer's Perspective

Sarah Stephens
Head of Cyber, Tech and Media E&O
JLT Specialty
Moderator

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The Buyer's Perspective

- **Sarah Stephens**, Head of Cyber, Tech and Media E&O, JLT Specialty (Moderator)
- **Jeremy Harvey**, Vice President, Group Insurance, Barclays
- **Elizabeth Queen**, Vice President Risk Management, Wolters Kluwer
- **Henriette Scotwin Guespereau**, Lead Risk Advisor, Maersk

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CyberadAPT
RGL Forensics
QBE
WILSON ELSER
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Track 1

Event Round-Up

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Event Round-Up

Winston Krone
Managing Director
Kivu
Moderator

Event Round-Up

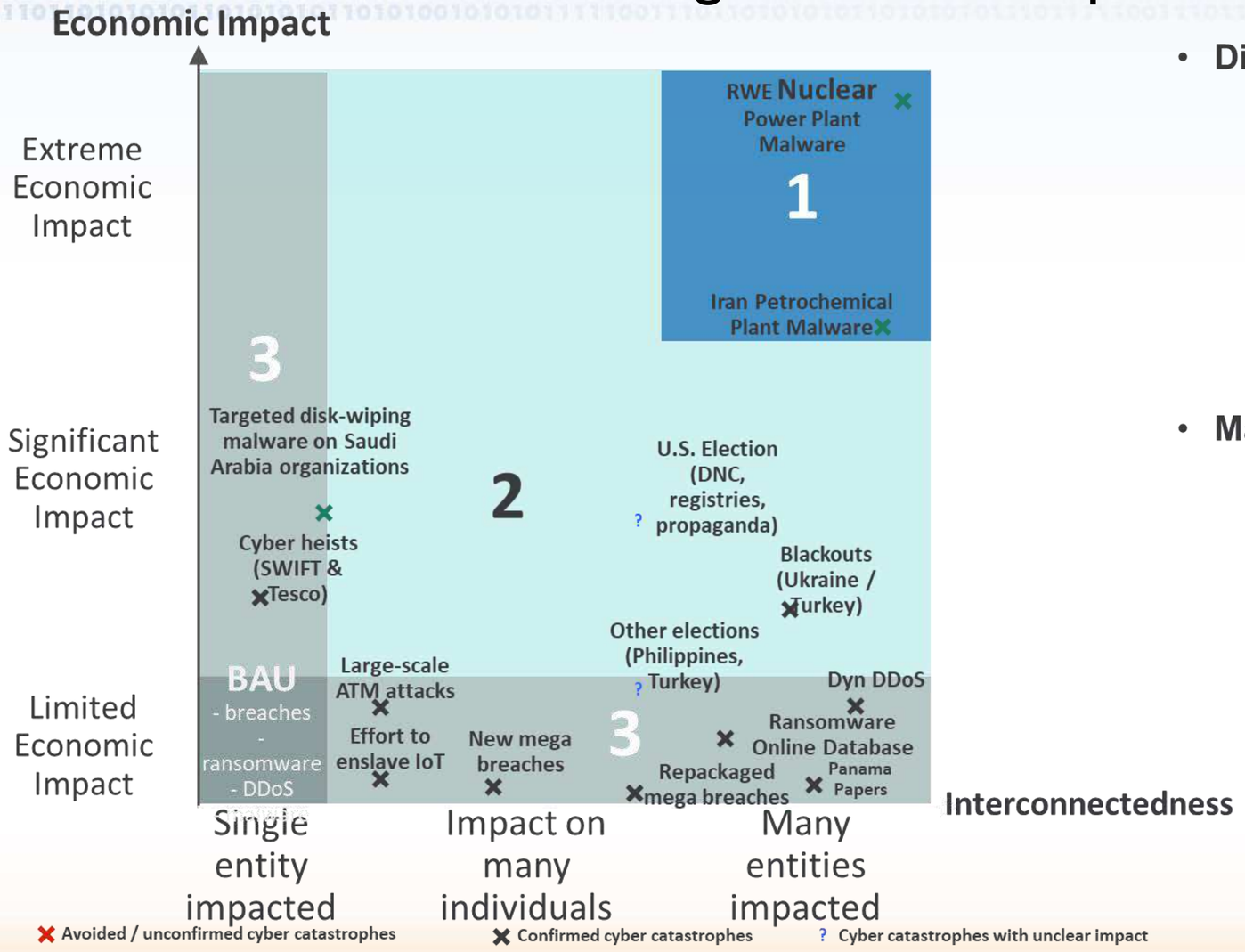
- **Winston Krone**, Managing Director, Kivu (Moderator)
- **Oliver Brew**, Head of Client Services, CyberCube Analytics
- **Sean Hoar**, Partner, Lewis Brisbois Bisgaard & Smith LLP

The Best of 2017

Specific events that symbolized 2017

1. **Destructionware – e.g. Wannacry/NotPetya**
2. **Surge in cyber extortion (and size of ransom demands)**
3. **Equifax**
4. **Email compromise/ Payment redirection fraud**

