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Developing Useful Metrics

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Notices

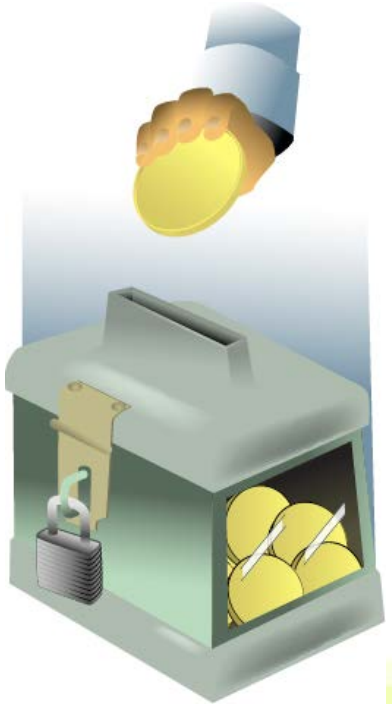
GRC-F03

- This session
  - does not cover specific technical security metrics
  - does cover the importance of metrics tied to things that matter to the business
- Why you might want to stay for this session - if you are interested in
  - determining what to measure in support of business objectives
  - identifying risks and gaps in your current measurement processes
  - a process for developing metrics that will help you do these things

Why do you want to measure?

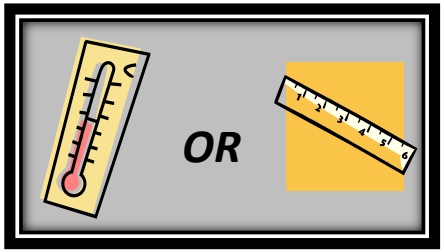
Key questions

- What should I measure to determine if I am meeting my performance objectives for security?
- What is the business value of being more secure?
  - Of a specific security investment?



Terminology (*)

- Measure vs. metric
  - I had 2 eggs for breakfast this morning
  - It's 53 degrees in San Francisco, CA
  - This session is 40 minutes long



- A measure (or measurement) is the value of a specific characteristic of a given entity (collected data).
- A metric is the aggregation of one or more measures to create a piece of business intelligence, in context.

(*) Visualize This! Meaningful Metrics for Managing Risk. Session GRC-F02, RSA Conference 2014.

So what? Why do you care?

- If I had this metric: (*)
  - What decisions would it inform?
  - What actions would I take based on it?
  - What behaviors would it affect?
  - What would improvement look like?
  - What would its value be in comparison to other metrics?

(*) informed by Douglas Hubbard, *How to Measure Anything*, John Wiley & Sons, 2010

Why measure?

- Speak to decision makers in their language
- Demonstrate that the security program has measurable business value
- Justify new investments; make improvements
- Use trends to help predict future events
- Demonstrate that control objectives are (and continue to be) met
- Answer key questions

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Deriving Metrics from Objectives - GQIM

Key questions

- Not “What metrics should I use?” but

“What do I want to know or learn?”

- Alternatives:
  - What decisions do I want to inform?
  - What actions do I want to take?
  - What behaviors do I want to change?

