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Barney Fife Metrics: The Bullet That we Have but Don't Use, and Why

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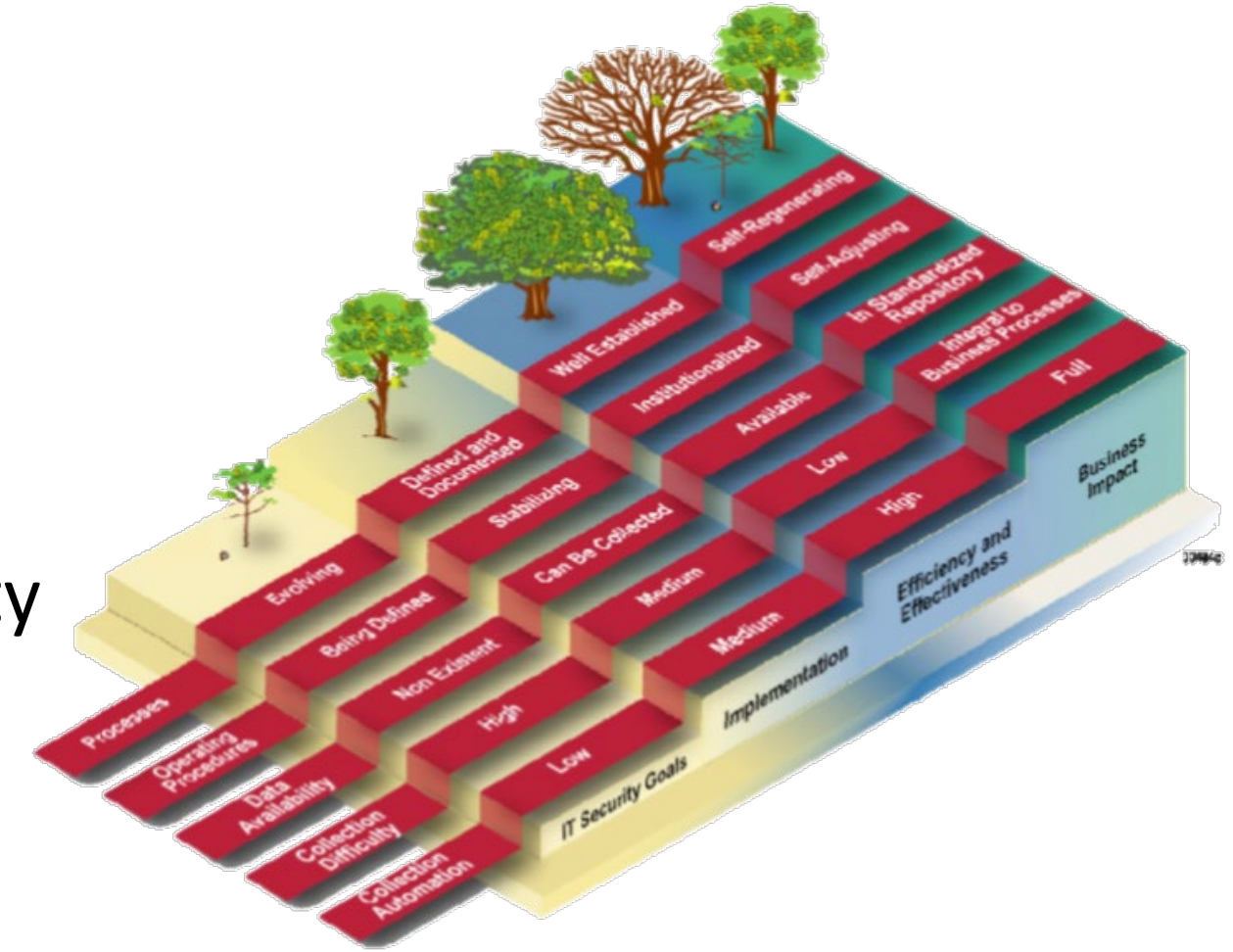
What's a Barney Fife?

And what does he have to do with metrics?

