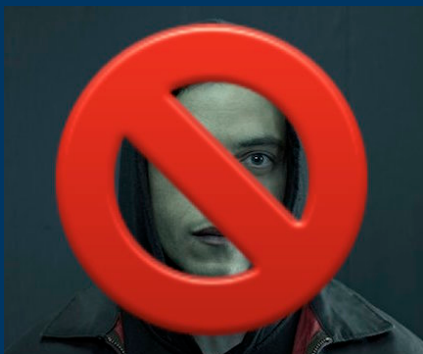


Mind This Gap: Criminal hacking and the global cybersecurity skills shortage



Stephen Cobb, Senior Security Researcher
ESET North America



The cybersecurity skills gap



- What is it? • Is it real? • Where did it come from?
- How big is it? • Does it matter?
- What are we doing about it?
- What's wrong with what we're doing about it?
- Why does this gap worry me so much?
- What can WE do about it?
- Where does this gap go from here?

What is the cybersecurity skills gap?

- The number of unfilled (or possibly under-filled) information security positions
- Positions unfilled or under-filled because there are not enough suitably skilled people to fill them
- In other words, there are not enough people in the world with the skills required to meet the cybersecurity needs of organizations

The cybersecurity skills gap is not

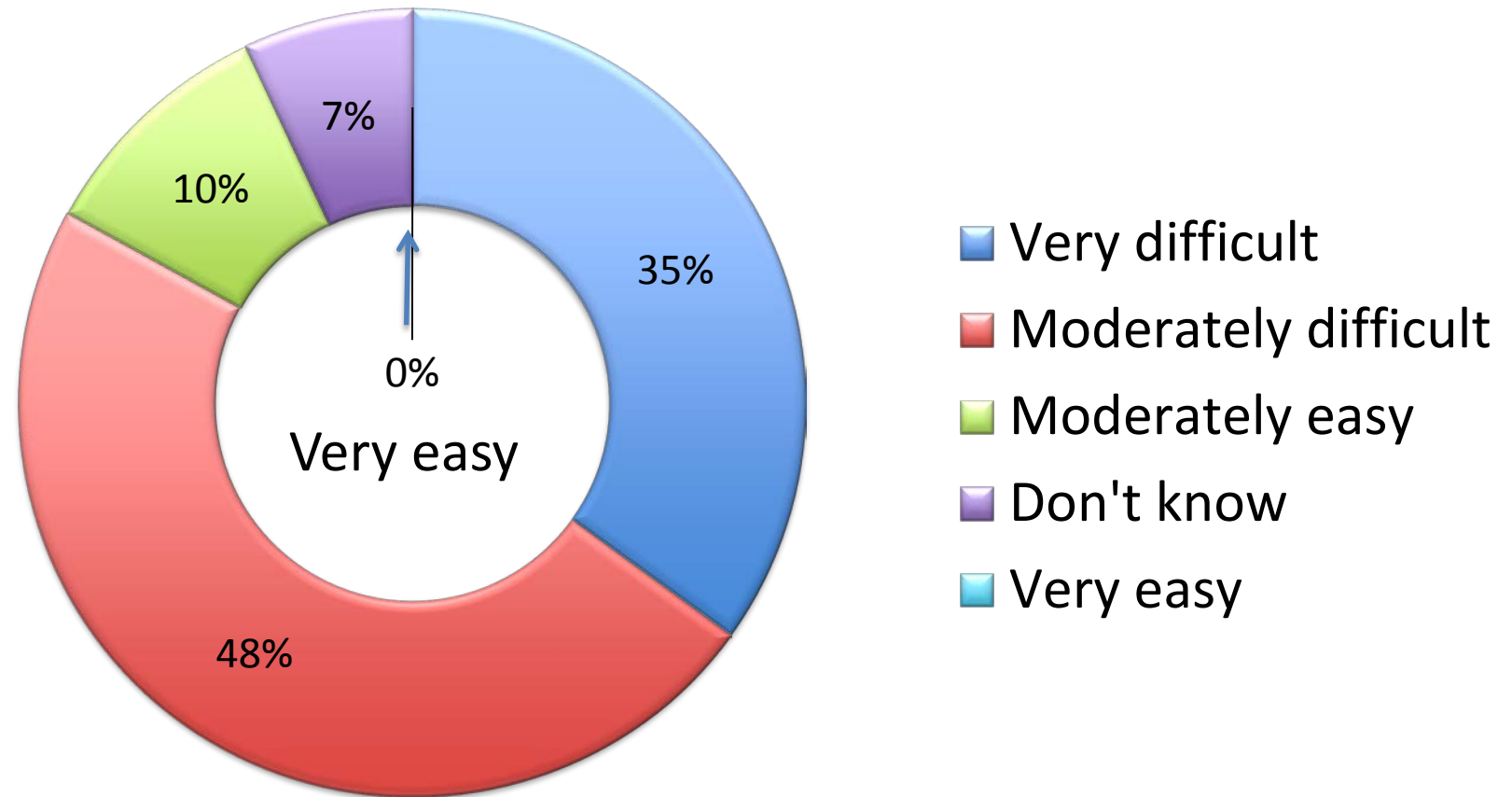
- A question of wanting more than you can afford
 - It is not the gap between how many people security managers *would ideally like to hire* and the number of positions that the organization decides to fund
- The result of Human Resource departments failing to understand security
 - But that is a real problem that must be addressed