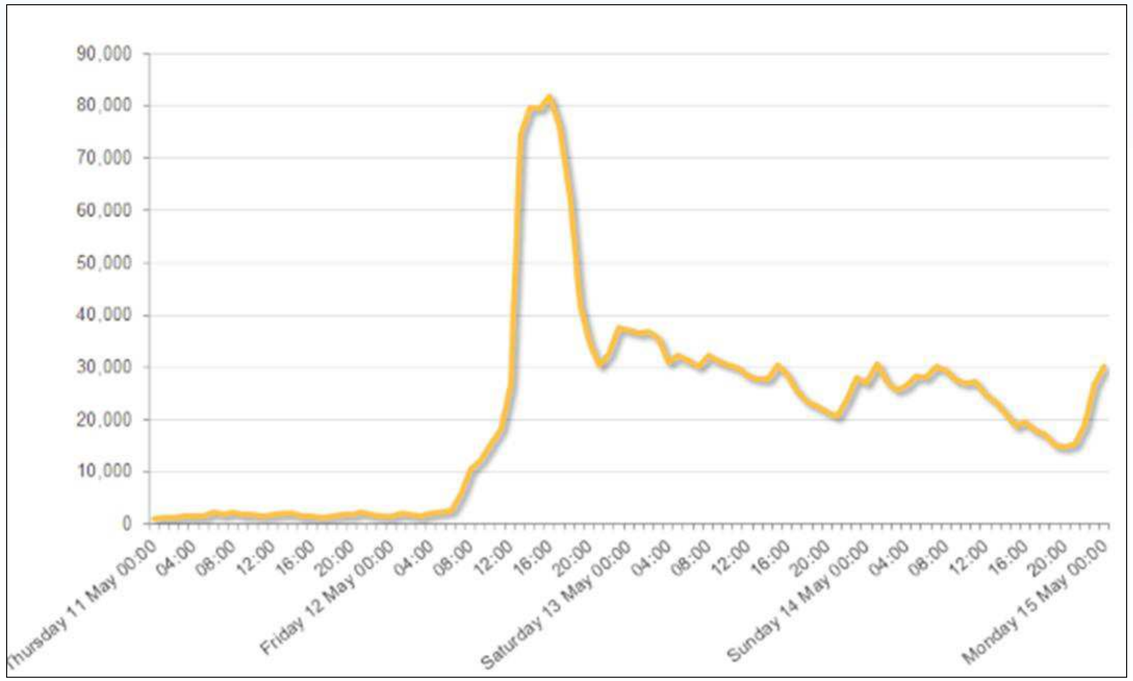
Digital attack impact: mapped



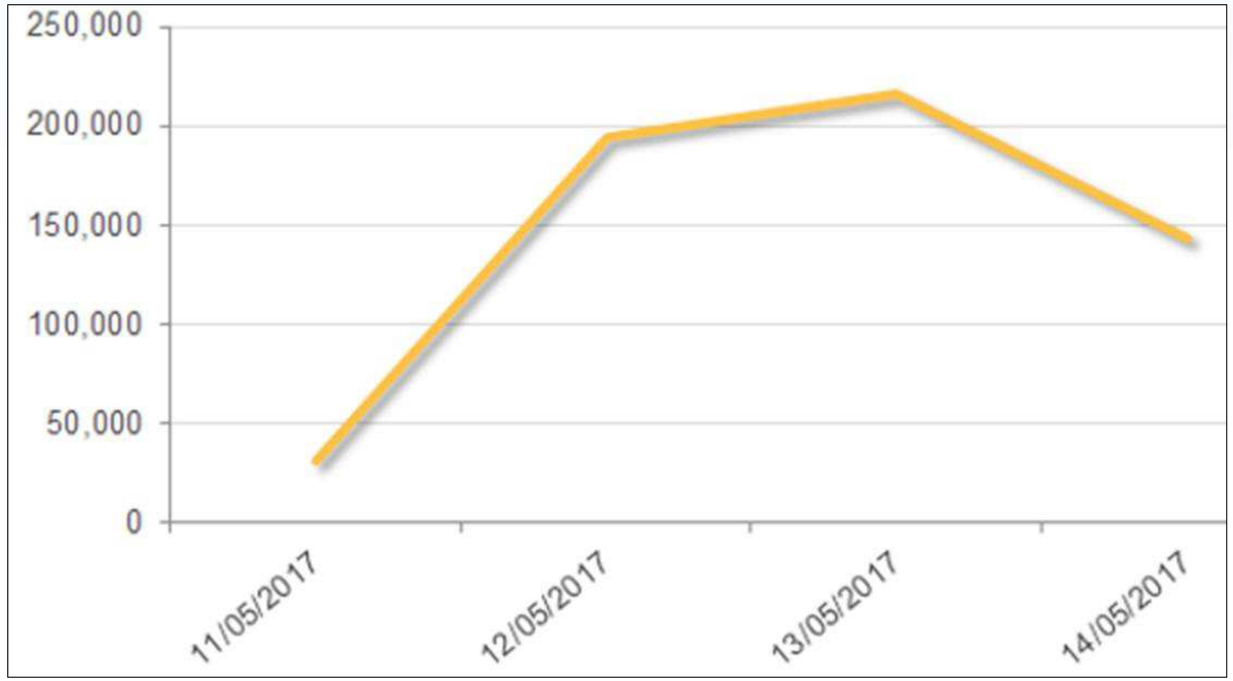
- **Different tiers of cyber catastrophes:**
  - **BAU**: typical attacks happening
  - **Tier 3**: extreme one-off events affecting a single entity and swarms of limited GDP impact attacks (outliers)
  - **Tier 2**: some GDP impacts expected
  - **Tier 1**: highest GDP impact potential

- **Major changes to the playing field:**
  - Nation State owned exploits and capabilities leaked (Shadow Broker /Wikileaks Vault 7)
  - Source code to create own botnets from IoT devices open sourced (Mirai)
  - iOS vulnerabilities revealed
  - Ransomware-as-a-Service, DDoS-as-a-Service make attacks even easier for adversaries
  - 1st SHA1 collision means some encryption potentially at risk

WannaCry Attack: Response & Mitigation



Attacks blocked per hour.



Attacks blocked per day.

Multi-pronged protection + 22 million attempts blocked across 300 K endpoints.