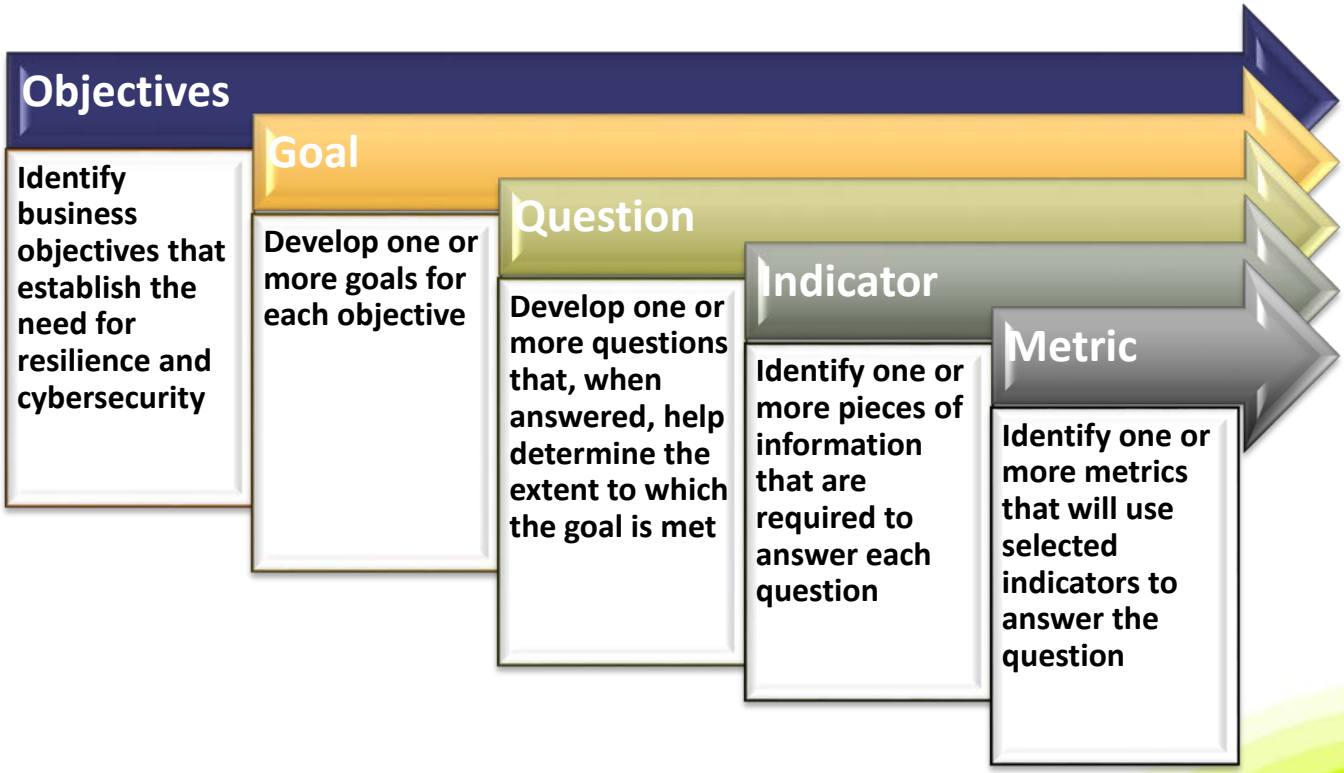
Purpose

- Use a defined, repeatable process to derive meaningful metrics that directly support achievement of business objectives and:
  - demonstrate the business value of each metric (and justify the cost for its collection and reporting)
  - defend such metrics in comparison to others
  - add metrics, update metrics, and retire metrics as business objectives change
  - ultimately, inform business decisions, take appropriate action, and change behaviors

Key takeaways

- Understand a 5-step process for deriving metrics from business or program objectives
- Be able to apply this process to your objectives
- Identify at least one metric that you can use immediately
- Be able to better communicate with business leaders in their language
- Assess the utility of current metrics

GQIM process



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Objectives to Goals

Process

- State a business or program objective
- Define one or more goals that are required to achieve the stated objective
- Goal: the end toward which effort is directed
  - Fewer are better
  - Essential (high leverage/high payoff) vs. complete coverage
    - Judgment informed by stakeholder review

Objectives to Goals

- What are meaningful actions to take to achieve the objective?
- Which actions are most important?
  - 2-3 that are essential, high leverage, high payoff
- Carry forward and refine key terms from the objective in the goals

Ask “If I achieve this goal, will I be able to demonstrate substantive progress in achieving the objective?”

Objective to Goals – Incident Management example

Objective	Goal
Mitigate the risks of business disruption and loss resulting from cybersecurity incidents (with impact threshold > [x])	*Operate a cybersecurity incident center that detects, responds to, and reports security incidents in accordance with established standards and guidelines.* • *enterprise and operational unit levels*
	Others?

Goals to Questions

Goals to Questions -1

- What are meaningful questions to answer to determine if the goal is being achieved?
  - Requires subject matter expertise
- Which questions are most important?
- Carry forward and refine key terms from the goal in the question

Ask “If I answer this question, will I be able to demonstrate substantive progress in achieving the goal?”

Goals to Questions -2

- Useful questions are in the form of:
  - *What is the process for . . . (better than "How does the organization . . .")*
    - leads to implementation metrics
  - *How effective is . . .*
    - leads to effectiveness metrics
    - most desirable but need implementation metrics first

Goal to Questions – IM example

Goal	Questions
G1: Operate a cybersecurity incident center that detects, responds to, and reports security incidents in accordance with established standards and guidelines.	***Q1:*** *What is the process by which suspicious events are detected and declared as incidents?*
	Q2: What is the criteria for escalating high-impact incidents? To whom?
	Others?

Questions to Indicators

Questions to Indicators

- What data do I need to answer the question?
  - Can add more data granularity than called for in the question
  - In what form should the data be reported?
- Which data is most important?
- Carry forward and refine key terms from the question in the indicators

Ask “If I have this data, will I be able to answer some aspect of the question?”

Question to Indicators – IM example

Goal	Question	Indicators
G1	**Q1:** What is the process by which suspicious events are detected and declared as incidents?	***Q1.I1:*** *process and criteria for detecting and triaging suspicious events*
		Q1.I2: process and criteria for declaring incidents
		Others?