Operating with a security position unfilled or
under-filled undermines security

Is it real? YES!

- Surveys say so, many times over...
 - 82% believe there is a shortage: (Intel/McAfee/CSIS)
 - 86% believe there is a shortage: (ISACA)
 - 71% say gap has harmed the organization (C/I/M again)
 - 59% of organizations under 500 employees have no access to cybersecurity expertise (Spiceworks)
- My own survey concurs...

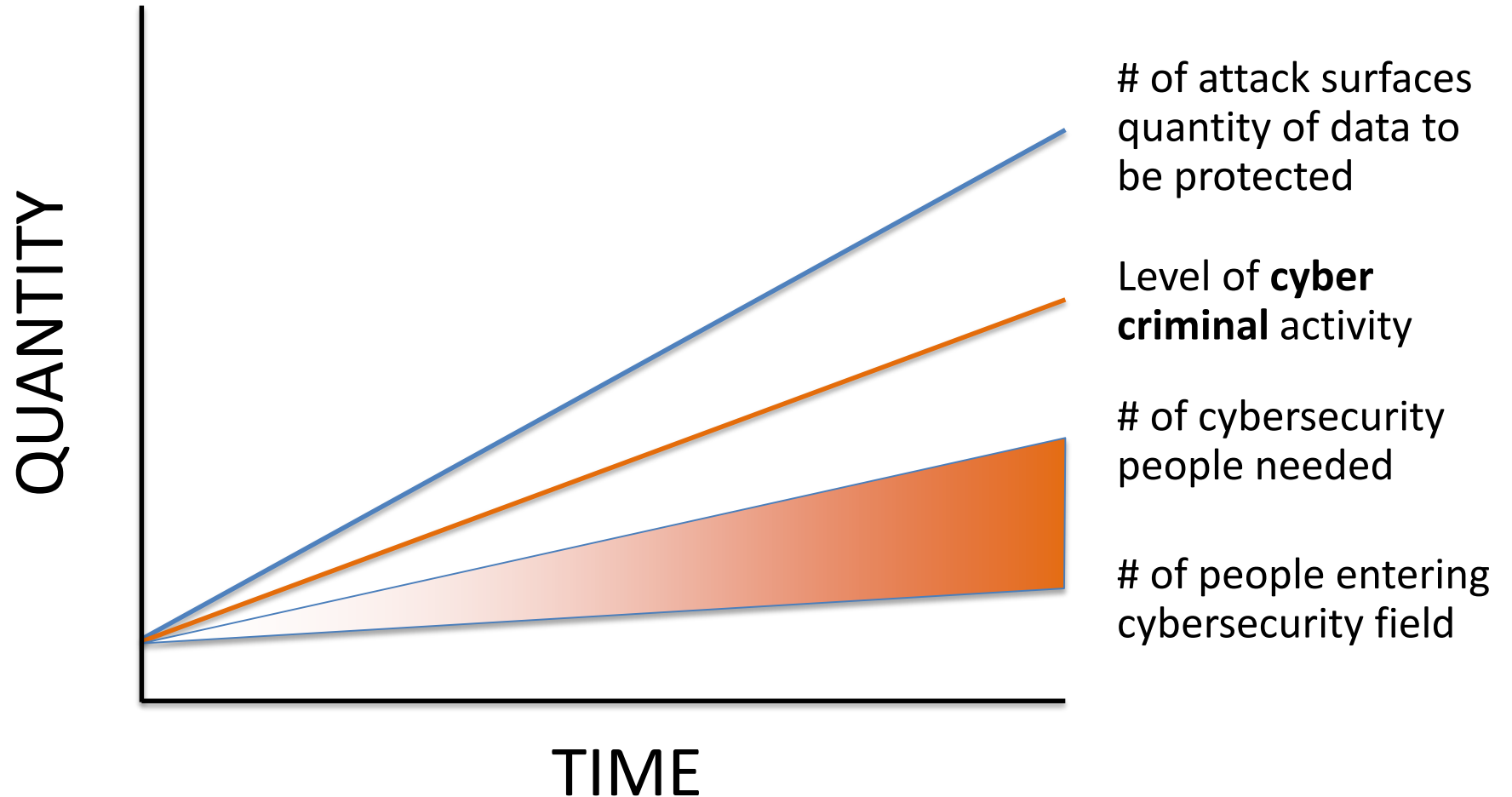
How would you describe your organization's experience when it comes to hiring people for the cybersecurity roles it needs to fill?





