



Integrating Cyber Security and Resilience in a design engineering project

Patrik Chartrand CISSP, CCNA



Cyber Safety VS Cyber Security

disambiguation



SAFETY

Unintentional

Cyber incident

Friendly

Can be avoided

SECURITY

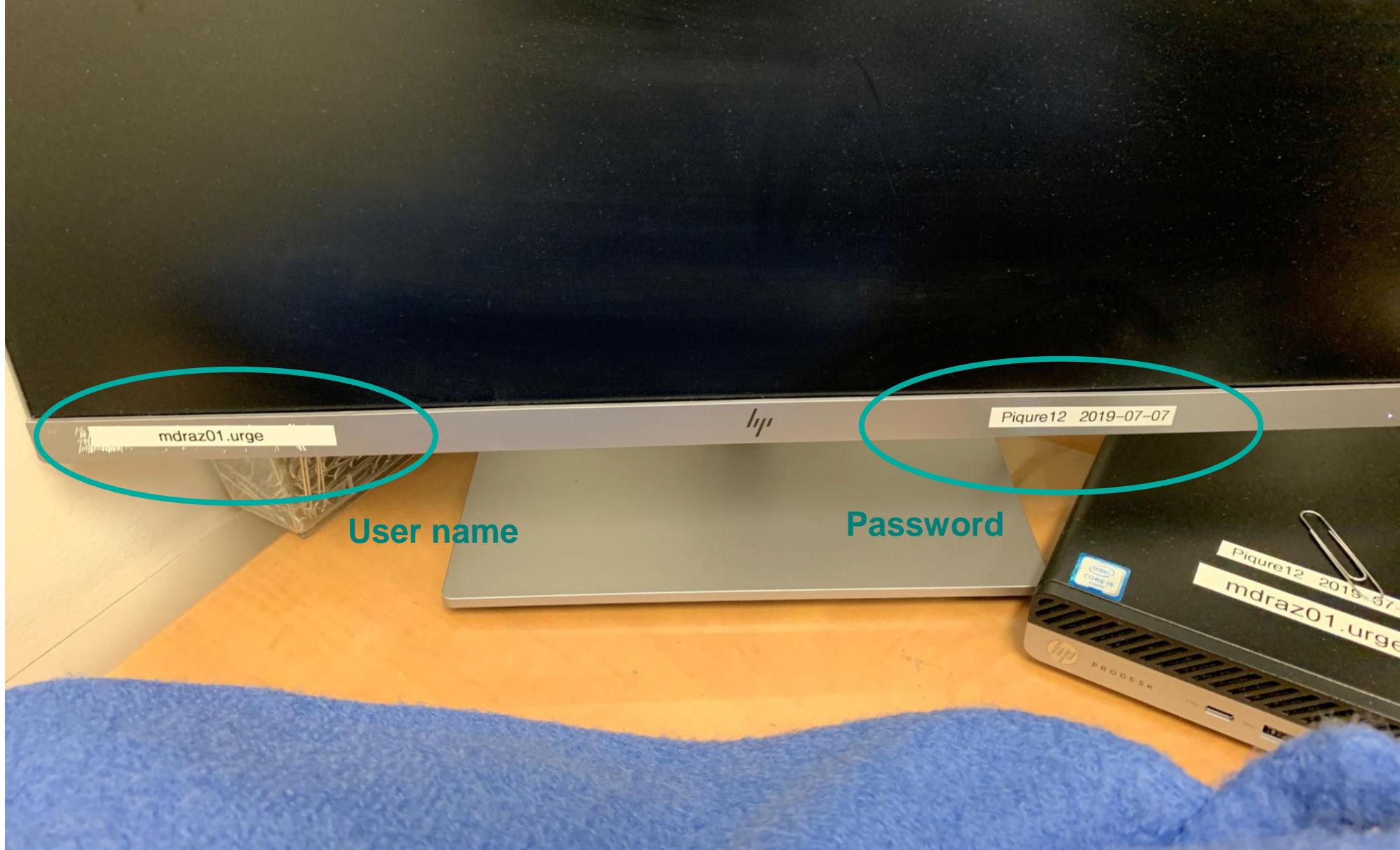
Intentional

Cyber Attack

Enemy

Operational Unpredictability





Unintentional, potential compromise = Safety issue



Cyber Safety VS Cyber Security

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ATKINS
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Cyber Safety VS Cyber Security

