Enterprise Security Governance and Strategic Planning

What is the latest thinking to address the cybersecurity challenge?

Earl Crane, PhD

Who is this guy?

Earl Crane, PhD, CISSP

CEO, Emergent Network Defense

CRANE@ANDREW.CMU.EDU

EARL@ENDSECURITY.COM

Ph.D. George Washington University in emergent network defense (2013)

MISM Carnegie Mellon - Information security management (2001)

B.S. Carnegie Mellon - Mechanical Engineering (2000)

Earl Crane is the CEO of Emergent Network Defense, providing a Digital Risk Management solution to help organizations, governments, and financial institutions "secure what matters" through a biological ant-based swarming artificial intelligence.

- Previously he was the Director for Federal Cybersecurity Policy at the White House National Security Council.
- Prior to his recruitment to the White House staff, Dr. Crane was the Director of Cybersecurity Strategy and the Chief Information Security Architect at the Department of Homeland Security.
- Most recently, he was a Director with Promontory Financial Group, a strategy, risk management, and regulatory compliance consulting firm.
- Elected to (ISC)2 Board of Directors for 2018

If you get one thing from today…

Capturing and governing your organization's cyber risk appetite is crucial to its survival.

"It looks like you have no appetite for risk"

Cyber Risk Management Model

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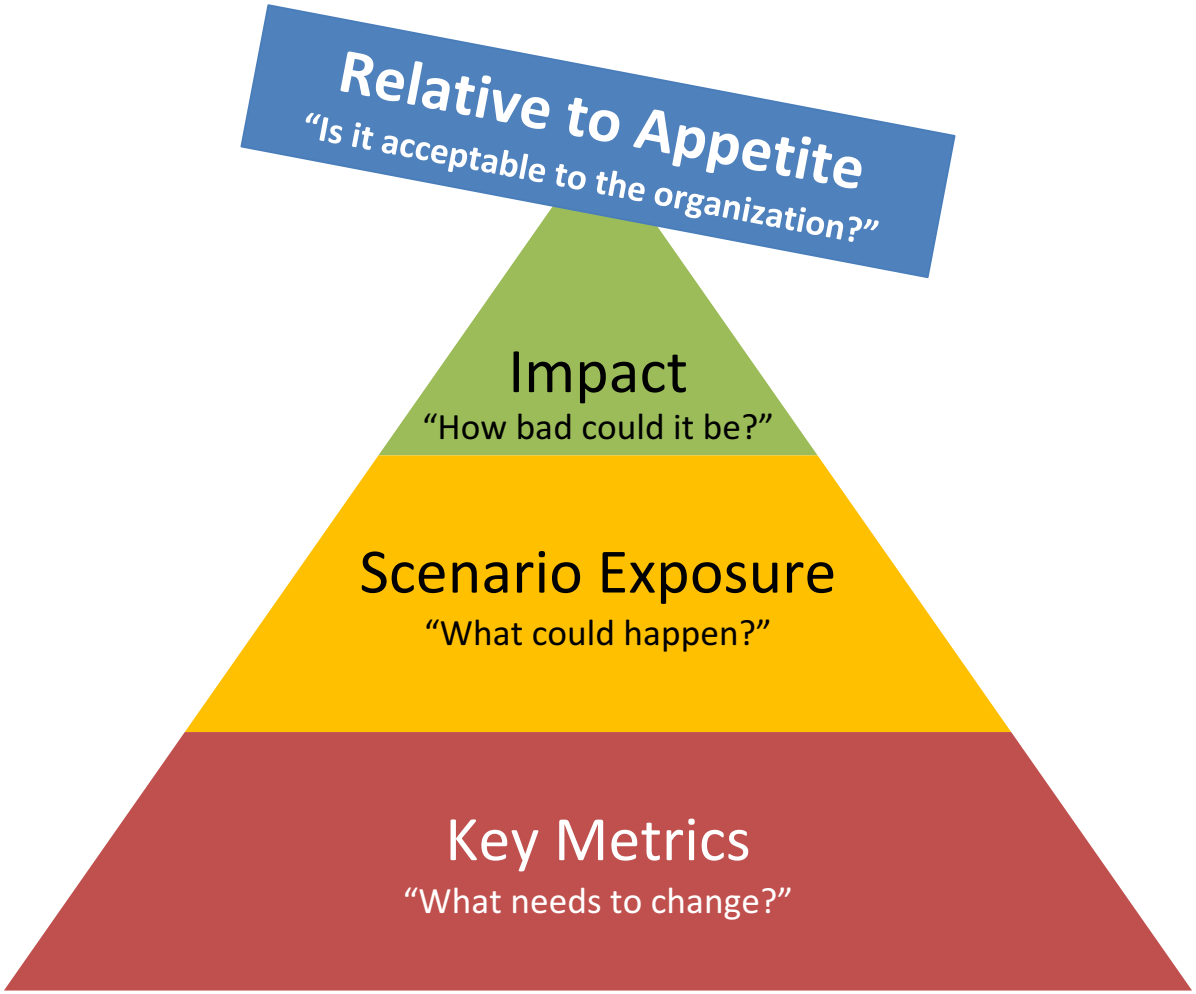


War of 1812

- Secretary of War John Armstrong refused to take warnings about a British threat seriously
- DC was a small, backwater town, built on a swamp, with no perceivable tactical military advantage.

His reply when pressed by General Van Ness was,

‘Oh yes by God, the British will strike somewhere: but not here! What the devil will they do here?... no, no! Baltimore is the place, sir; that is of so much more consequence.’”

Why wait for the house to burn down?

”They Burned The House Down”

“…the folks who did this didn’t just steal practically everything from the house; they burned the house down. They took our data. Then they wiped stuff off our computers. And then they destroyed our servers and our computers.”

Michael Lynton,
CEO Sony Pictures Entertainment

Moving Beyond Cybersecurity

Phishing

Ransomware

Credential Stuffing

$100bn in losses

Digital Exposures

"We should have seen this coming."

Executive Attention

Increased Focus on Cyber Risk Management

NACD

"Current cybersecurity strategies fail, stakeholders lack education, and cybersecurity failure costs are equivalent to 1/3 of US GDP worth of information stolen each year."

– **National Association of Corporate Directors, *Cyber-Risk Oversight: A Focus on ERM and C-Suite to Boardroom Collaboration***, *April 2016*

CEOs

61% of CEOs cited Cyber Threats as a key risk in 2016.

– ***PWCs 19th Annual Global CEO Survey***, *January 2016*

CROs

"The key is ignoring the press and *understanding your own top risks*. The top risks that sell newspapers may be different than the risks that could kill your bank."

– *CRO in* ***Bank Governance Leadership Network ViewPoints***, *July 27, 2015*

CIOs

"Cybersecurity routinely makes the top 5 list of CIO concerns. Increasingly, instead of fixed solutions to security issues, **artificial intelligence is being incorporated into IT security** product to dynamically investigate and respond to unique and emergent security breaches on the fly."

– **The enterprise technologies to watch in 2016**, *May 29, 2016*

External Expectations

Gartner

"Organizations will learn to live with **acceptable levels of digital risk** as business units innovate to discover **what security they need and what they can afford**."

– **Gartner** VP and Analyst Paul Proctor, *June 23, 2016*

Marsh Global

"Cyber is going to continue to be a more prevalent risk issue. While it started off more in the IT world, it has become a board issue, and the C-suite needs to deal with the complexities of cyber risk ."

– ***Marsh Global*** *CEO* Peter Zaffino, *March 31, 2016*

ACE Group

"Risk managers are asking for a comprehensive strategy that helps them assess their cyber and data privacy risk, incorporates appropriate loss control services to mitigate losses before they happen, provides access to post breach services to assist them in the event of a breach, and offers higher limits to meet their coverage needs."

– *Toby Merrill, Global Cyber Risk Practice* ***ACE Group****, September, 2015*

S&P Capital

"If we were to believe that a bank is ill-prepared to withstand a cyberattack, we could downgrade the bank before an actual attack."

– ***Standard and Poor's Capital****, September 28, 2015*

Heightened Regulatory Expectations

OMB

Management's responsibility is to develop and maintain effective internal control that is consistent with its **established risk appetite and risk tolerance levels**.