WannaCry Attack: Response & Mitigation

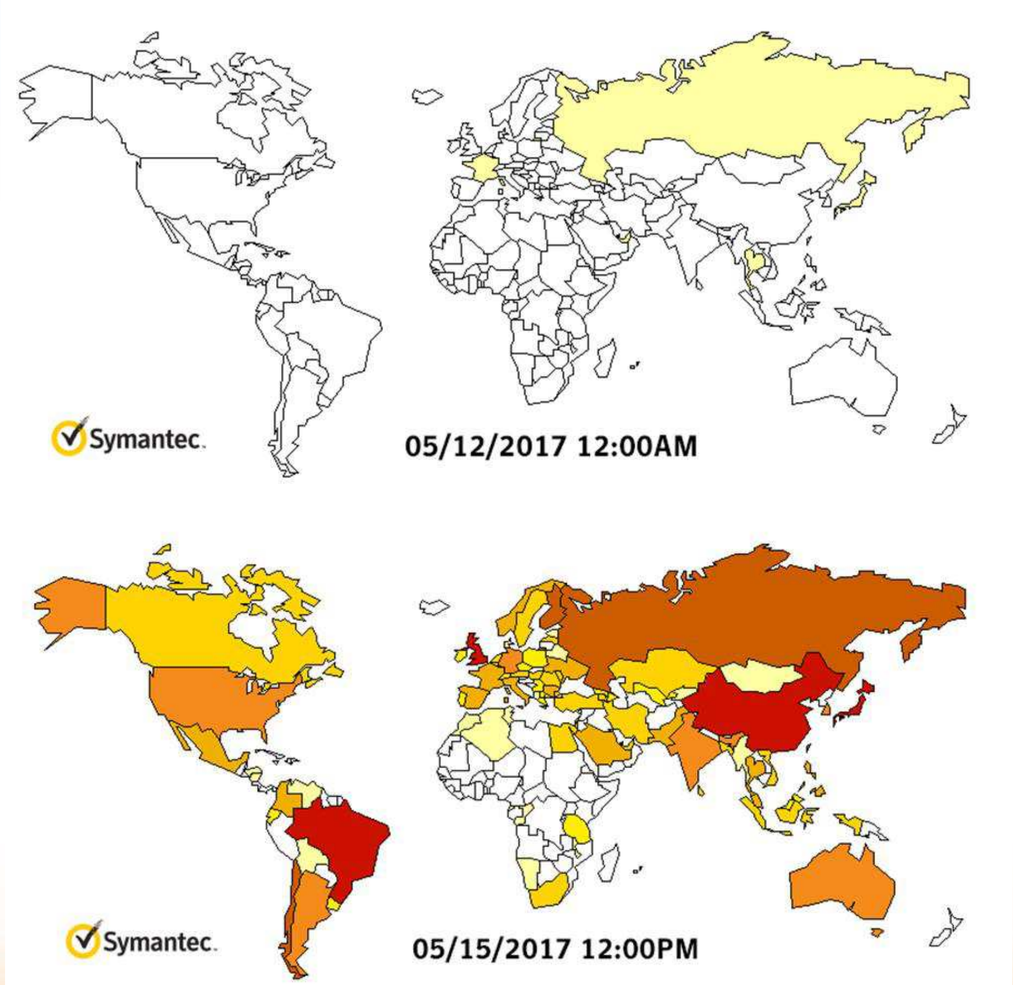


Figure 3. Heatmap showing Symantec detections for WannaCry, May 11 to May 15

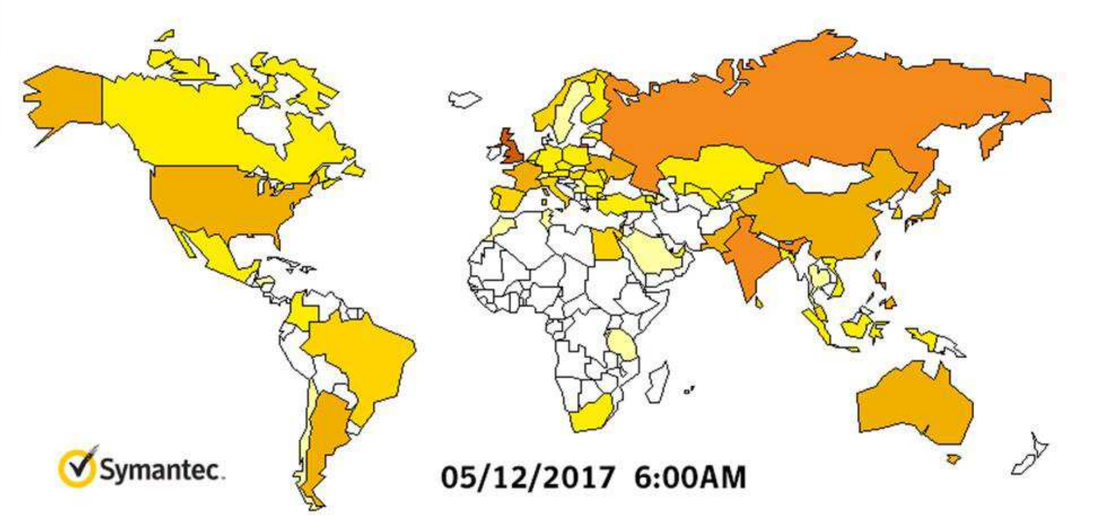


Figure 3. Heatmap showing Symantec detections for WannaCry, May 11 to May 15

The WannaCry Attack: Significant Entities Impacted

	Russia	Europe	USA/Canada	China	Brazil	Others
Manufacturing		RENAULT NISSAN, SANDVIK				
Transportation	Russian Railways	DB BAHN, QPARK	FedEx	*Gas Stations*		LATAM, SHAHEEN AIR
Telecomms	MEGAFON, MTC, VimpelCom	Telefonica, PT, telenor, vodafone SPAIN			vivo	STC الاتصالات السعودية
Financial Services	SBERBANK By your side, VTB	Santander, BBVA		*ATMs*		*ATMs in India*
Utilities / Energy		gasNatural, IBERDROLA, edp		PetroChina	BR PETROBRAS	
Professional Services		Capgemini, KPMG				
Healthcare		NHS	Lakeridge Health			INSTITUTO NACIONAL DE SALUD *Hospitals in Indonesia*

Source: Publicly available information
Additionally, several government/educational/individual targets have been reported. Examples: Russian ministry of internal affairs, Russian central bank, MOFA Romania, universities in North America, Europe, China etc., Brazil's social security system, Brazil's court systems, MOFA Brazil, Yanshui county public security bureau, government agencies in India (the Andhra Pradesh police dept.).

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Cyber Extortion

1. With all the spend on security, why is it getting worse?
2. UBER – and the pitfalls of paying ransoms
3. Risk mitigation strategies

Equifax – 2017 poster child

Lessons learned

1. **Patch management**
2. **External web application testing**
3. **Scalability of incident response plan**
4. **Testing and scalability of consumer remediation measures**

Email compromise/ payment redirection fraud

Lessons learned

1. Social engineering … a common and dangerous attack vector
2. Executives are targets … anyone perceived to have decision making authority over wire transfers
3. Security protocols must be enhanced … the human firewall …

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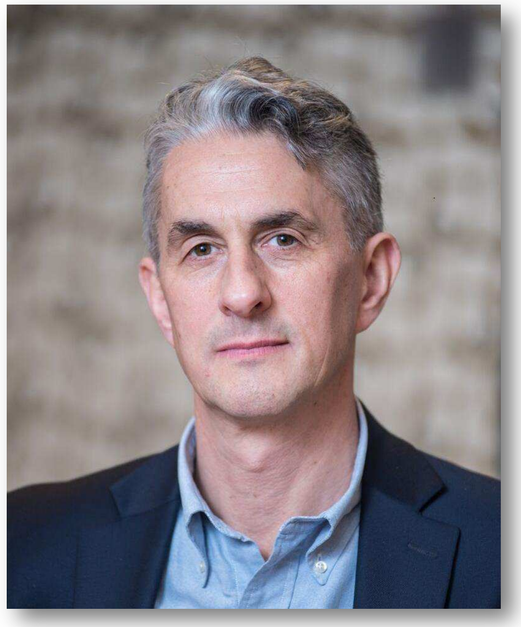
Event Round-Up



Winston Krone
Kivu

Oliver Brew
CyberCube Analytics

Sean Hoar
Lewis Brisbois Bisgaard & Smith LLP

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Protecting your Reputation: Responding to a Breach

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Protecting your Reputation: Responding to a Breach

Mark Bannon
Head of Cyber Liability, EMEA
Zurich
Moderator

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Protecting your Reputation: Responding to a Breach

- **Mark Bannon,** Head of Cyber Liability, EMEA, Zurich (Moderator)
- **Hans Allnutt,** Partner, DAC Beachcroft LLP
- **Michael Bruemmer,** Vice President, Data Breach Resolution Group, Experian
- **Lawrence Dore,** Partner, Risk and Crisis Communications, DRD Partnership

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Protecting your Reputation: Responding to a Breach

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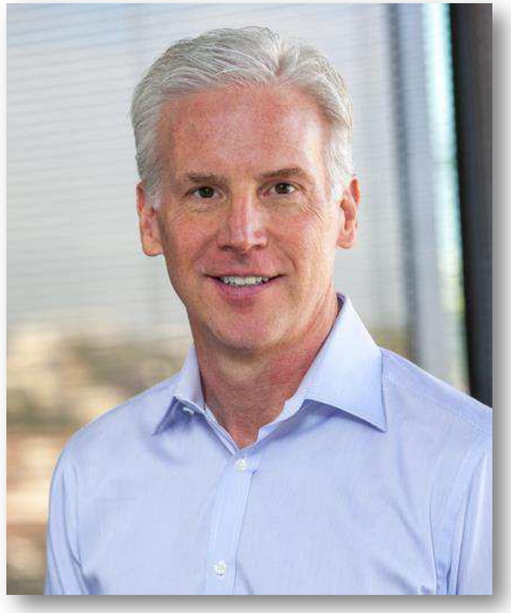
Zurich

Hans Allnut
DAC Beachcroft LLP



Michael Bruemmer
Experian

Lawrence Dore
DRD Partnership

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CyberadAPT
RGL Forensics
QBE.
WILSON ELSER
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EQUIFAX
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CYBER RISK ASSURANCE
DykEMA

Track 1

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Selling the Board on Cyber Insurance

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Selling the Board on Cyber Insurance

Shay Simkin
Managing Director
Howden Israel
Moderator

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Selling the Board on Cyber Insurance

- **Shay Simkin,** Managing Director, Howden Israel (Moderator)
- **Lyn Grobler**, Group CIO, Hyperion Insurance Group
- **Valerie Jenkins,** Security Officer and CIO, TSB Bank

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Selling the Board on Cyber Insurance

Shay Simkin
Howden Israel

Lyn Grobler
Hyperion Insurance Group

Valerie Jenkins
TSB Bank

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Managing Third Party Cyber Risk: From Vendor to M&A

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Managing Third Party Cyber Risk

Rafael Sanchez
International Breach
Response Manager
Beazley
Moderator

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Managing Third Party Cyber Risk

- **Rafael Sanchez,** International Breach Response Manager, Beazley (Moderator)
- **Ariel Evans,** CEO, InnoSec
- **Matt Palmer,** Group Information Security Officer, Willis Towers Watson

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Managing Third Party Cyber Risk

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Beazley

Ariel Evans
InnoSec

Matt Palmer
Willis Towers Watson

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Best Foot Forward: Presenting your Company to the Insurance Market

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Presenting your Company to the Insurance Market

Rebecca Bole
EVP & Editor-in-Chief
Advisen

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Presenting your Company to the Insurance Market

- **Rebecca Bole**, EVP & Editor-in-Chief, Advisen (Moderator)
- **Erica Constance**, Cyber Portfolio Manager, QBE European Operations
- **Sarah Neild**, Senior Vice President, Marsh

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Erica Constance
QBE European Operations

Sarah Neild
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Track 2

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Up Periscope: Underwriting Cyber Risk

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Up Periscope: Underwriting Cyber Risk

Mark Camillo
Head of Professional Indemnity & Cyber, EMEA
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Moderator

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Up Periscope: Underwriting Cyber Risk

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- **Samit Shah,** Insurance Solutions Manager, BitSight Technologies
- **Aloysius Tan,** Product Manager, Advisen

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Up Periscope: Underwriting Cyber Risk

Mark Camillo
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Samit Shah
BitSight Technologies

Aloysius Tan
Advisen

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The Cyber Hurricane: Quantifying Aggregation