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Indicators to Metrics

Indicators to Metrics

- Using the indicator data, what number, percentage, mean, or other metric can I collect/calculate to help answer the question?
  - a percentage presumes 2 numbers are available so you don't need to list the numbers as a metric if the percentage is based on it
- Which metrics are most important?
- Ask "Do I need additional data (more indicators)?"

Ask "If I report this metric (over time), will it provide the greatest insight possible to answer the questions from which it derives?"

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Using this method to validate your current questions or metrics

What if I only have a Metric? - 1

- "We've always reported the number of machines with patches out of date."
- How are you using this metric today?
- "What question will this metric answer?"
  - This metric answers the following question: "How many machines are currently out of date?

What if I only have a Metric? - 2

- Answering this question will demonstrate substantive progress in achieving what goal?
  - The goal answered by this question is “Keep machines up to date through patching.”
  - Will this goal demonstrate progress against an existing *strategic business or program objective*?
- By measuring the actual time between patch release and patch application, you are able to measure your organization’s ability to improve patch capability.

Using GQIM to restate

- **Strategic Business Objective:** Mitigate the risk of successful software exploits by minimizing out-of-date software systems.
- **Goal:** Improve my organization's process for patch management
- **Question:** How effective is my patch management process?
- **Indicators:** Increased efficiencies in the patch management process
- **Metrics:** Actual time between patch release and patch application.

s

What if all I have is a Question? - 1

- **"I'm always asked if my users have the proper level of system access."**
  - How are you answering this question today?
  - If the answer to this question is yes, what is the goal I am trying to achieve?
    - Goal: Ensure all users have the proper level of system access for their job responsibilities.

What if all I have is a Question? - 2

- What is the strategic business objective tied to this goal?
  - Strategic business objective: Mitigate insider threats by ensuring appropriate levels of system access for all users.
- What data would I need to answer the question: “Do all users have appropriate system access?”
  - Inventory of IT systems with required security and access attributes
  - Current list of users with approved security attributes
  - An ability to compare IT systems access and users list

Using GQIM to Restate

- **Strategic Business Objective:** Mitigate insider threats by ensuring appropriate levels of system access for all users.
- **Goal:** Ensure all users have the proper level of system access for their job responsibilities.
- **Question:** Do all users have appropriate system access?
- **Indicators:**
  - Inventory of IT systems with security and access attributes
  - Current list of users with approved security attributes
  - An ability to compare IT systems access and users list
- **Metrics:** (more user centric)
  - Time (min, max, med) to add a new system to inventory
  - Time (min, max, med) to remove access when violation is discovered
  - "Age" Time (min, max, med) of security and access attributes

Barriers and challenges

- What current barriers do you face in establishing, managing, and/or executing a measurement program?
- What challenges do you face in identifying meaningful metrics within your organization?
- Have you identified some new/updated approaches for tackling these?

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Getting started

Approach

- State a business objective
  - Ideally your business objective supports a stated strategic objective
  - **Ensure that** [*business unit, service, product, supply chain, technology, data center*] **is** …
    - *available to meet a specified customer or revenue growth objective*
    - *unavailable for no more than some stated period of time, number of transactions, other units of measure*
    - *fully compliant with [law, regulation, standard] so as not to incur penalties*

To get started

- Identify sponsors and key stakeholders
- Define security objectives and key questions
- Determine information that informs these
  - What information do you already have?
  - What information do you need to collect?
  - What is the value of collecting additional information?
- Define and vet a small number of key metrics
- Collect, analyze, report, refine
- Leverage an existing measurement program

Questions

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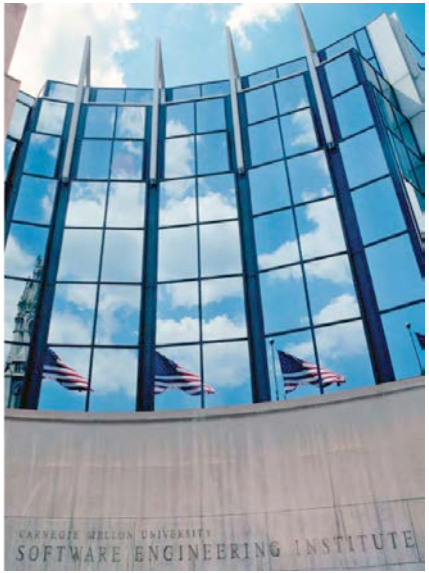

Carnegie Mellon University

- **Software Engineering Institute (SEI)**
  - Federally funded research and development center based at Carnegie Mellon University
  - Basic and applied research in partnership with government and private organizations
- **CERT – *Anticipating and solving our nation's cybersecurity challenges***
  - Largest technical program at SEI
  - Focused on information security, digital investigation and forensics, insider threat, operational risk, vulnerability analysis, network situational awareness, metrics, and governance