– *White House OMB Circular No. A-123* , July 2016

FFIEC

The institution has a **cyber risk appetite statement approved by the board** or an appropriate board committee.

Management and the board or an appropriate board committee **hold business units accountable** for effectively managing all cyber risks associated with their activities.

– *Cybersecurity Assessment Tool, June 2015*

CFTC

"[Cybersecurity] is perhaps the **single most important new risk to financial stability** … We **require** clearinghouses, exchanges, and other market infrastructures to implement safeguards, and we are focusing on this issue in our examinations. … we want to make sure the **board of directors and top management are making this a priority**."

– *Chairman Massad, January 2015*

FRB

The Federal Reserve **requires** the financial institutions it regulates to develop and maintain effective information security programs that are tailored to the complexity of each institution's operations and that include steps to protect the security and confidentiality of customer information.

– *Governor Tarullo, February 2014*

Why do we need strategy?

Three lines of defense

First Line

Risk Ownership

Operational management

- Day-to-day tempo
- Provide **strategy** for controls
- Identify, assess, control, and mitigate risks
- Security is designed into the systems

Second Line

Risk Oversight

Work closely with first line

- Supporting management policies, defining roles and responsibilities, and setting goals for implementation
- Providing risk management frameworks
- Identifying known and emerging issues
- Identifying shifts in the organization's implicit risk appetite
- Assassisting management in developing processes and controls to manage risks and issues

Third Line

Risk Assurance

Independent assurance function

- Periodic audit and review, including operational efficacy, safeguarding, reporting, and compliance
- Report sufficiently high in the organization and to governing body

A different mindset at the second line

Third Line of Defense
Audit and Review
Independent Assurance:
Senior Management
& External Reporting

Validation of First Line operations, Second line effectiveness

Effective challenge of risk functions across the enterprise

Second Line of Defense
Risk Management
Risk Oversight:
Monitor, Identify Emerging Issues,
Identify Risk Appetite Shifts

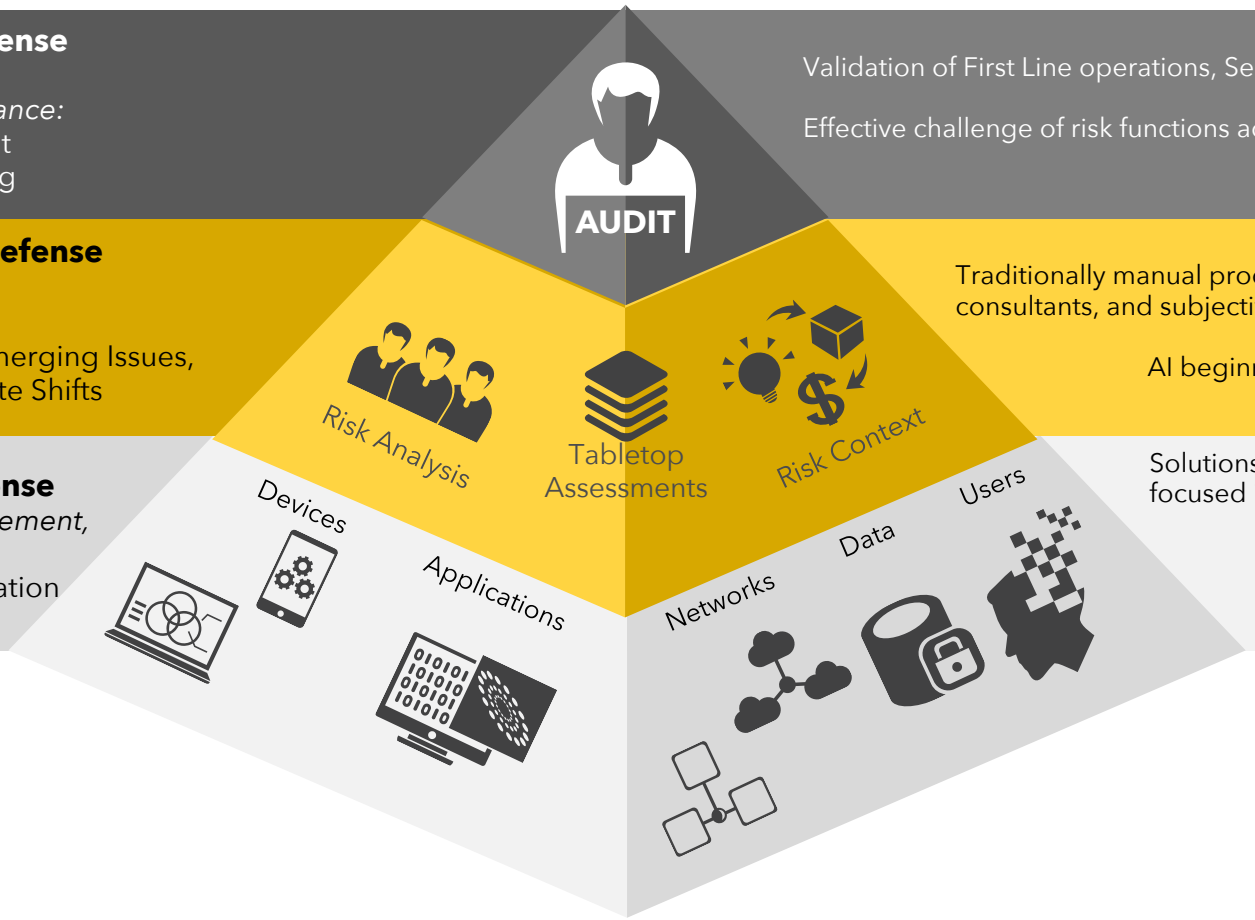
Traditionally manual processes and tools, periodic consultants, and subjective assessments

AI beginning to help with context

First Line of Defense
Operational Management,
Risk Ownership:
Control Implementation