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Where did this gap come from?



How big is the cybersecurity skills gap?



400 pounds?

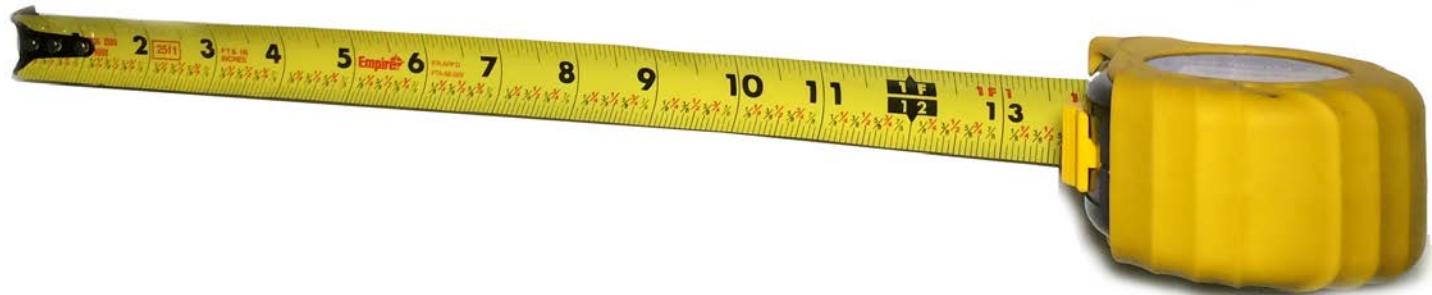
How big is this gap?

- Security industry not always fact-based
- Numbers tend to be repeated without basis*
- In 2014 Cisco said something about the global cybersecurity skills gap being 1 million
- This was repeated many times

*See last year's VB paper: Sizing Cybercrime

In my opinion, the size of the cybersecurity skills gap today is:

- About 1 million people globally
- About 200,000 in the US
- Headed to 1.5 million globally by 2020



For the history of, and my arguments for, a cybersecurity skills gap of 1 million, see my white paper at scobbs.blogspot.com



Does the gap matter? YES!

- Lack of skilled people weakens current security
- Limits our ability to defend the status quo
- And undermines security of future products
- Simply put, the cybersecurity skills gap threatens the future of technology



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CAREER CENTER - NOW HIRING!