Image courtesy of Rogers and Cowan, Beverly Hills [Public domain], via Wikimedia Commons

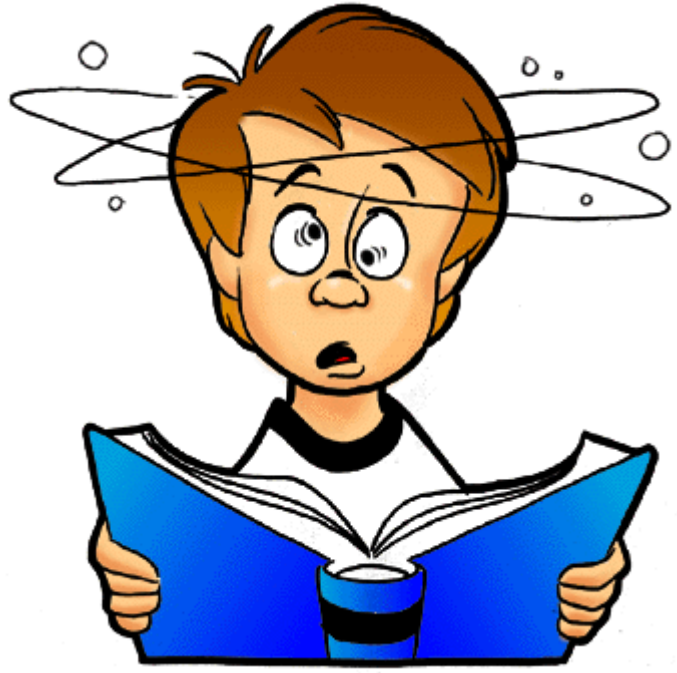
Question: it's been 20+ years: is there truly a lack of consensus and progress towards information security metrics maturity? If so, why?

- The Bullet
- Expected:
  - Industry shared solution(s)
  - Common set of practices
- Compare to financial or safety metrics



What we did

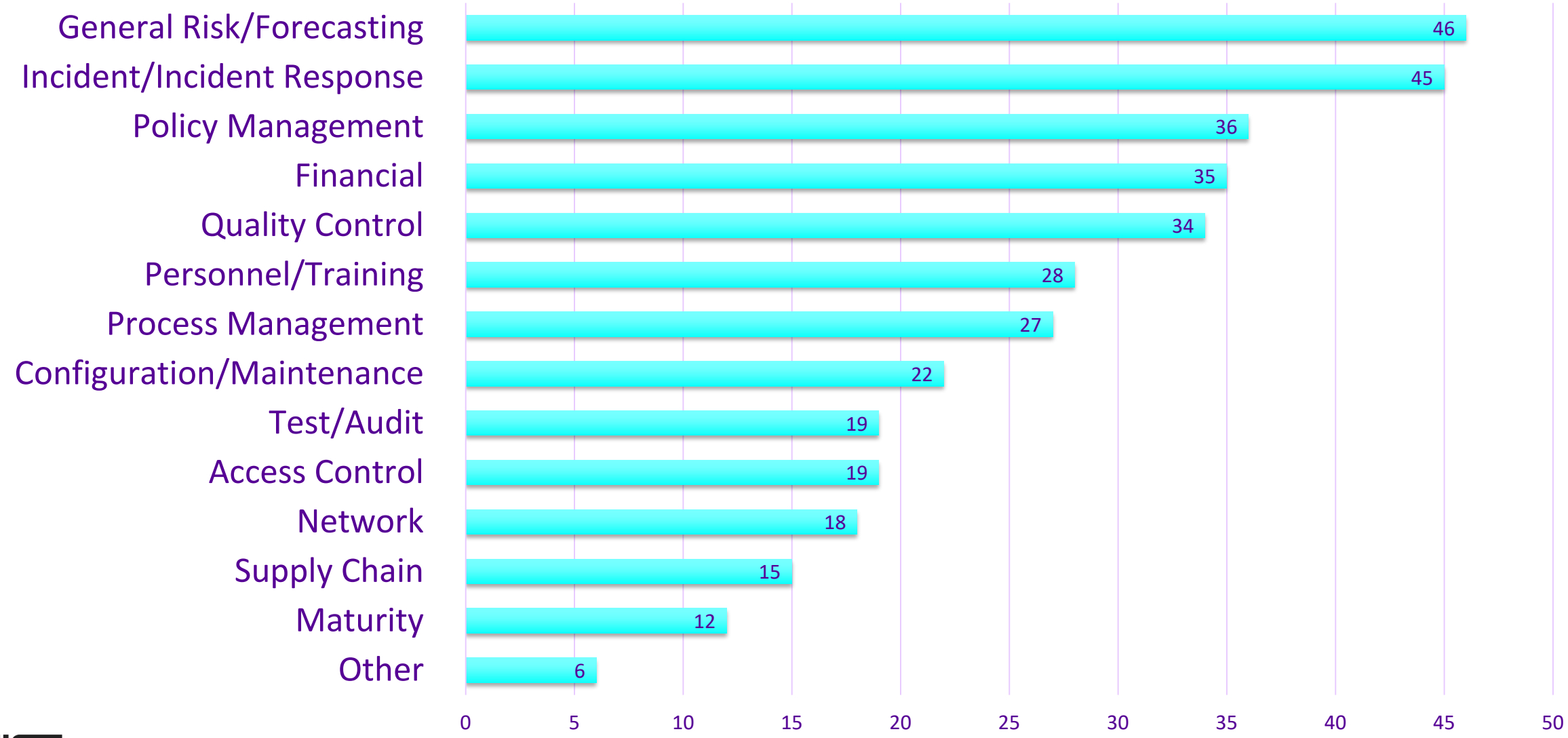
- Literature:
  - 160 Sources reviewed: 52 chosen
    - 28 on information security; 24 on related disciplines
  - 22 described metrics in enough detail
    - 429 total metrics; 373 unique metrics (87%)
- Interviews
  - 13 subject matter experts
    - Diversity in size, sector, regulatory oversight, etc
    - Senior information security & IT leaders (CIO, CISO, CSO, etc.)