Solutions are tactical and point-focused in nature

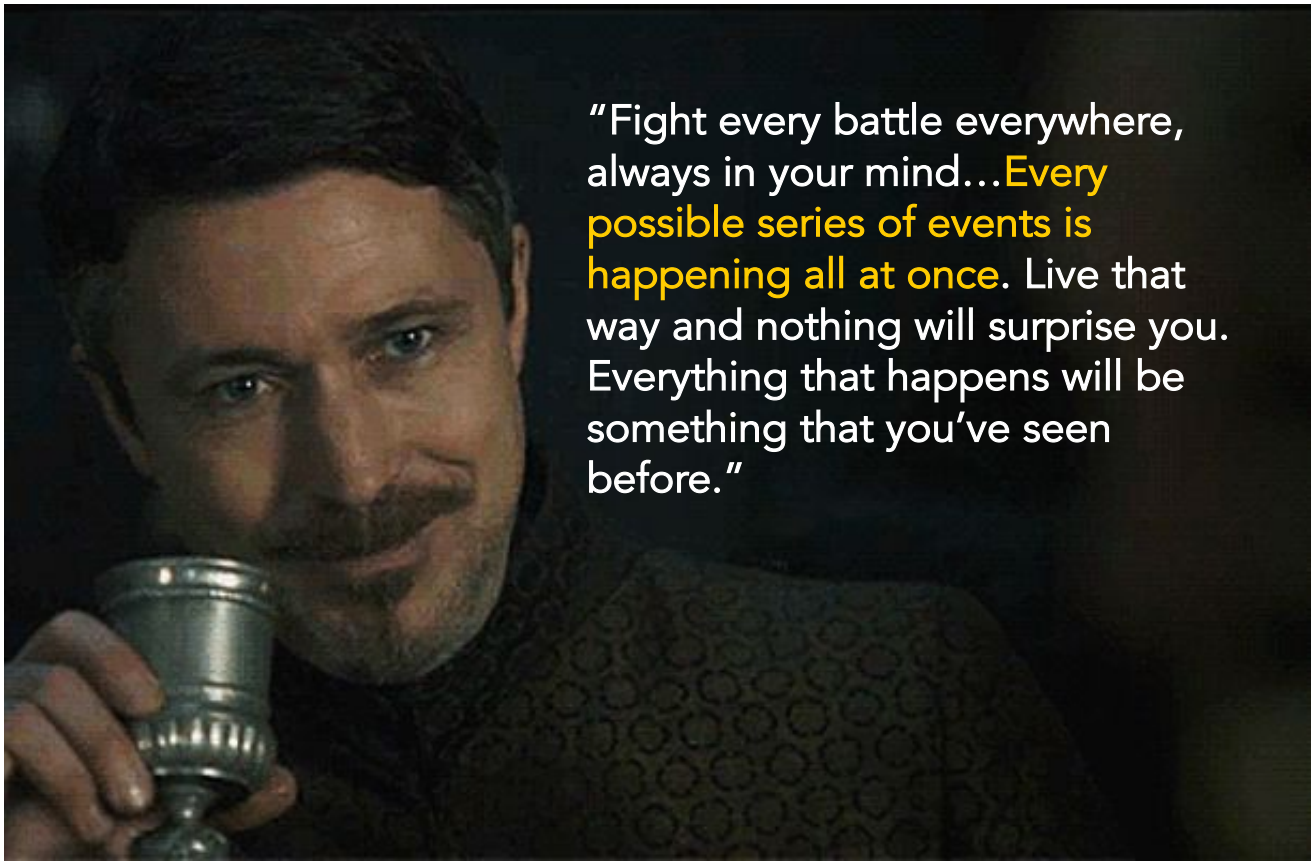
Rigid compliance frameworks



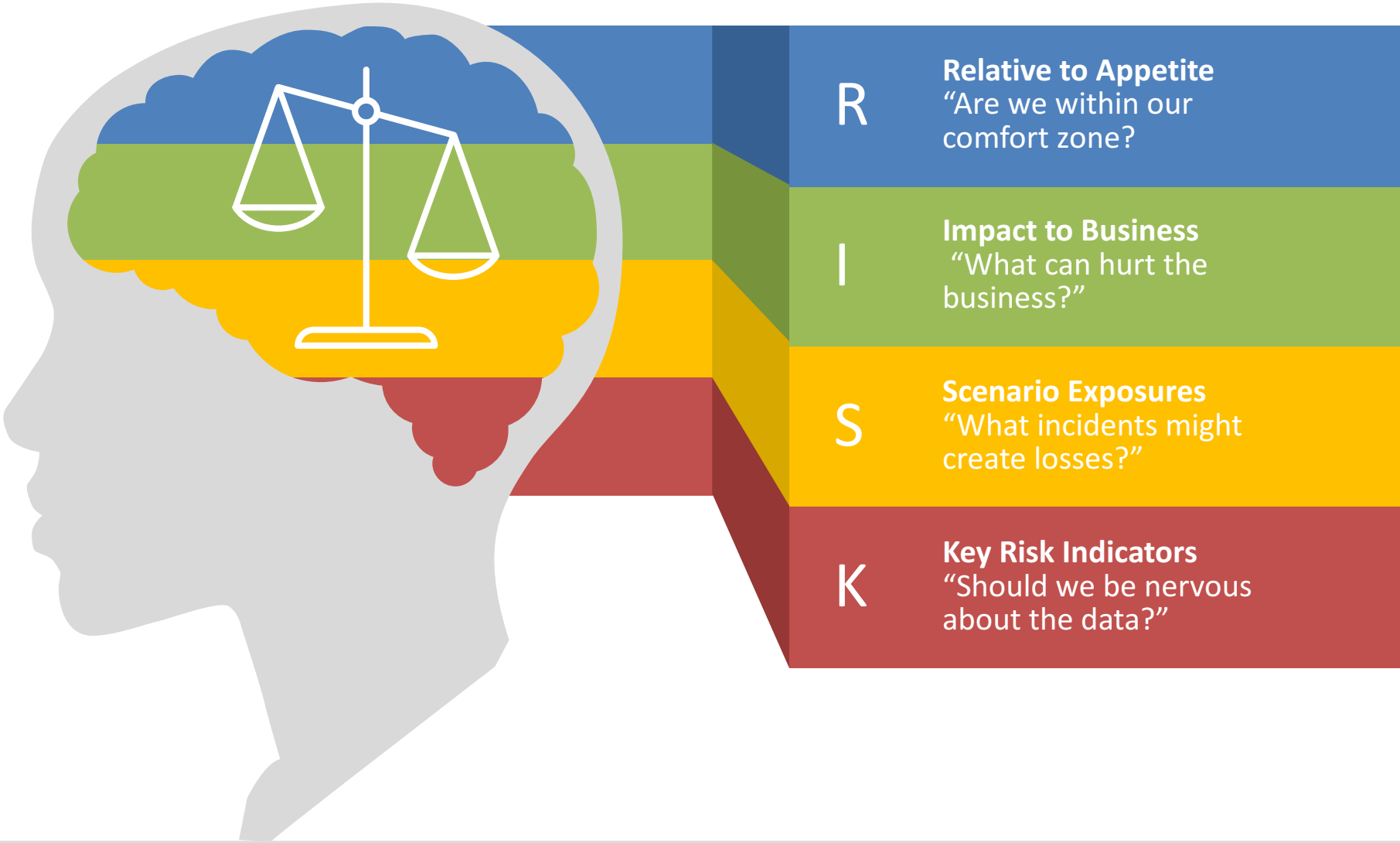
Risk is not a game of “Whack Attack”

BlackHat 2016

It's a Game of "*What Ifs*?"



How to think about risk at the second line



Digital Risk Questions

Cyber Risk Management Model

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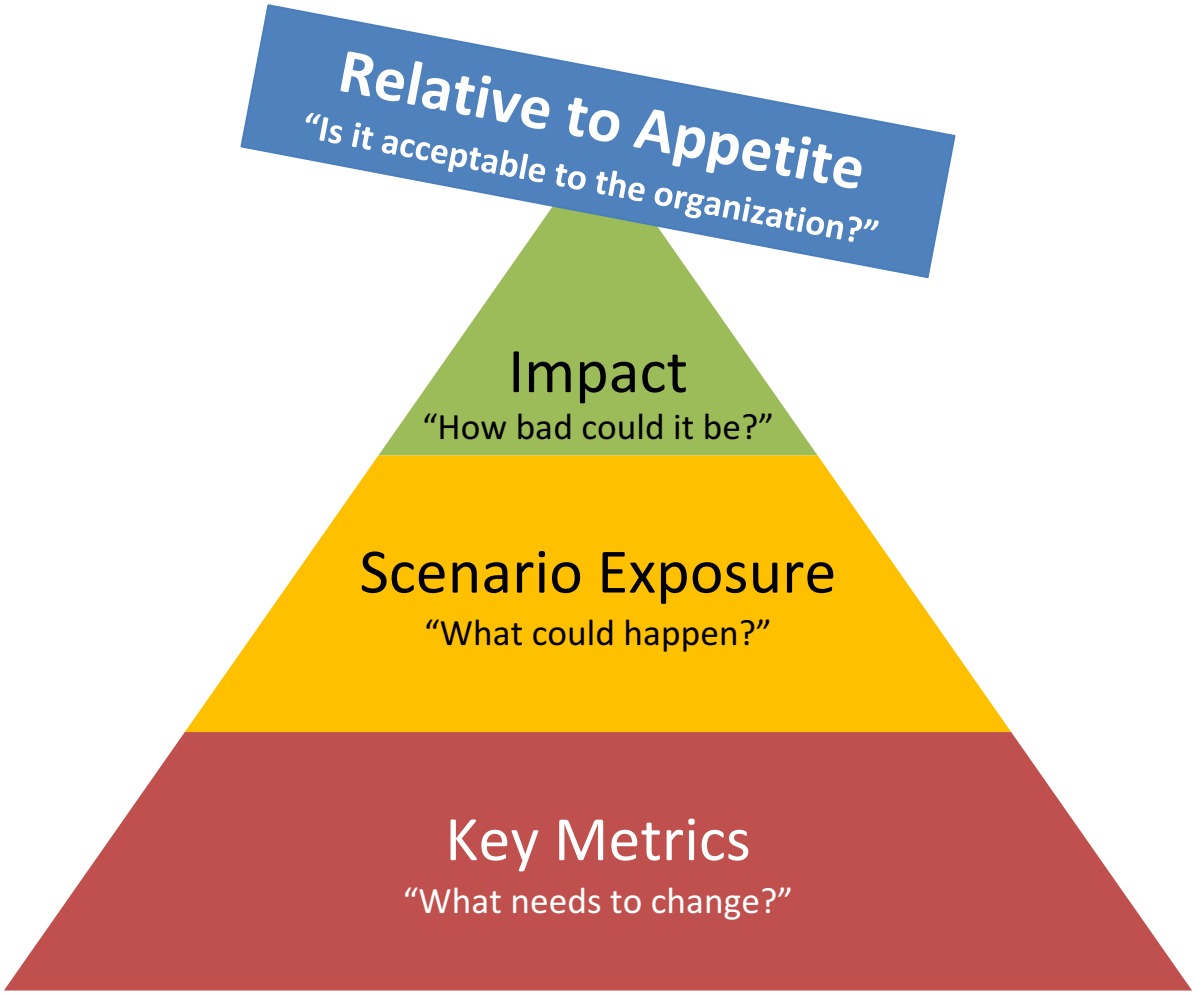