CYBER
SECURITY

OTHER



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What are we doing about it?

- A lot is going on in the US...
- National Initiative on Cybersecurity Education (NICE)
- National Cybersecurity Workforce Framework
- Comprehensive taxonomy of cyber KSAs
 - Knowledge, Skills, Abilities
- A place to find out where you can get KSAs = NICSS
 - National Initiative for Cybersecurity Careers and Studies

But we need to do more

- KSAs are important, but what about aptitude?

To forge ahead in a field of activity presupposes aptitude for it. Capacity to become proficient in the work to be done, and to find in it a certain zest, is vital to happiness and health of mind, whether in school and college, in business and government, in trade or a profession.

- Walter Bingham, 1937

But we need to do more

- KSAs are important, but what about aptitude?
- Some good studies by military, academics, industry
- CATA: Cyber Aptitude and Talent Assessment (UMD)
- Smart Grid Cybersecurity: Job Performance Model
 - DOE funded study by Pacific Northwest National Laboratory: skills needed to secure the smartgrid
 - Developed a vignette-based approach to defining cybersecurity tasks and assessing competency

What about cybersecurity competitions?



What about cybersecurity competitions?

- Cybersecurity competitions are popular in the US
- Ages 11 through university
- E.g. San Diego Mayors' Cyber Cup
- But they are not a sure-fire recruiting tool



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What is wrong with current efforts to close the skills gap?

- Too many untested assumptions
- Too many unanswered questions

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Untested assumptions

- #1: It's all about technical knowledge and skills
- But several studies found:
 - Cybersecurity professionals tend to value some soft skills, such as communication, more than technical skills or domain-specific security knowledge.
 - This perspective is more pronounced among those who have been in the profession longer and/or have greater responsibility for cybersecurity within the organization.

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Full report to be published later this year:
check scobbs.blogspot.com for updates



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Untested assumptions

- #2: It's all about more information security degrees
- Among factors contributing to success in information security management, an information security degree was not highly valued (relative to other attributes like the soft skills of communication and analytical thinking, or broad understanding of threats, technical knowledge, or even professional certification).
- While younger people tend to value information security degrees more, even those who possess such a degree are not unanimous in finding it highly valuable to their cybersecurity career.

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Untested assumptions

- #3: Cybersecurity workers are like other IT workers
- No, according to Freed who used the Five Factor Model of personality (OCEAN, NEO-IPIP)
- Cybersecurity workers score higher on:
 - Openness to new experience, Conscientiousness
- Lower on:
 - Neuroticism
- Differences are even more pronounced in CISOs
 - Cobb's CISO Survey

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Unanswered questions

- Are there enough people in the world who are smart enough to do this work?
- Will enough of the people who are smart enough to do the work actually want to do it?
- Is society prepared to pay the price?



Rebuttals

- The laws of supply and demand will produce enough suitably skilled people over time
- Future security solutions will reduce the need for a skilled cybersecurity workforce (e.g. using AI)
- The skills gap is tech employer propaganda aimed at lowering labor costs by flooding the market



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Why this gap scares me



Worm Epidemics in Vehicular Networks

Oscar Trullols-Cruces, *Student Member, IEEE*, Marco Fiore, *Member, IEEE*,
Jose M. Barcelo-Ordinas, *Member, IEEE*

"capable of spreading through very large areas and infecting tens
of thousands of vehicles in tens of minutes at most"