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The Cyber Hurricane: Quantifying Aggregation

Kimberly Manibusan
Director – Cyber Insurance Solutions
FICO
Moderator

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The Cyber Hurricane: Quantifying Aggregation

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- **Domenico del Re,** Director, Risk Modelling Services, PwC
- **Rory Egan,** Cyber Actuary, Munich Re
- **Adelle Gruber,** Global Cyber, Privacy & Technology Underwriter, Brit Insurance

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The Cyber Hurricane: Quantifying Aggregation

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Track 2

Gaps & Overlaps

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Gaps & Overlaps

David Rees
Executive Director –
Cyber London
RKH Specialty Limited
Moderator

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- **Russell Kennedy**, Divisional Director, Brit Insurance
- **Julian Miller**, Partner, DAC Beachcroft LLP
- **Jacqueline Spencer-Sim**, Cyber Liability Class Underwriter, Axis Capital
- **Scott Stransky**, Assistant Vice President & Principal Scientist, AIR Worldwide

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RKH Specialty Limited

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Brit Insurance

Julian Miller
DAC Beachcroft LLP

Jacqueline
Spencer-Sim
Axis Capital

Scott Stransky
AIR Worldwide

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When Systems Stop Working: Measuring Business Interruption Exposures

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When Systems Stop Working

John Merchant
Director of Cyber Insurance
Cyence Risk Analytics
Moderator

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When Systems Stop Working

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- **Jamie Bouloux**, CEO, EmergIn Risk
- **Ben Hobby**, Partner, RGL Forensics

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Afternoon Keynote Address

Dr Jason R C Nurse
Senior Researcher,
Department of Computer Science
University of Oxford

The Cybersecurity Challenge:
Emerging risks in complex environments

Dr Jason R. C. Nurse *PhD. MSc. BSc. MBCS*

Senior Researcher, Department of Computer Science, University of Oxford

JR Fellow, Wolfson College, University of Oxford

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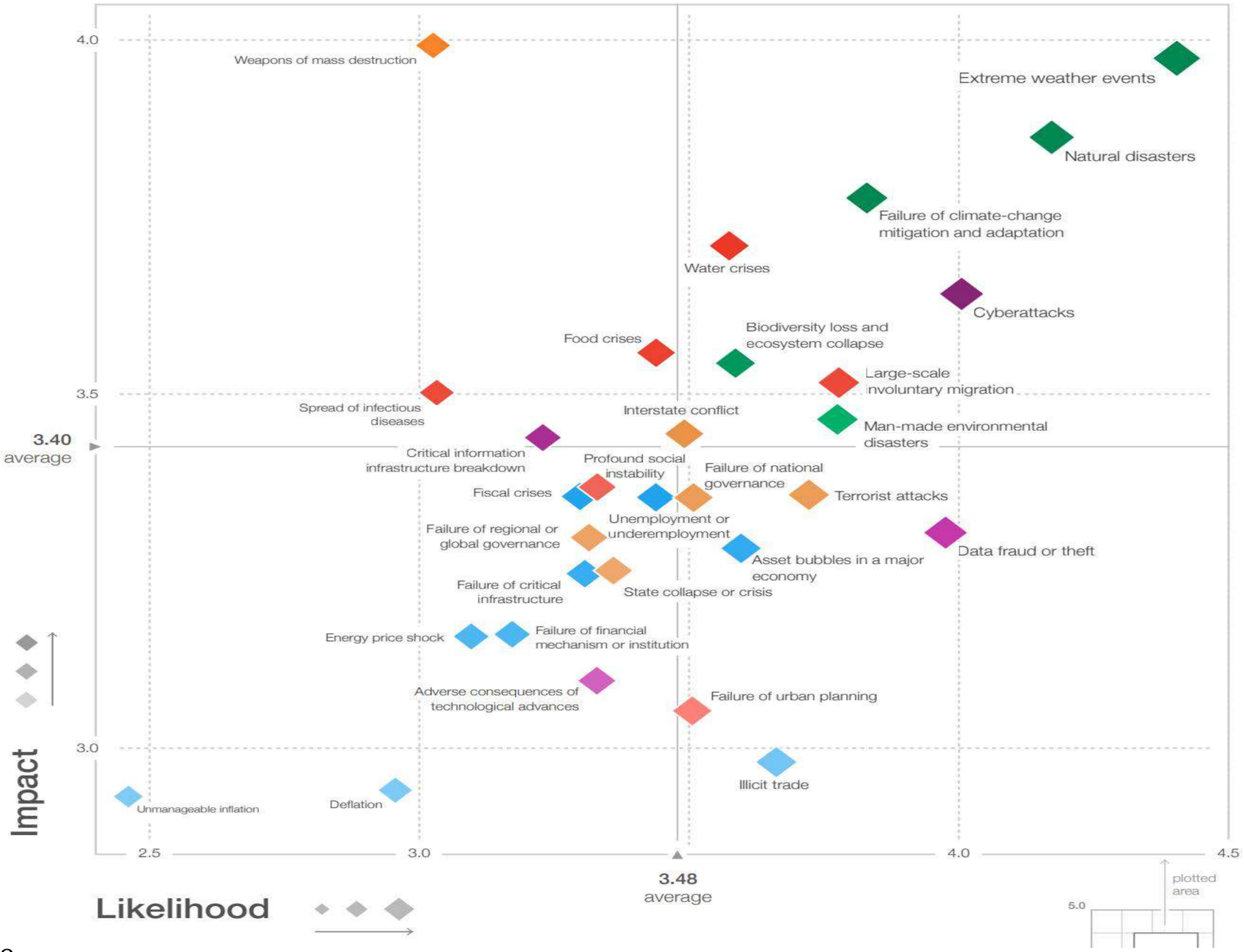
emerging[1] risks

[1] and some very present!

WEF Global Risks Landscape 2018



World Economic Forum,
The Global Risks Report 2018

top 5 Global Risks in terms of *likelihood*

2015	2016	2017	2018
Interstate conflict with regional consequences	Large-scale involuntary migration	Extreme weather events	Extreme weather events
Extreme weather events	Extreme weather events	Large-scale involuntary migration	Natural disasters
Failure of national governance	Failure of climate-change mitigation and adaptation	Major natural disasters	Cyberattacks
State collapse or crisis	Interstate conflict with regional consequences	Large-scale terrorist attacks	Data fraud or theft
High structural unemployment or underemployment	Major natural catastrophes	Massive incident of data fraud/theft	Failure of climate-change mitigation and adaptation