What Matters?

As leaders and executives ask yourself:

- What is the risk culture?
- What are the “crown jewels”?
- What would the business impact be if you lost control?

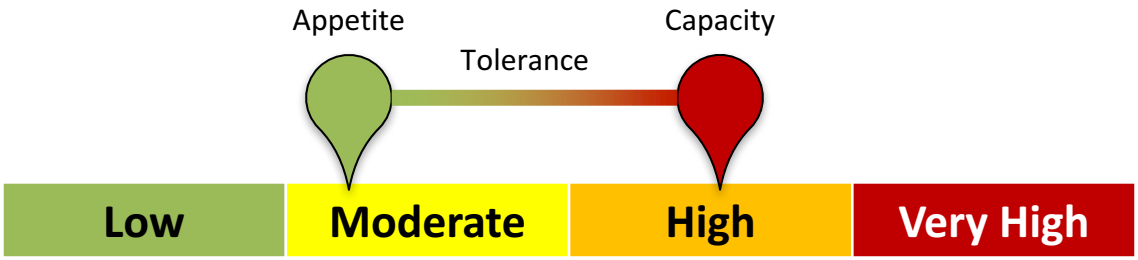
Risk Categories

- You are the owner/executive of the risk catalog. What are the top risks for your organization?
  - Capital, Assets, Management, Earnings, Liquidity, Sensitivity to markets (CAMELS)
  - BASEL III (Capital, Leverage Position, Liquidity)
  - Credit, Liquidity, Market, Profit, Systemic, Settlement, Operational (ERM - Banking)
  - Audit, Management, Development and Acquisition, Support and Delivery (AMDS)
  - Reputational, Strategic, Compliance, Agility, Business, Technology, Culture, Environmental, Others
- What risk categories represent your ”crown jewels”?

Risk Appetite

A standard approach to risk appetite is to think about it like a point on a line

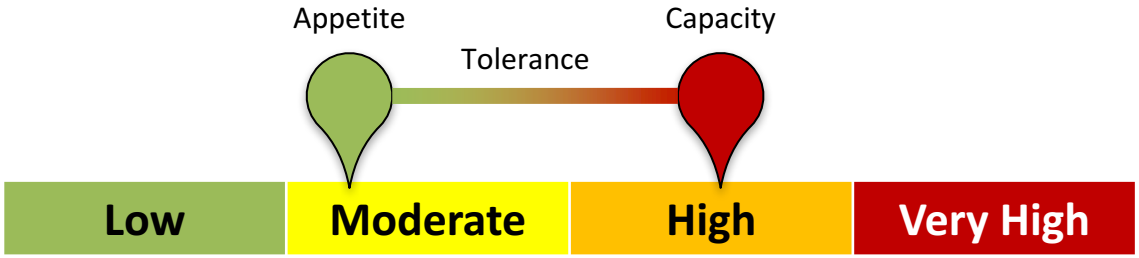
- Risk Appetite: The amount of risk the firm chooses to take
- Risk Capacity: The total amount of risk the firm can withstand
- Risk Tolerance: Deviation an organization is willing to accept

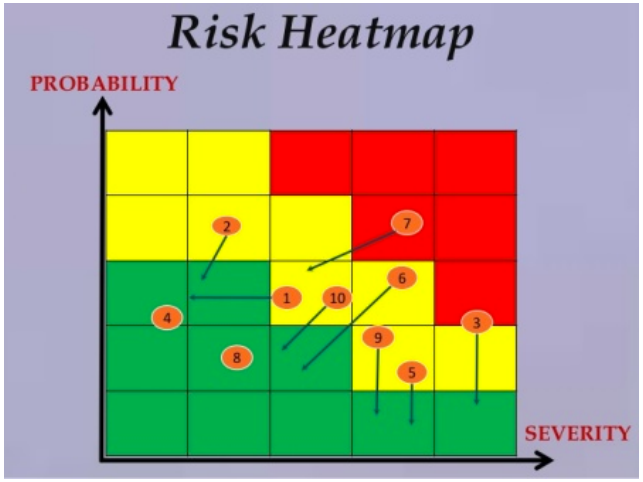


(Note: While useful as a thought exercise, this approach is less helpful when later discussing loss probability)

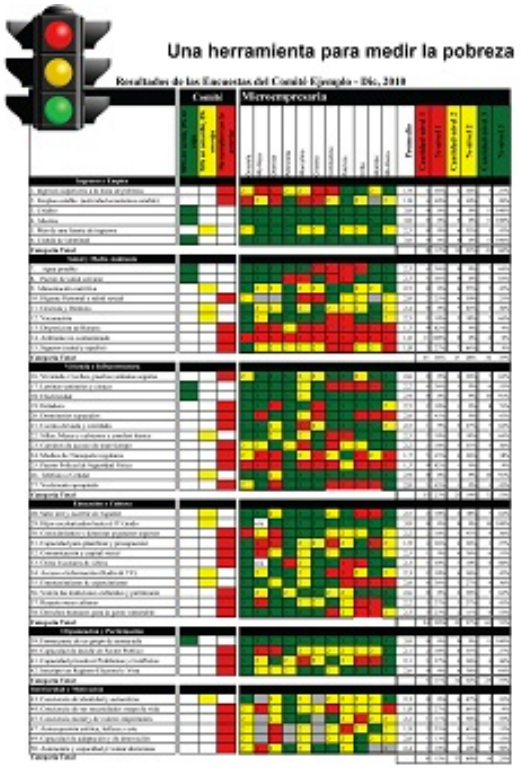
Qualitative vs. Quantitative Appetite?

Risk Appetite has traditionally been thought of as a qualitative scale (Low, Moderate, or High). However, this is insufficient for wise management decisions.