Agenda

- State of maturity for cybersecurity metrics
  - Literature vs. Interviews
- Challenges to achieving maturity
  - Literature vs. Interviews
- Possible Best Practices
  - Literature vs. Interviews
- Where we go from here

Categories of Information Security Metrics in Literature

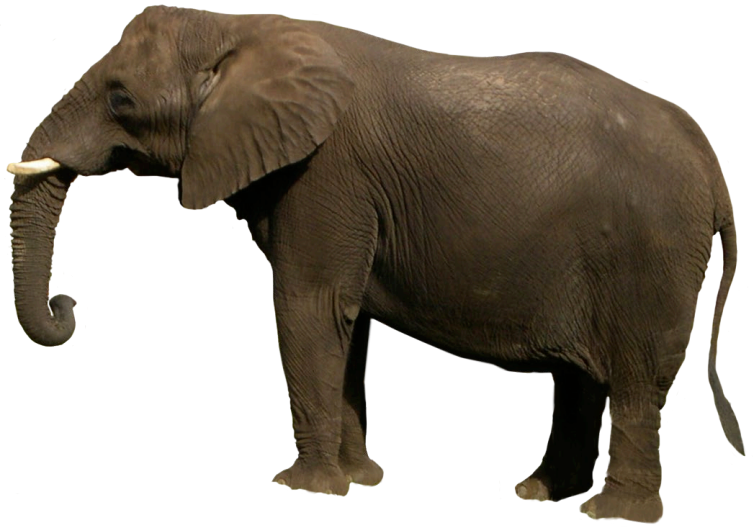


The State of Maturity of Cybersecurity Metrics

- Strategic (27%), managerial (53%), operational (20%)
- There is (still) a gap in the quality of managerial metrics (especially middle-management)
- Many programs seem to collect similar data, but mature programs use tailored metrics
- Mature programs evolve from measuring risk as a single metric to dynamically supporting business / project decisions

Questions Security Professionals Need to Answer

- What does good information security look like?
- What is the vocabulary we need to use to measure information security?
- How do we relate things to risk and to each other?



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Challenges, Best Practices, and What's Next

Challenge #1: Too much data

- Early metrics programs collect and report fewer metrics
  - One-size-fits-all does not work
  - Number and frequency of reports decreased as programs matured
- Automation = more data (not necessarily better data)
  - Security tools
  - ERM / connected tools
  - Custom tools
- Filtering out the noise

Challenge #2: Simple vs. Complex

- Quality is more important than quantity
- Quality = (1) Easy to collect, (2) repeatable, (3) have value
  - Similar to literature
- Simple metrics are often not useful
  - e.g. Number of incidents
- Complex metrics are difficult to compile & make accurate
  - e.g. financial impact of risk