Economic Environmental Geopolitical Societal Technological

World Economic Forum, The Global Risks Report 2018

organisational perspective

Increasing reliance on technology, which leads to an increased attack surface

Los Angeles Times

Hollywood hospital pays $17,000 in bitcoin to hackers; FBI investigating

engadget UK

Intruders 'borrowed' Tesla's public cloud for cryptocurrency mining

Harvard Business Review

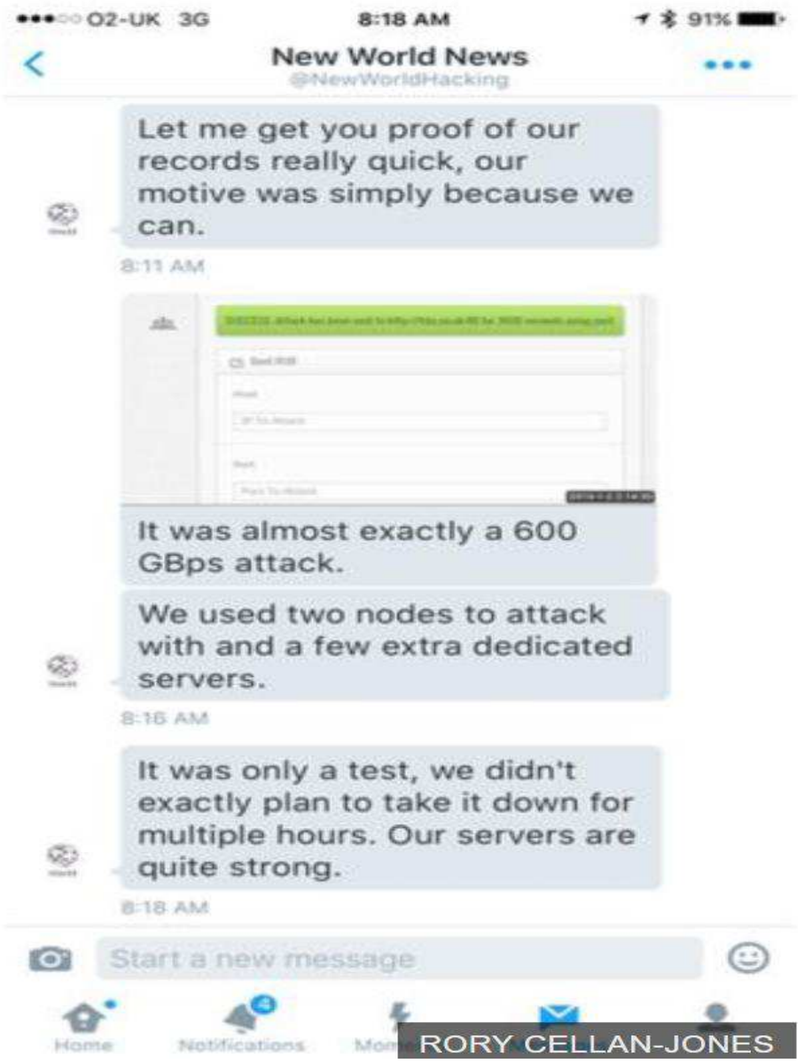
The Internet of Things Is Going to Change Everything About Cybersecurity

Lots more: remote hacks on the Jeep Cherokee, malware infection of the Ukraine Power plant, WannaCry and NHS

attacker perspective

- **Vastly increased threat capabilities**
  - “It was only a test” (BBC website attack 2015)
  - Customised information-stealing malware can be purchased for $300 (Secureworks, 2018)

- **Data openly available on organisations, their employees and customers**
  - Increasing amount of hacked and leaked credentials found on the dark web
  - Social media (esp. LinkedIn) have become hackers’ prime reconnaissance tools



http://www.bbc.co.uk/news/technology-35213415

choosing/suggesting the ‘right’ security control(s)