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Why this gap scares me



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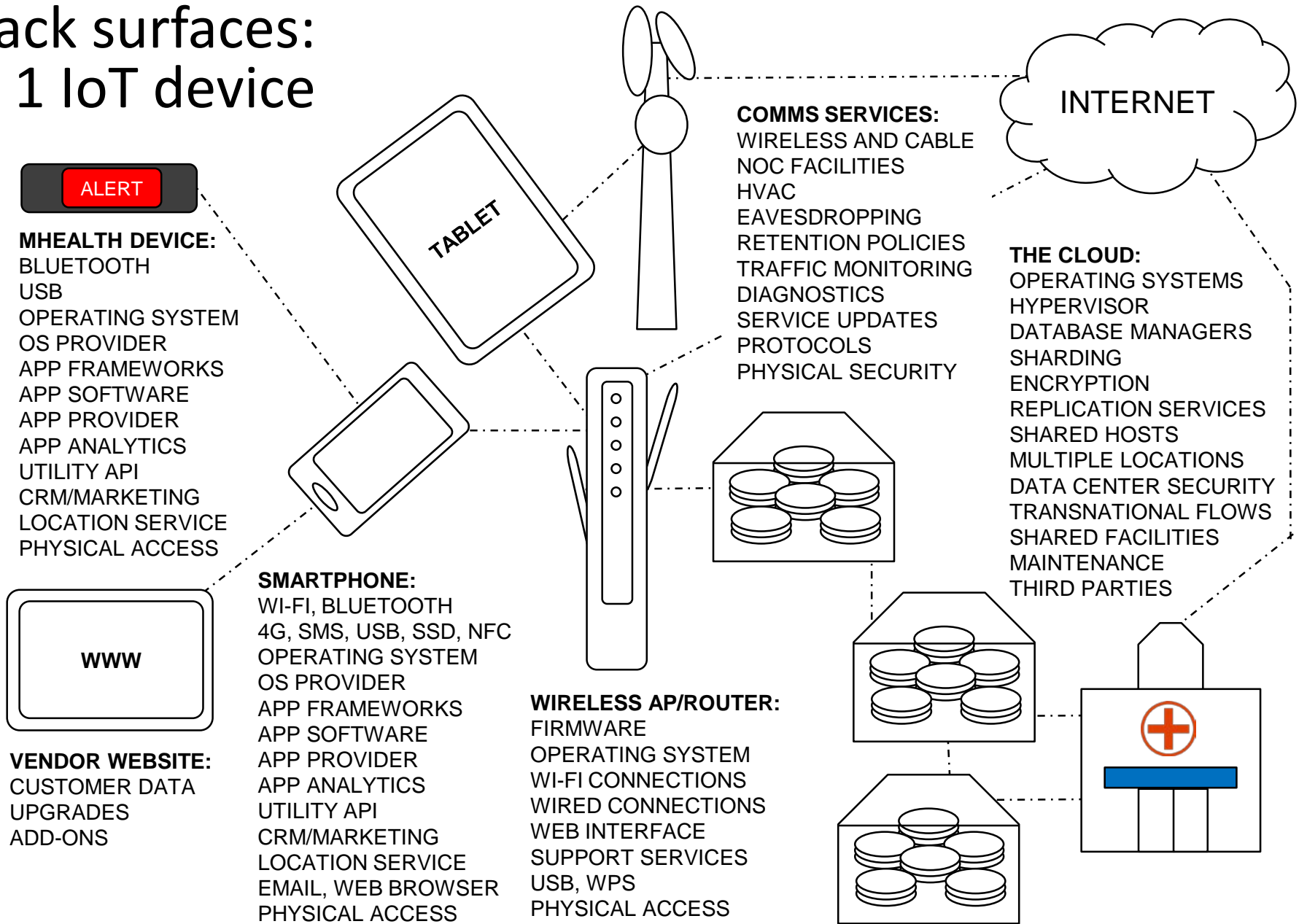
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Attack surfaces: 1 IoT device



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What can WE do about it?

- Inspire people to become defenders
- Debunk unhelpful cultural stereotypes



What can WE do about it?