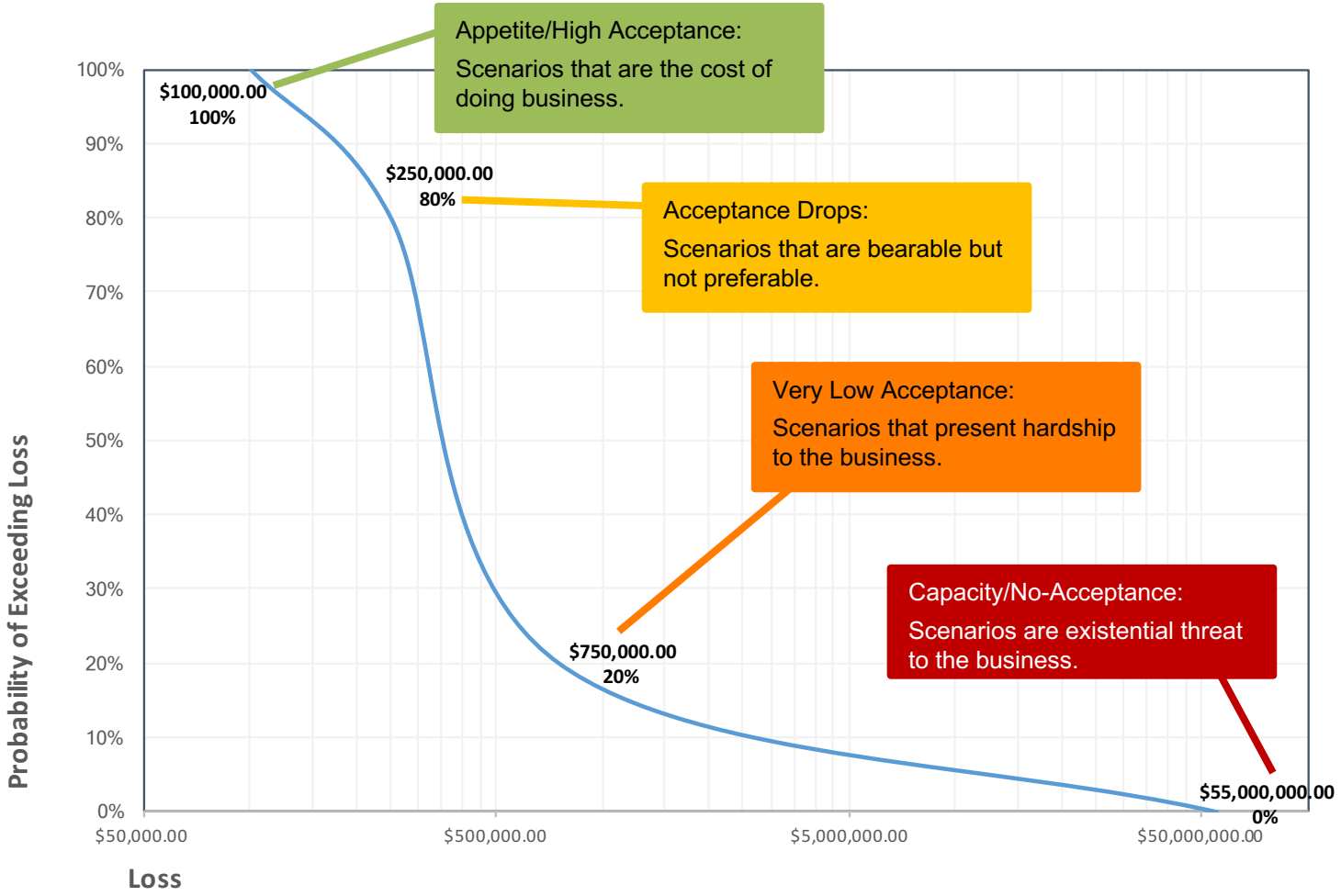




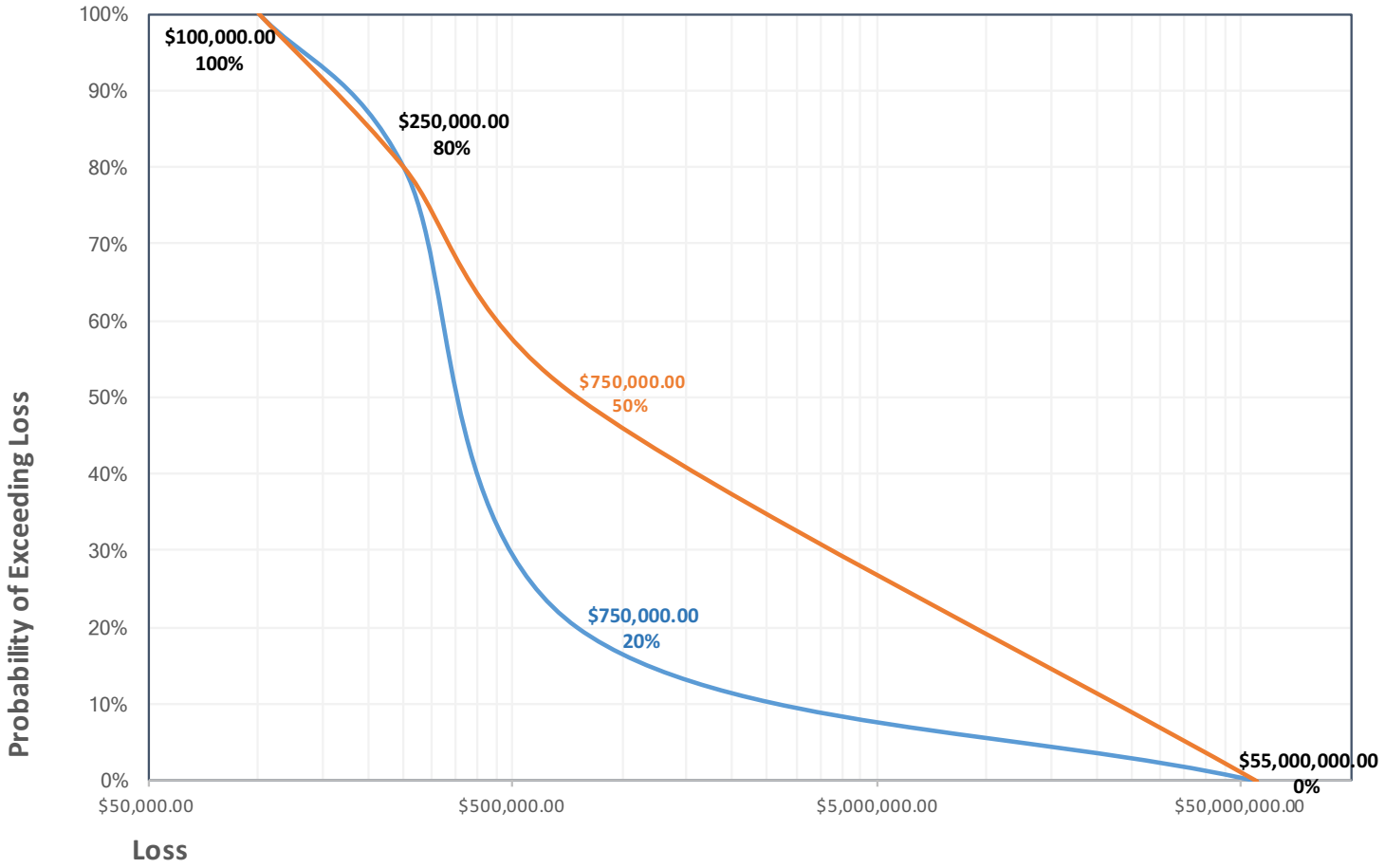
It leads to subjective and uninformative constructs like the Risk Heatmap or Stoplight Charts