CYBER ESSENTIALS

ISO

ISO/IEC 27000-series

CIS Center for Internet Security®

CIS Controls

*version 7 launch March 19th

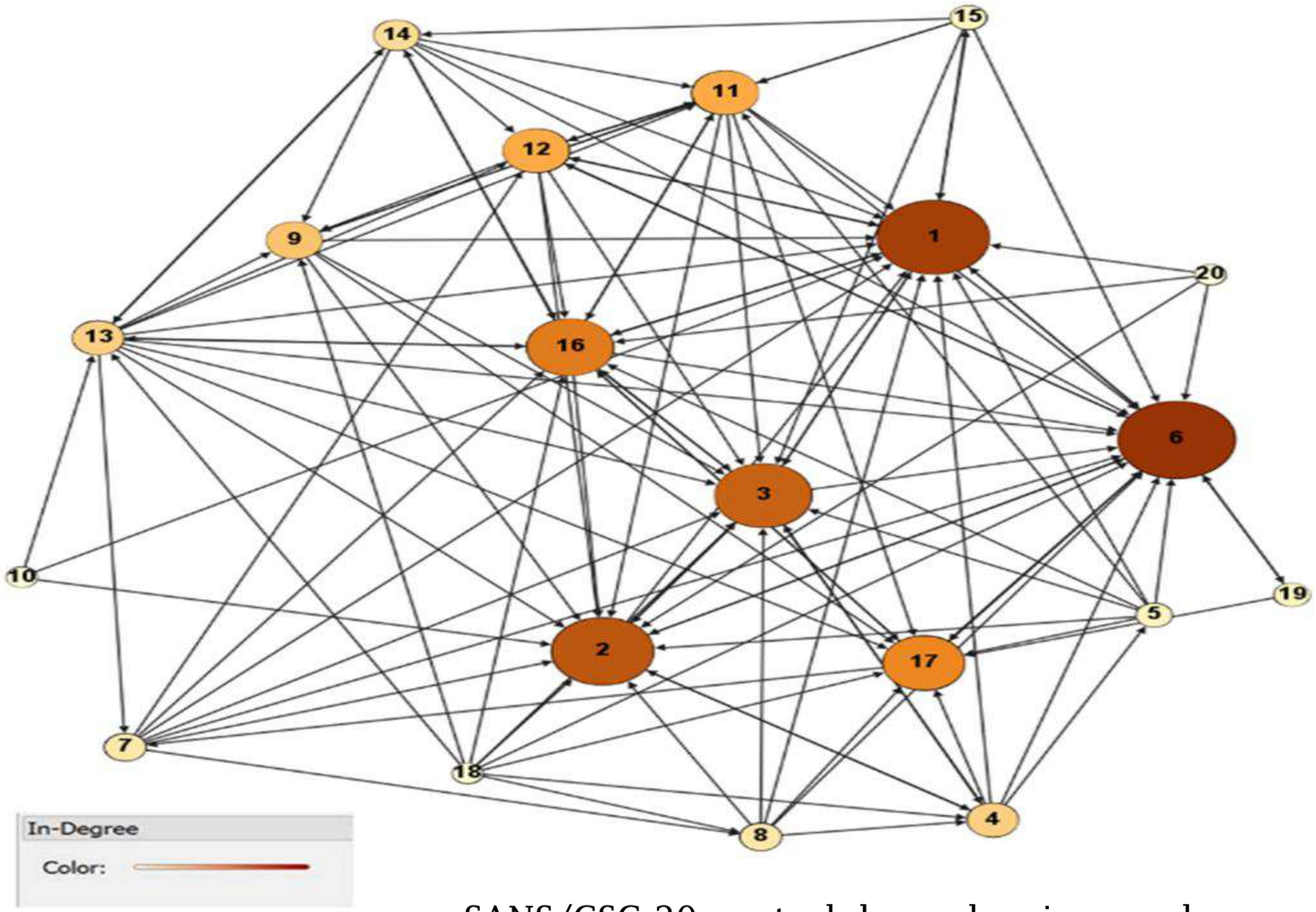
SANS

NIST

CYBERSECURITY FRAMEWORK

*version 1.1 available in Spring 2018

selecting/prioritising controls is difficult due to interdependencies



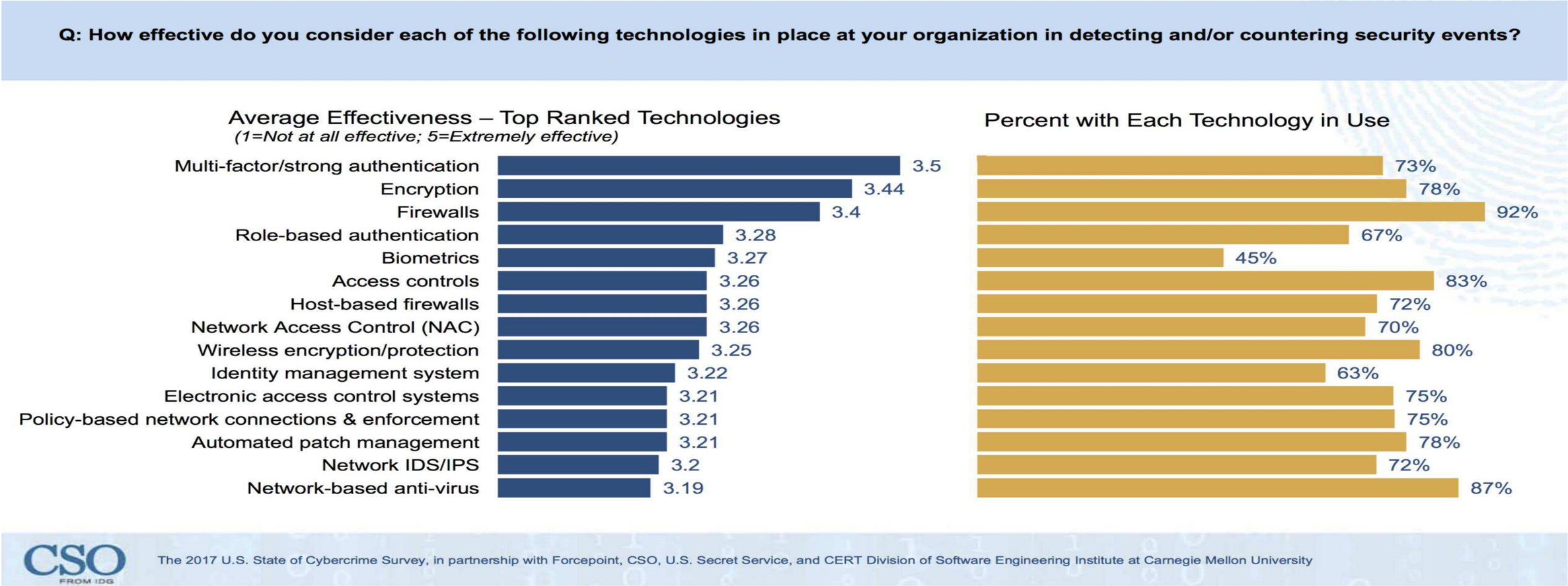
SANS/CSC-20 control dependencies graph

CSC 6: Maintenance, Monitoring, and Analysis of Audit Logs

CSC 16: Account Monitoring and Control

CSC 17: Security Skills Assessment and Appropriate Training to Fill Gaps

lack of objective data about the effectiveness of controls and residual risk



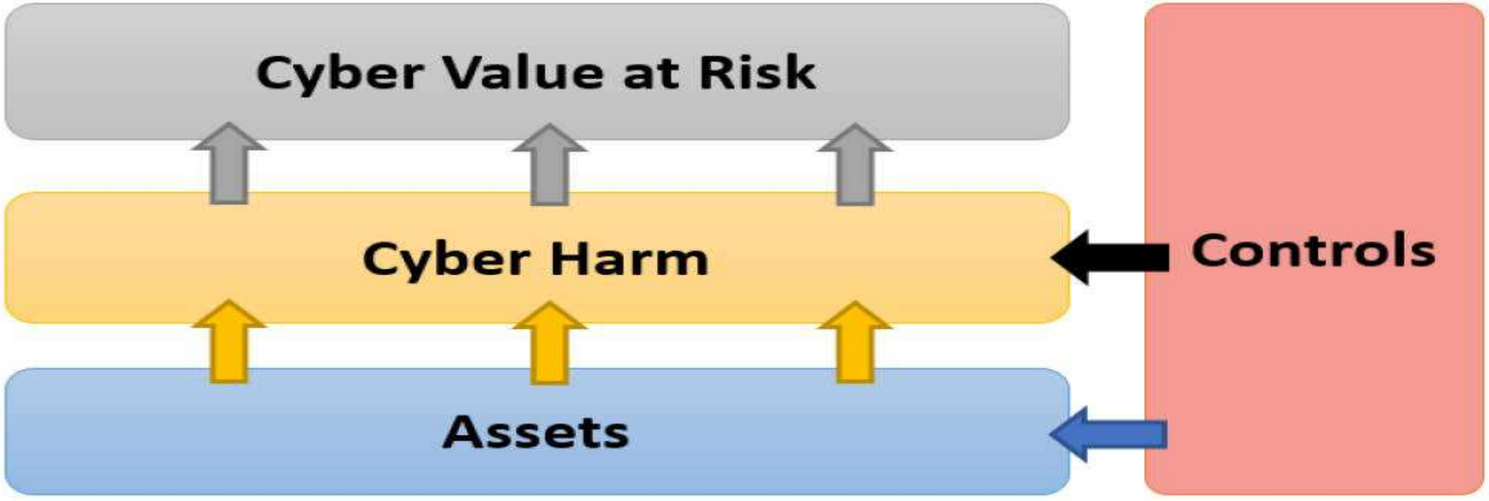
Majority of data is based on opinions and may also not incorporate control dependencies

a model to reason about risk, control effectiveness and value-at-risk

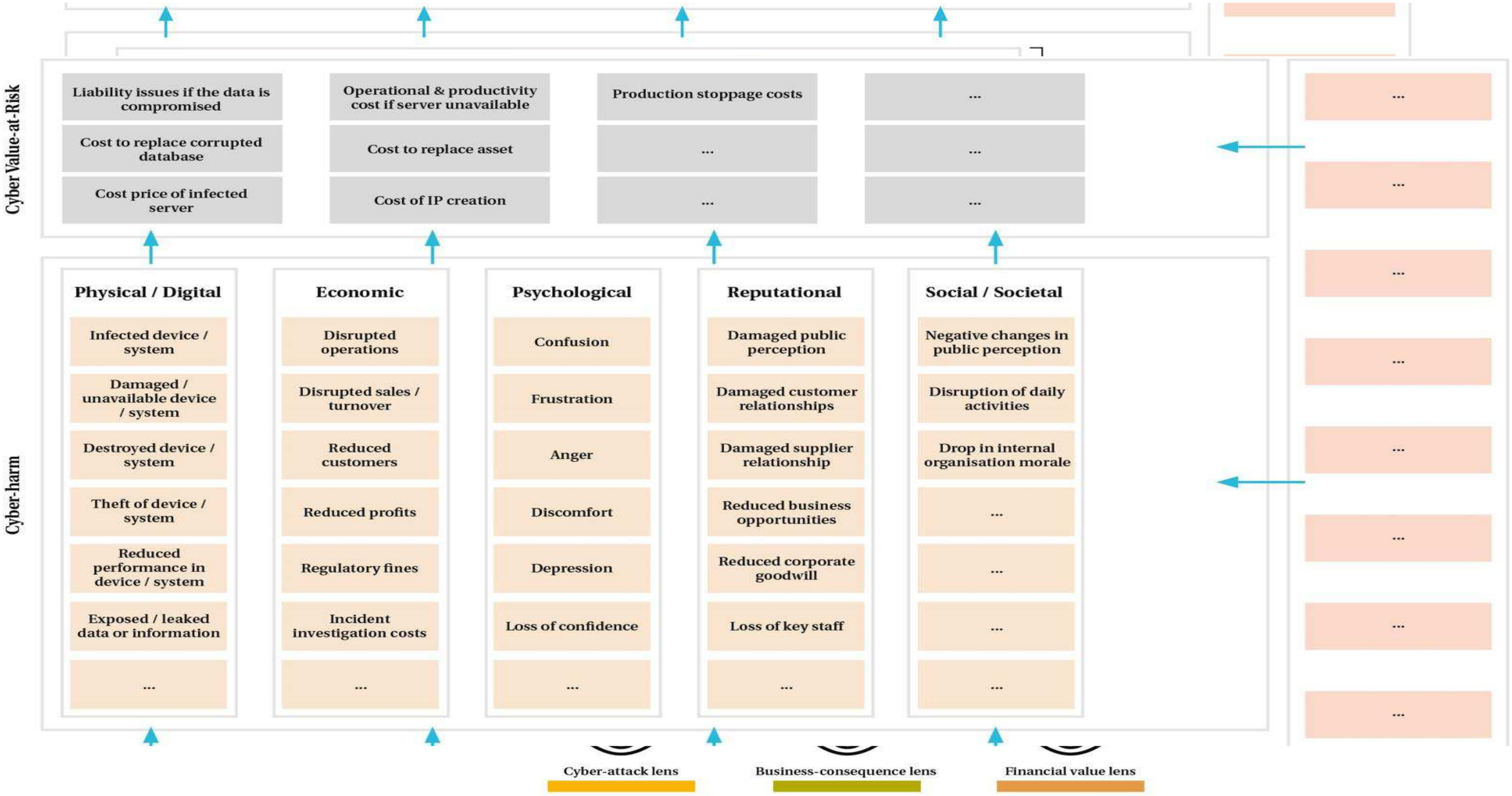
the model aims

- **Facilitate the definition of corporate assets and the modelling of how they are associated**
  - Where is my data stored? What other systems or people have access to that data? If a system fails, what other systems will be impacted?
- **Enable the modelling of harms (negative impacts) related to attacks on corporate assets**
  - What specific harms may occur if an asset or set of assets is attacked? What secondary harms may be triggered after an initial attack?
- **Estimate the value-at-risk from a cyberattack**
  - Considering the attack likelihood, what is the value-at-risk?
- **Reason about the impact/effectiveness of specific security controls in reducing harms and value-at-risk**
  - How does implementing control X over control Y benefit my organisation?