Challenge #3: Time & Commitment

- Finding a metrics champion
  - Must be able to translate board-level needs and priorities to data
  - Must be able to show how data can be useful in their world
- Even with executive support, resources, and talented leadership, takes time (e.g. six months for one organization)
- No such thing as “done”

Best Practice #1: Invest in a Program to Manage Metrics

- Metrics Champion
  - Understanding of data science & the business
- Make it a business priority
  - Make a program specifically for:
    - Identifying metrics
    - Testing metrics
    - Delivering metrics / reports
    - Improving metrics

Best Practice #2: Metrics Should "Tell a Story"

- Metrics tied to a goal
  - e.g. "security control effectiveness"; "Δ time"
  - Best if goal is strategic; if the metric can be used to direct strategic decision-making
- Measure trends and improvement, not numbers
  - More data does not necessarily mean better data
  - Show the meaning behind the number
- Need agreement on what a metric means and what action should they elicit

Best Practice #3: Experiment

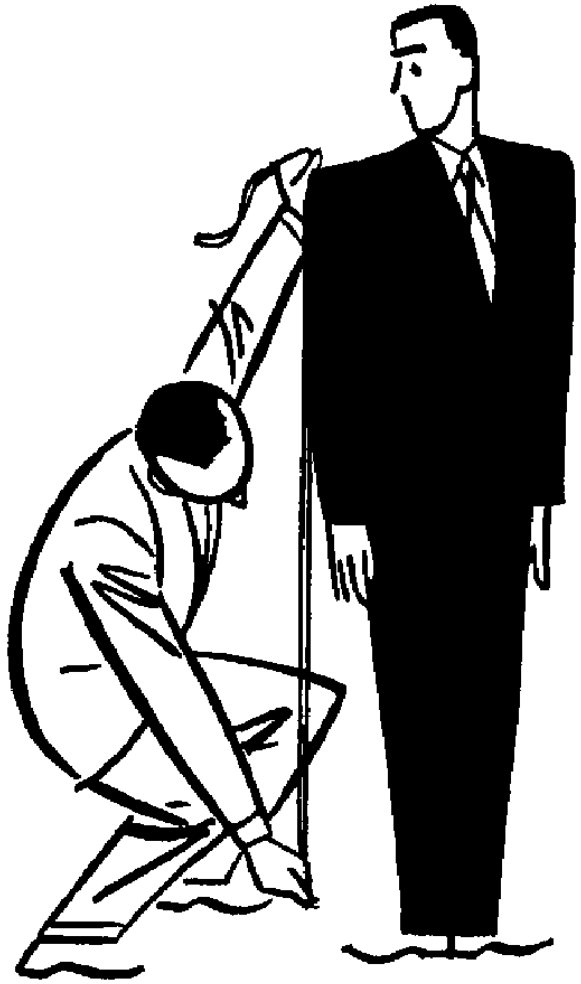
- Metrics programs need to be highly adaptive and dynamic
  - Rapidly evolving threats
  - Diverse and changing tools market
  - Changes in leadership priorities
- Different people need different information
- Start small
- Measure the effectiveness of your measurements!

Early vs. Mature Metrics Programs

Early Programs	Mature Programs
Use only pre-packaged metrics	Build on pre-packaged metrics
Everybody receives the same metrics	Metrics customized to function
Reporting the same info many times	Reporting changes & anomalies
Reporting more often	Reporting less often
Using simple metrics	Using complex metrics
Operational metrics only	Operational, managerial, & strategic
Create metrics once	Constantly improving metrics
Metrics as an after-thought	Metrics as key strategy driver

Research Needed

- Useful executive-level metrics
- KSAs for driving metrics programs
- Case studies:
  - Example metrics
  - How metrics are tested
- How to tailor information security metrics



The bullet we have but don't use

"Data! Data! Data! I can't make bricks without clay!"

– Sir Arthur Conan Doyle's Sherlock Holmes

Apply What You Have Learned Today

- Next week:
  - Identify a metrics champion for your organization
  - NIST SP 800-55 Rev. 1, Performance Measurement Guide for Information Security
- In the next three months:
  - Make a list of the data sources you have access to
  - Measure the effectiveness of your current metrics
  - Define what stories you need to hear/tell
- Within six months:
  - Have a core set of metrics for each layer of the organization
  - Create a program to test-drive metrics
  - Share your results!

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Questions???

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