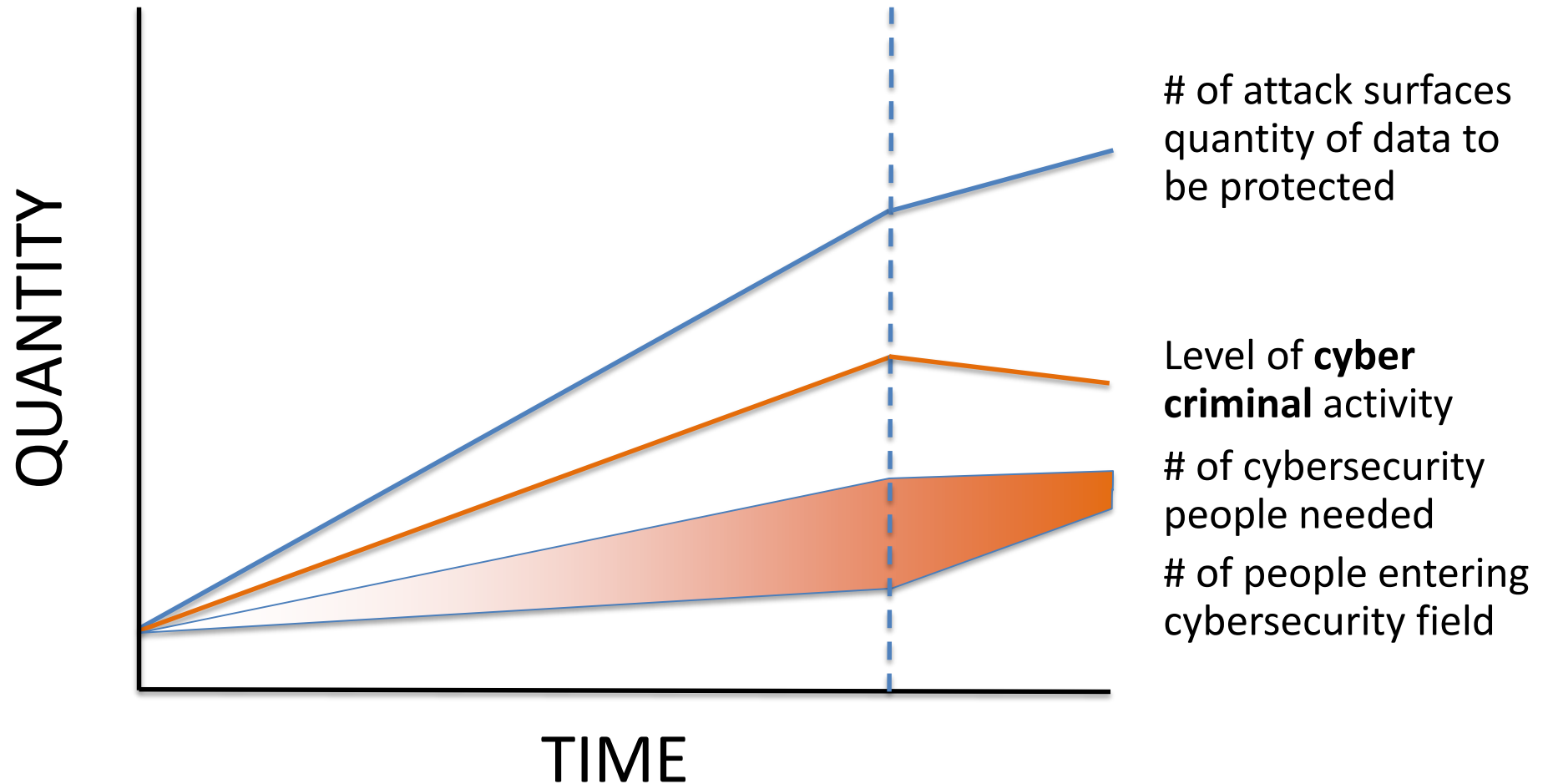
- Inspire people to become defenders
- Debunk unhelpful cultural stereotypes
- Educate everyone (especially policy makers)
- Help PR reduce friction in the hiring process
- Mentor those with a passion for security
- Don't plan to retire any time soon



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Where does this gap go from here?

- The highly optimistic scenario



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Thank you!

- stephen.cobb@eset.com
- @zcobb on Twitter
- scobbs.blogspot.com
 - Sizing the Cybersecurity Skills Gap
- Later this year
 - MSc dissertation
- Follow WeLiveSecurity.com