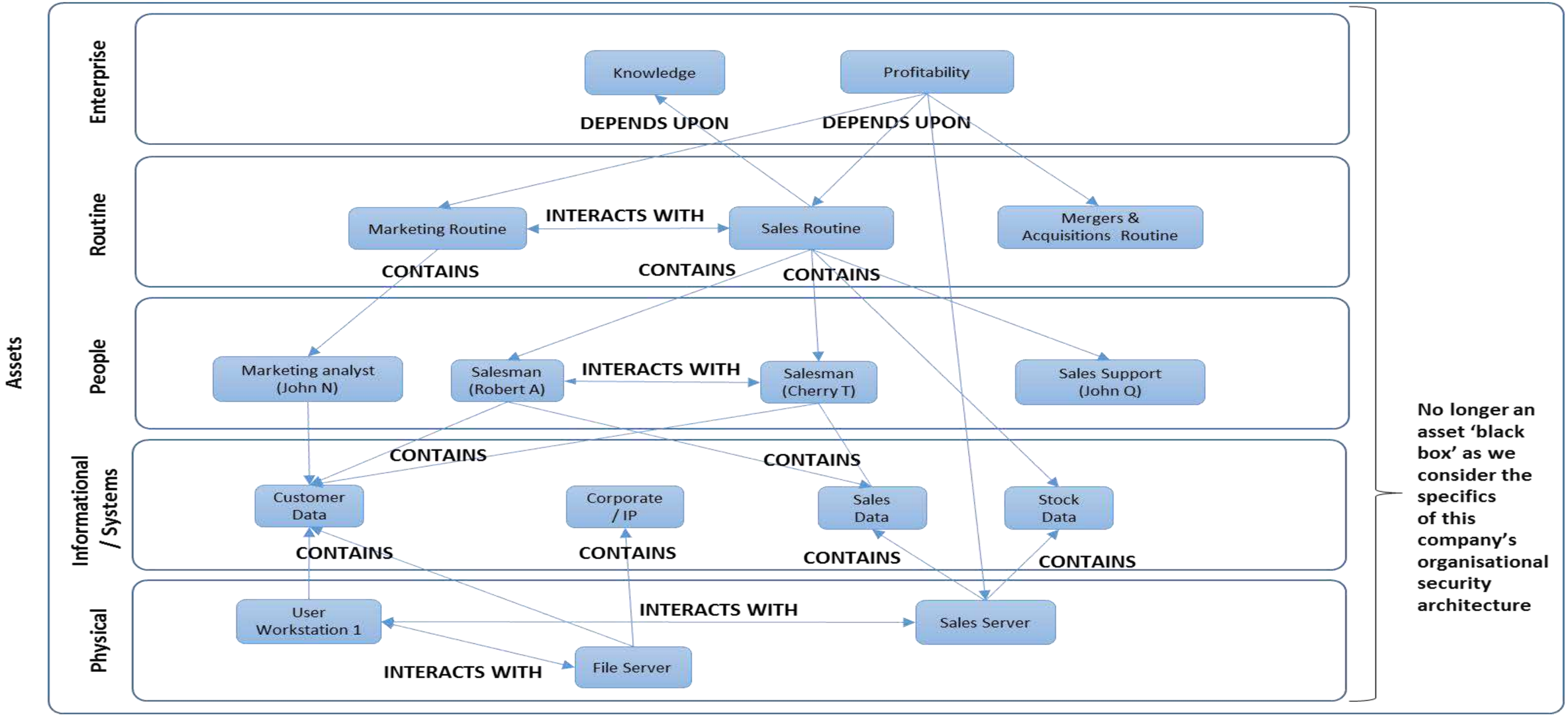
the model



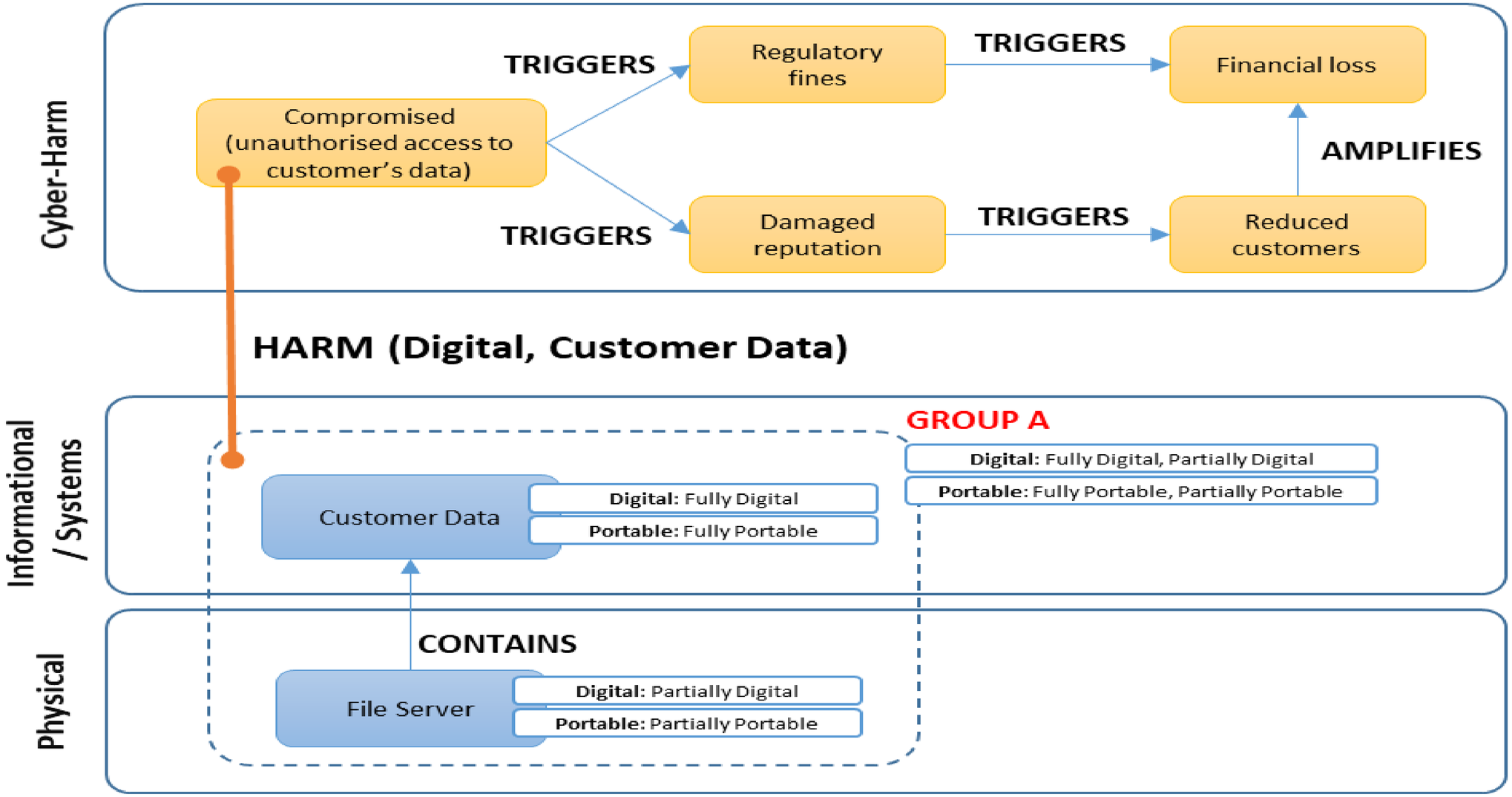
- Considers the aggregate **harm**, which is then paired with the likelihood of the **Threat** being successful to determine CVaR
- Considers the **assets** that may be harmed and how that **harm** may propagate
- Considers the **controls** that seek to protect **assets** from harm
- Considers the **controls** that seek to mitigate the **harm** resulting from an attack