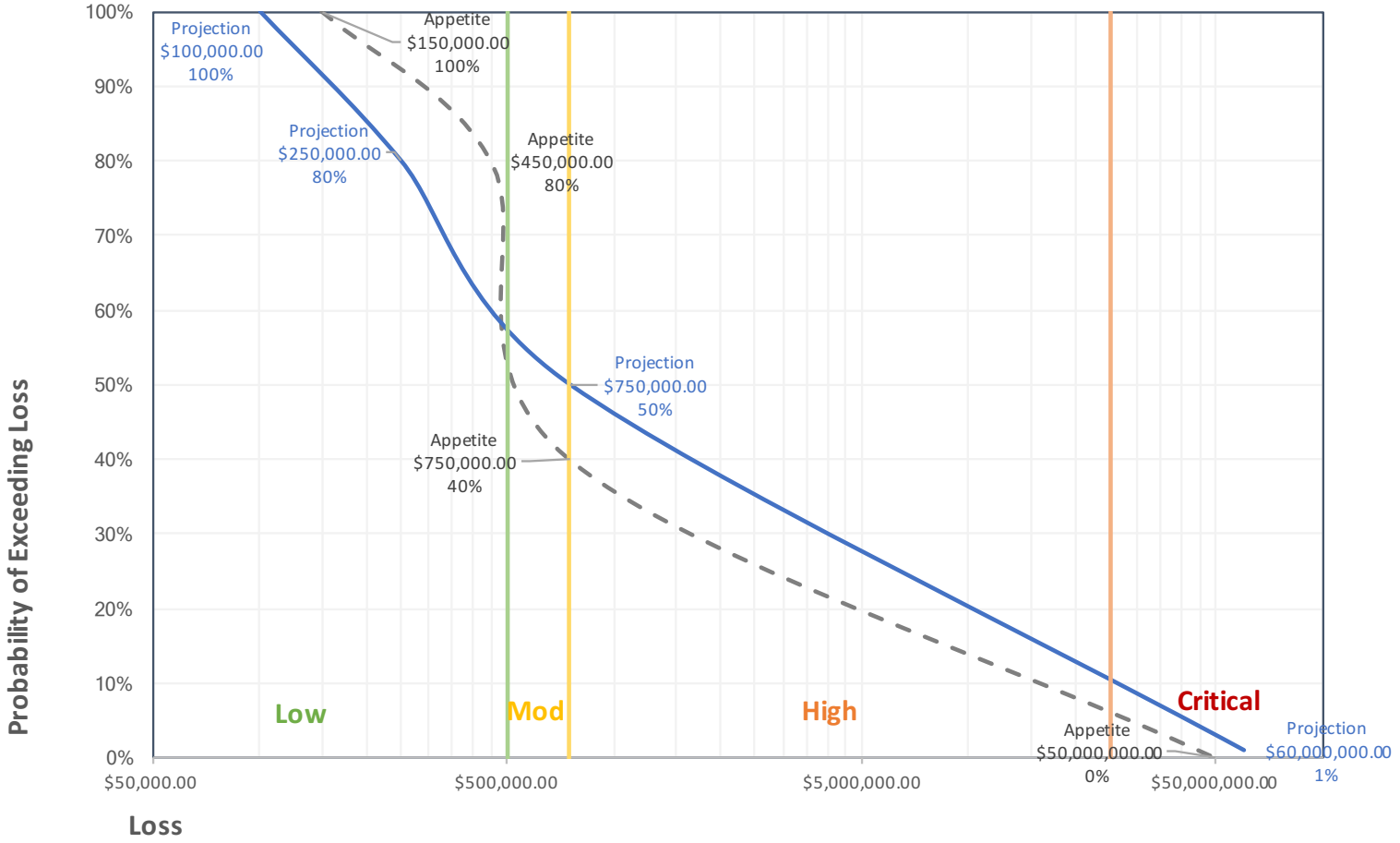
Risk Acceptance on a Probability Curve



Comparing Appetites



The Objective:
To compare appetite to a risk projection



Where does Risk Appetite come from?

Capacity Management

Consider:

- How bad can it get?
- How do you tell the story?
- To whom do you tell it?

Get inside the heads of the business:

- Impactful storytelling
- Culture of the organization

Poor Examples of Risk Appetite

- "*We have zero tolerance for fraud*" – Fraud can not be eliminated
- "*There is a low appetite for cyber losses*" – The term "low" is vague and needs to be quantified
- "The cyber risk appetite of the organization is medium" – Unclear how this is executed or the impact of this statement
- "*Our cyber risk appetite is bounded by the annual value of cyber risk losses. We do not have an appetite for cyber risk losses that exceed $20MM for the year*." – Confusing appetite for loss with a tolerance threshold
- "*The cyber risk appetite of the organization is defined by the cyber risk loss value using a 99.5% confidence level on our statistical loss distribution*". – Good quantification but unclear around what it means.

Association of Foreign Banks (AFB)

Risk Appetite Concepts

- Should be set in both quantitative and qualitative terms:
- Should consider the risk-reward dynamic;
- Have clear trigger points, actions and escalation processes;
- Have clearly described monitoring or arrangements and appropriate ownership thereof ;
- Be formally set and approved by the appropriate governance body and appropriately disseminated down/ translated for lower levels
- Can be set at various levels. e.g. Board, region, entity, business line, department
- Have clear ownership at the respective levels;
- Be embedded/ used by the business;
- Be expressed through a suite of measures rather than just one 'measure' or parameter (e.g. just losses or just Key Risk Indicators):
- Be simple to understand
- Be appropriately documented and reviewed on a periodic basis.

Association of Foreign Banks (AFB)

Characteristics of Effective Risk Appetite Statements:

- **Directly links to the organization's objectives**;
- Is stated precisely enough that it can be **communicated** throughout the organization, effectively **monitored**, and **adjusted** over time;
- Helps with setting acceptable **tolerances** for risk, thereby identifying the **parameters of acceptable risks**.

RISK APPETITE FORMULATION

Based on the discussion, the following assertions should part of Cyber Risk Appetite:

Position – Establishes what is an **acceptable/unacceptable** state, and how much.

Value – Establishes the value of **what is being protected** and ties into **corporate values/objectives**.

Metric – Key performance/risk indicators to monitor **tolerance** of risk to the desired condition.

Plan – Predetermined **escalation** and correction to **adjust** risk.

Thought Leadership in ERM - Understanding and Communicating Risk Appetite, COSO 2012

Appetite Discovery

Qualitative Statement		Quantitative Measures	
Position	**Value**	**Key Metrics**	**Plan**
“Company has a _____ appetite for _____,”	**”because…"**	**“By monitoring the following..."**	**"If we exceed risk threshold, we will …"**

The first half of risk appetite is a documented recognition of the types of risks the enterprise wishes to embrace or avoid, by how much, and tied to corporate value.

The second outlines the key risk indicators to be tracked, their thresholds, and actions (escalation or remediation) if they exceed.

Motivate the business to listen. Tell a better story.

June 21, 2017 – Fmr. DHS Sec Jeh Johnson testifying on the struggle to accept DHS assistance.

"Prior to the election, encouraging the horses to come to the water had to be the primary objective…

My staff and I repeatedly encouraged state and local election officials to seek our cybersecurity assistance."

Progression of Risk Management Approaches

Why has it been hard to motivate business?

Cybersecurity traditionally focuses on only one dimension of risk.

Targets (Assets)
What do you have?
What are you protecting?

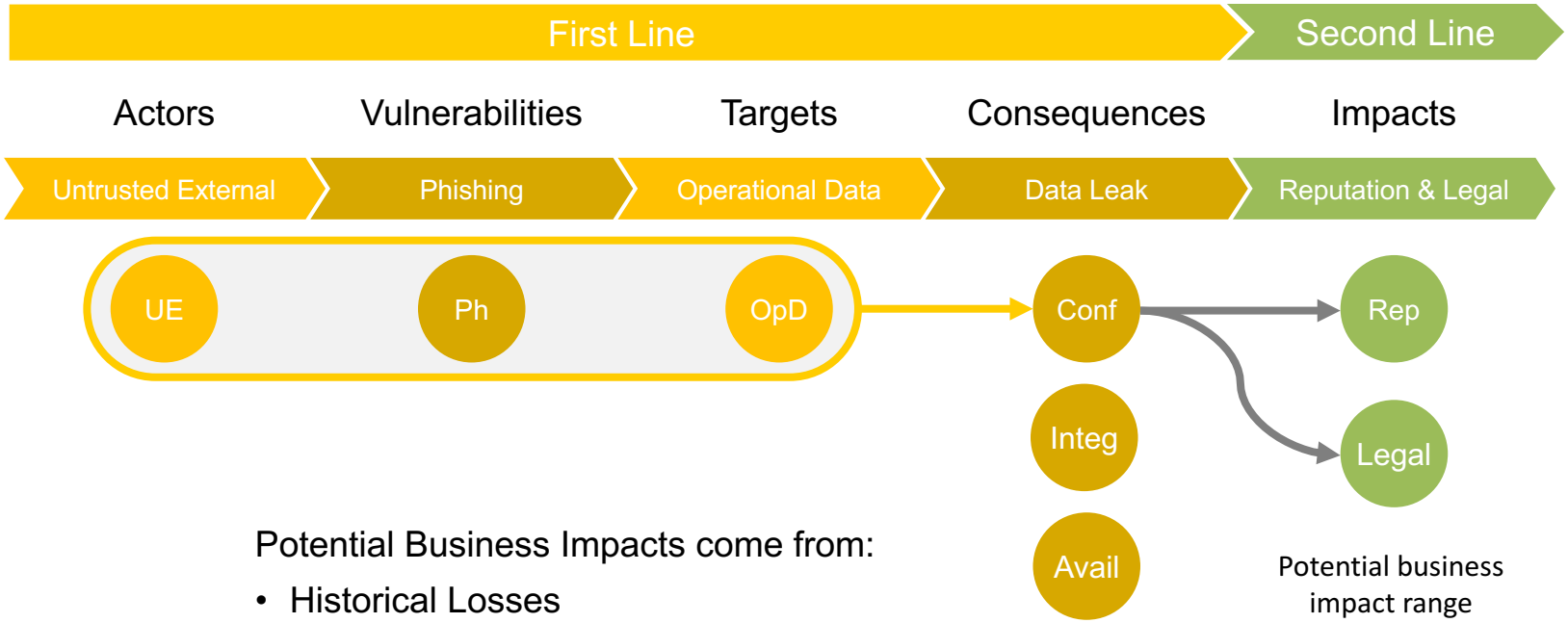
Vulnerability
Detect and close every vulnerability.