Cyber Value-at-Risk
Liability issues if the data is compromised
Cost to replace corrupted database
Cost price of infected server
Operational & productivity cost if server unavailable
Cost to replace asset
Cost of IP creation
Production stoppage costs
...
Cyber-harm
Physical / Digital
Infected device / system
Damaged / unavailable device / system
Destroyed device / system
Theft of device / system
Reduced performance in device / system
Exposed / leaked data or information
Economic
Disrupted operations
Disrupted sales / turnover
Reduced customers
Reduced profits
Regulatory fines
Incident investigation costs
Psychological
Confusion
Frustration
Anger
Discomfort
Depression
Loss of confidence
Reputational
Damaged public perception
Damaged customer relationships
Damaged supplier relationship
Reduced business opportunities
Reduced corporate goodwill
Loss of key staff
Social / Societal
Negative changes in public perception
Disruption of daily activities
Drop in internal organisation morale
Cyber-attack lens
Business-consequence lens
Financial value lens

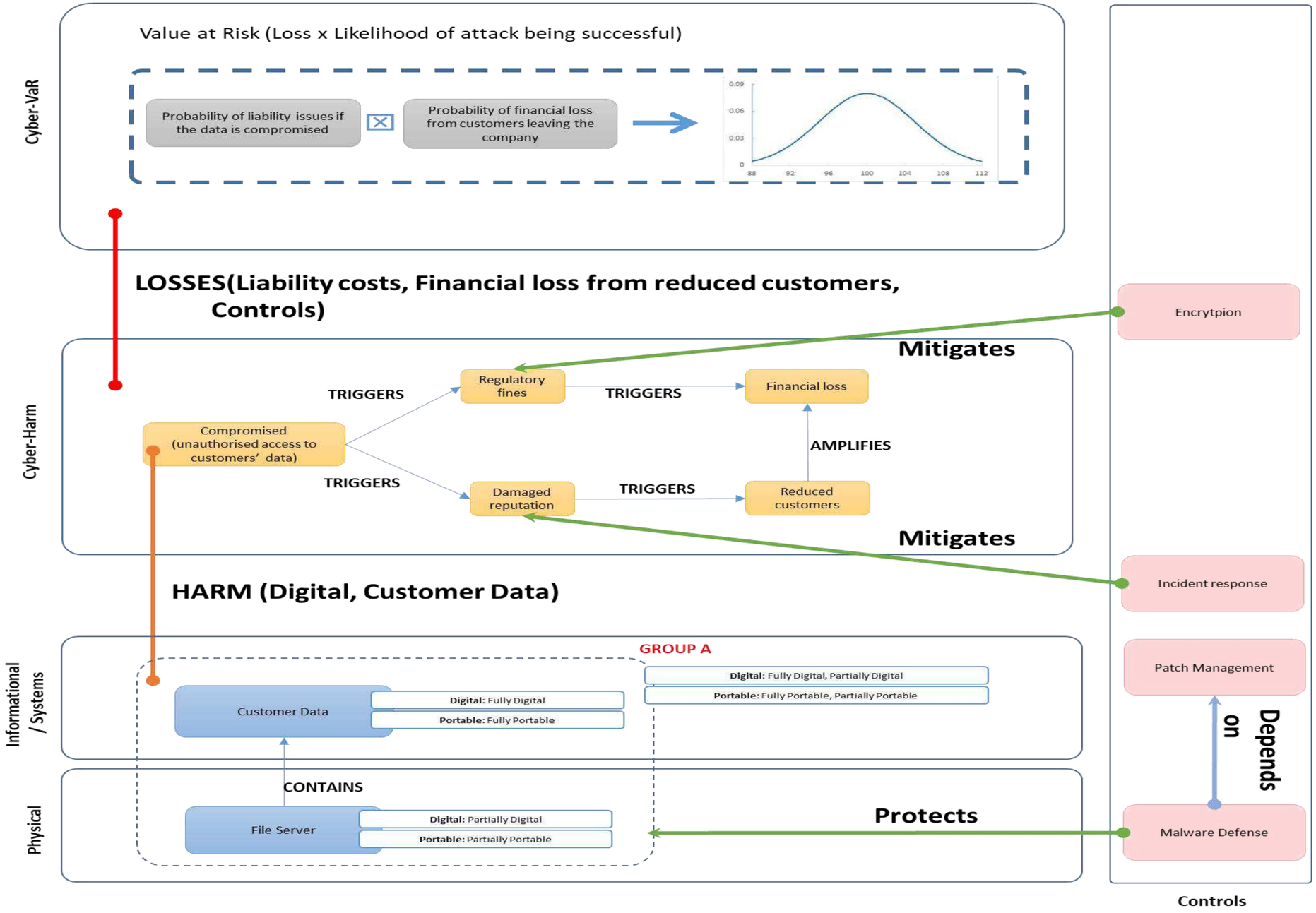
modelling corporate assets



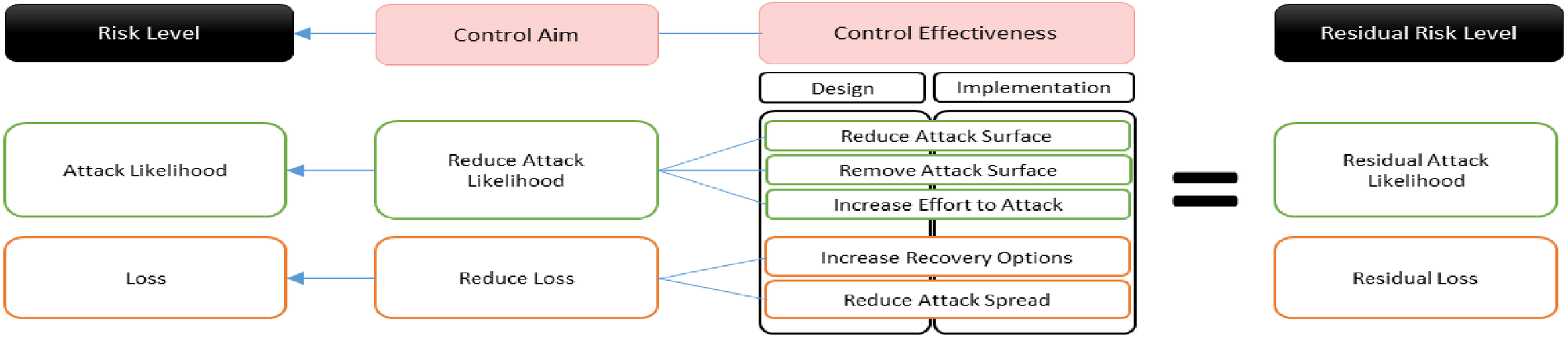
assets, cyber-harms (direct and indirect)



attacks, VaR and controls



modelling and incorporating risk control effectiveness and residual risk



research in partnership

- Our research is conducted in collaboration with and sponsored by AXIS Insurance Company. Thanks!!

- The academic team from the University of Oxford are Professor Sadie Creese, Professor Michael Goldsmith, Professor David Upton, Dr Ioannis Agrafiotis, Dr Arnau Erola and Dr Jason R C Nurse

https://www.novae.com/files/Modelling_the_cyber_gap.pdf

Thanks for listening!

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Managing Director
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- **Lyndsey Bauer,** Partner, Paragon International Insurance Brokers Ltd
- **Graeme Newman,** Chief Innovation Officer, CFC Underwriting
- **Dan Trueman,** Global Head of Cyber, AXIS Insurance

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