Maintain compliance.

Threat Actors
Understand completely your adversary.

Scenario-based Risk Management

Example Scenario: A **malicious actor** takes advantage of a vulnerability in **phishing defense capability** that results in **data leak** of **operational data** that has a **HIGH reputational and legal Impact.**



Potential Business Impacts come from:

- Historical Losses
- Peer Losses
- Financial Business Models
- "Calibrated" Experts

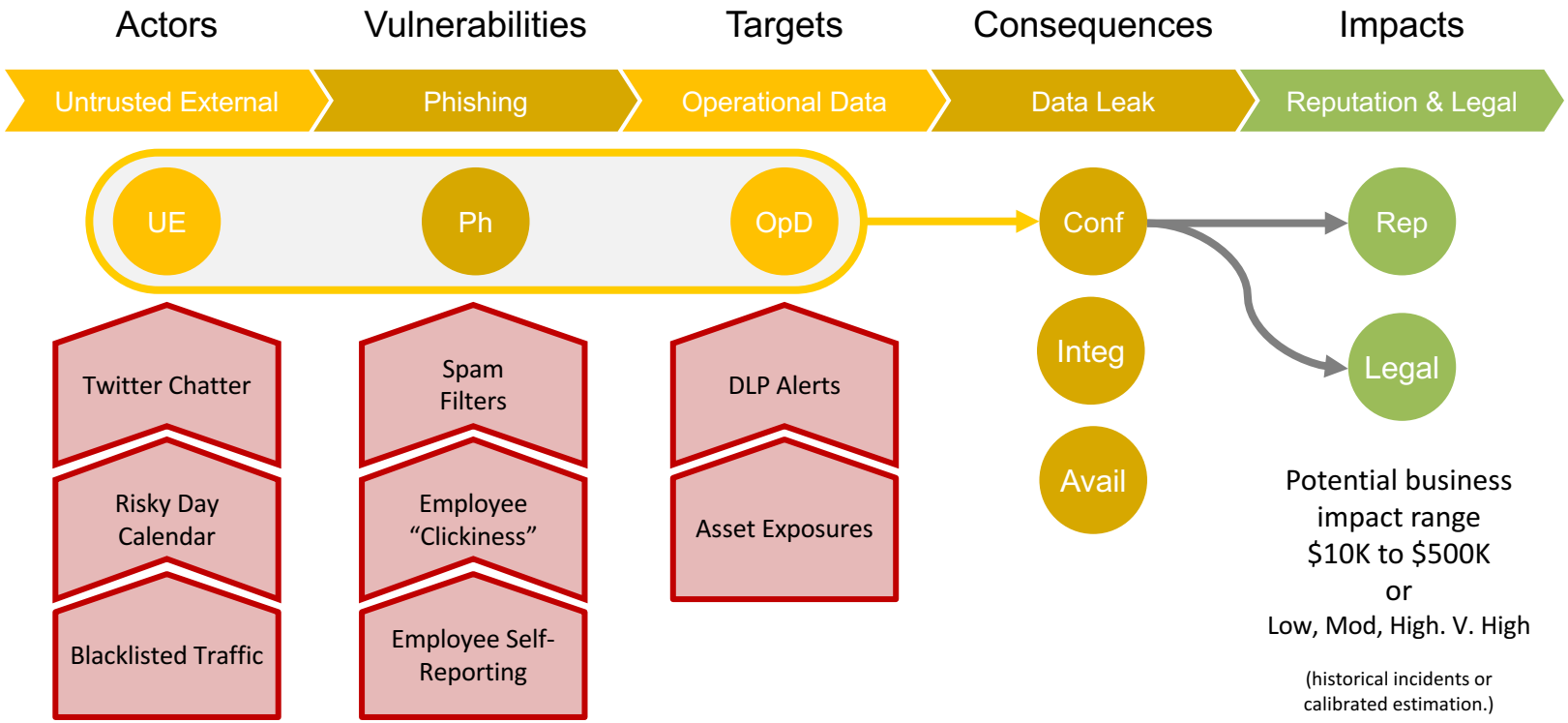
Potential business impact range
$10K to $500K
or
Low, Mod, High. V. High

(historical incidents or calibrated estimation.)

Assessing a Loss Exposure Scenario

Ask yourself “what would make me nervous about this scenario?” and look at each object through several data sources.

A scenario with several overly “nervous” objects is likely to be highly exposed.

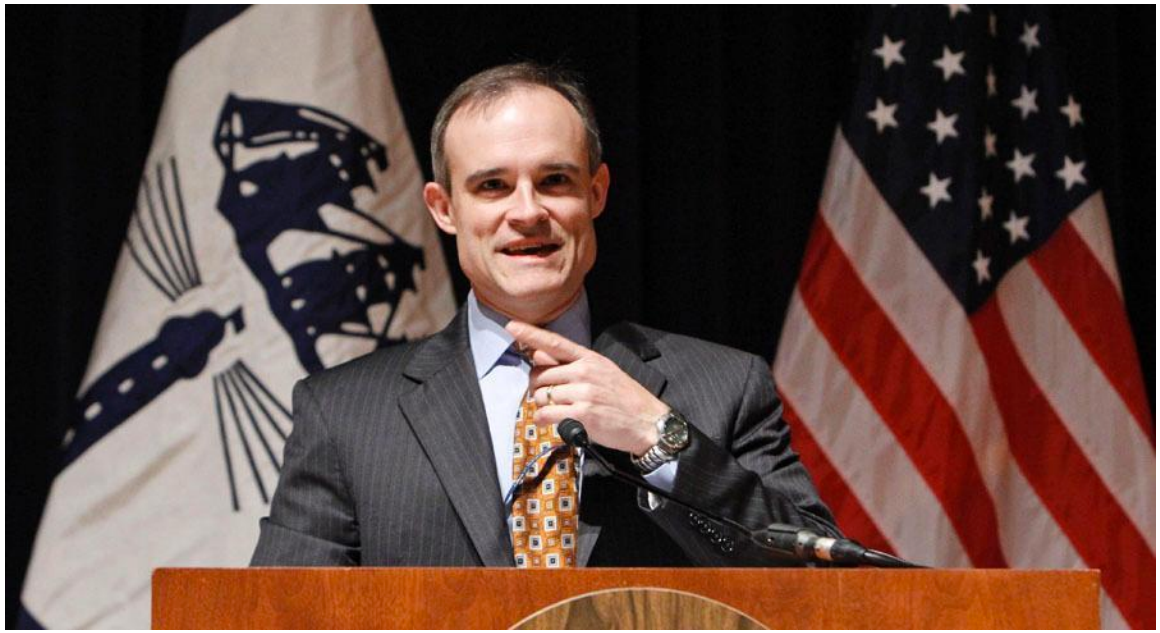


Many Questions, Many Data Sources

Metrics answer “should I be concerned about this?” “Nervousness” is a normalized scale using **data** against expected **thresholds**.

Even a lack of data is helpful with this approach. It can identify new tools or allow for reprioritization.

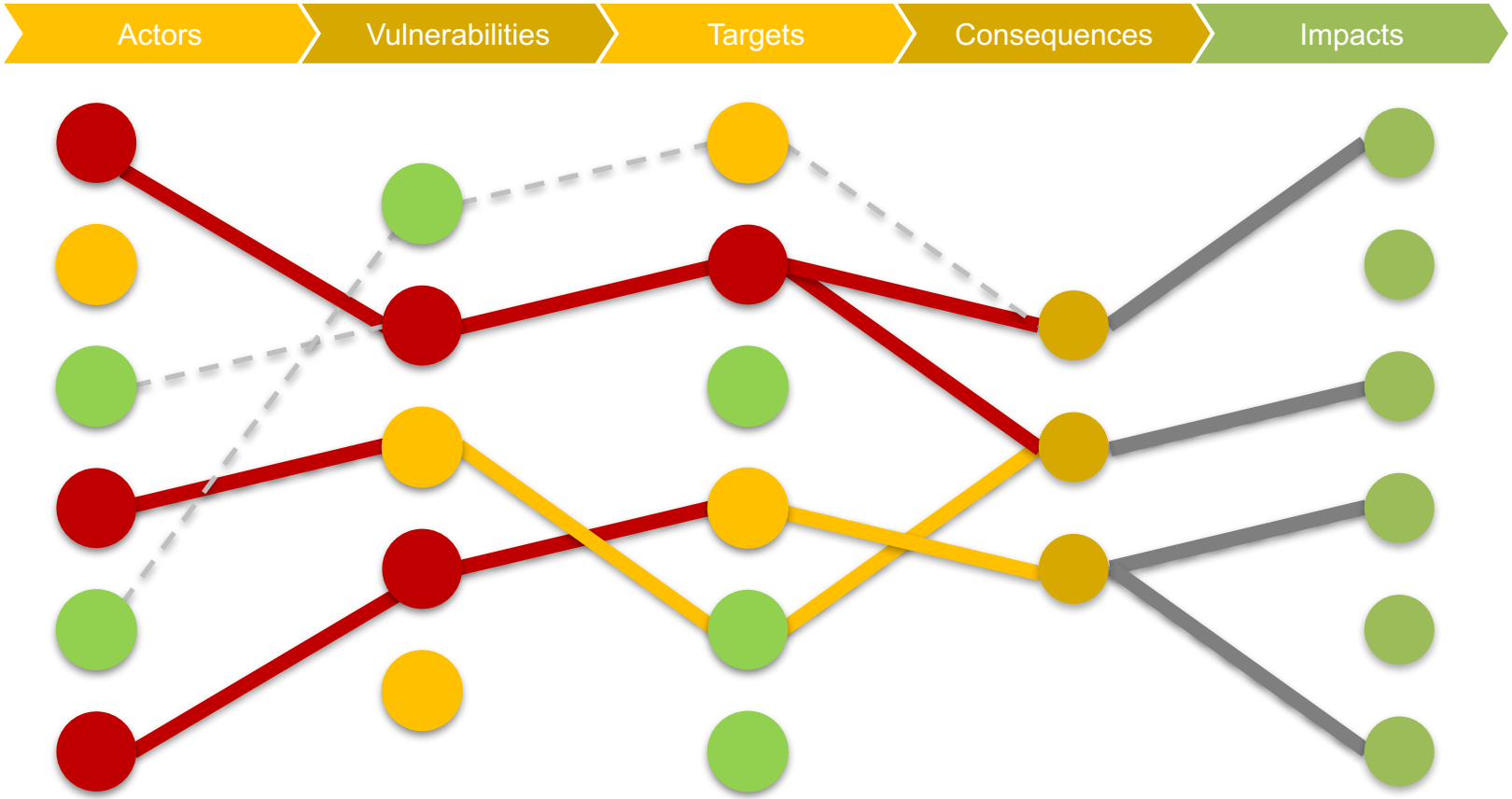
Telling the rest of the risk “story”



Fmr. WH Cybersecurity Coordinator Michael Daniel

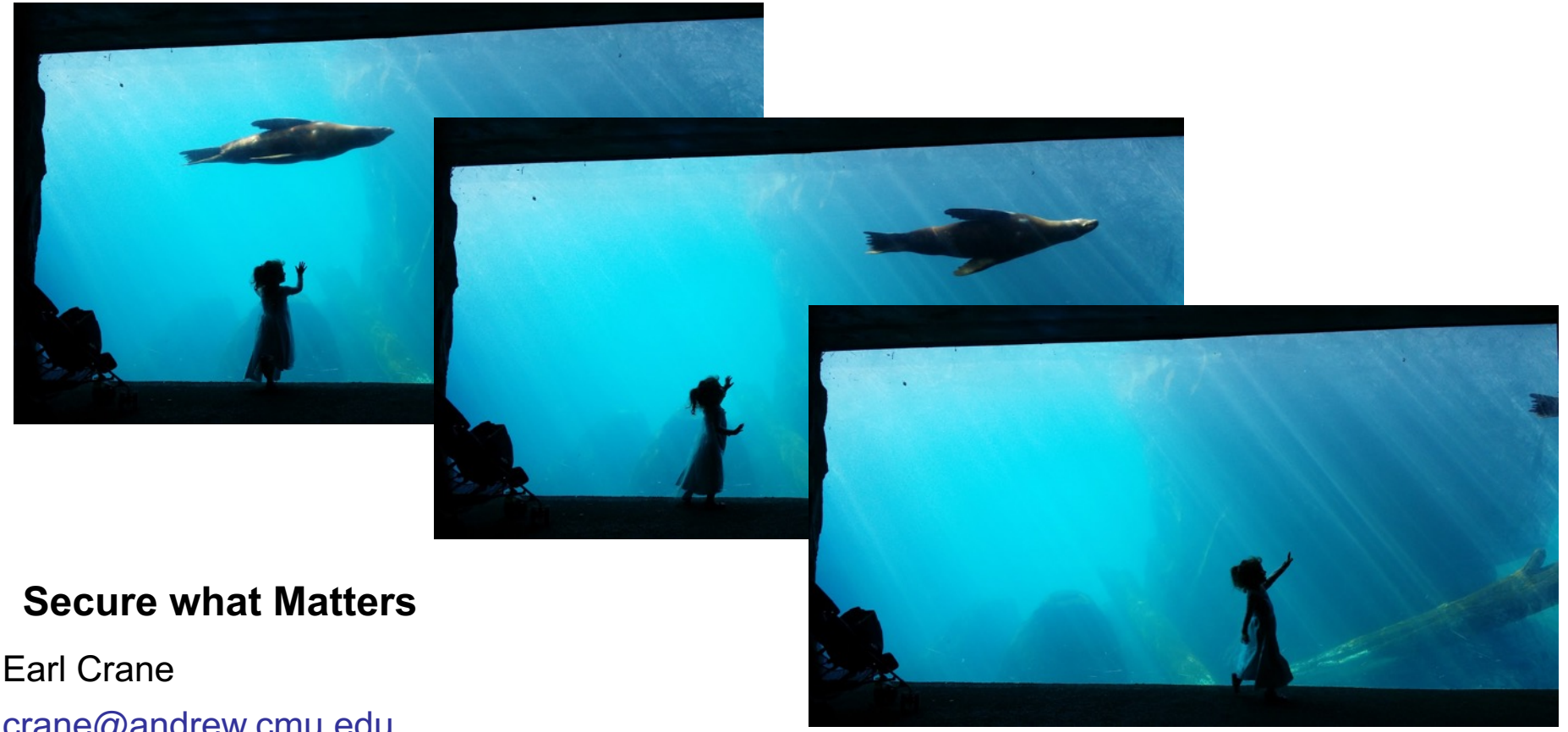
“We turned to other scenarios” the Russians might attempt, said Michael Daniel, who was cybersecurity coordinator at the White House, “such as disrupting the voter rolls, deleting every 10th voter [from registries] or flipping two digits in everybody’s address."

Composing New Loss Exposure Scenarios



Reusing objects allows for many more scenarios

Thank you



Secure what Matters

Earl Crane

crane@andrew.cmu.edu

earl@endsecurity.com