disambiguation



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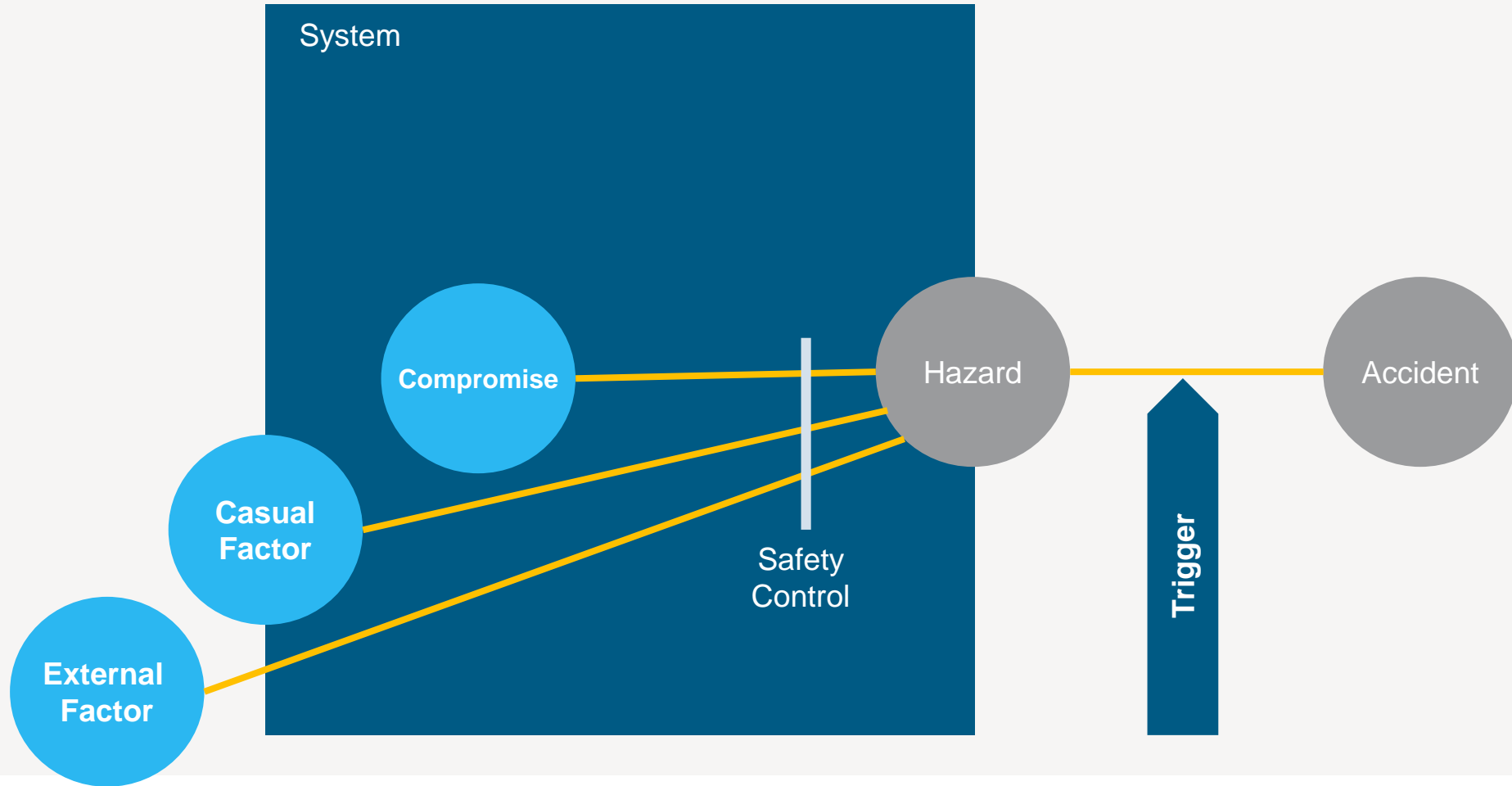
SECURITY

**Intentional
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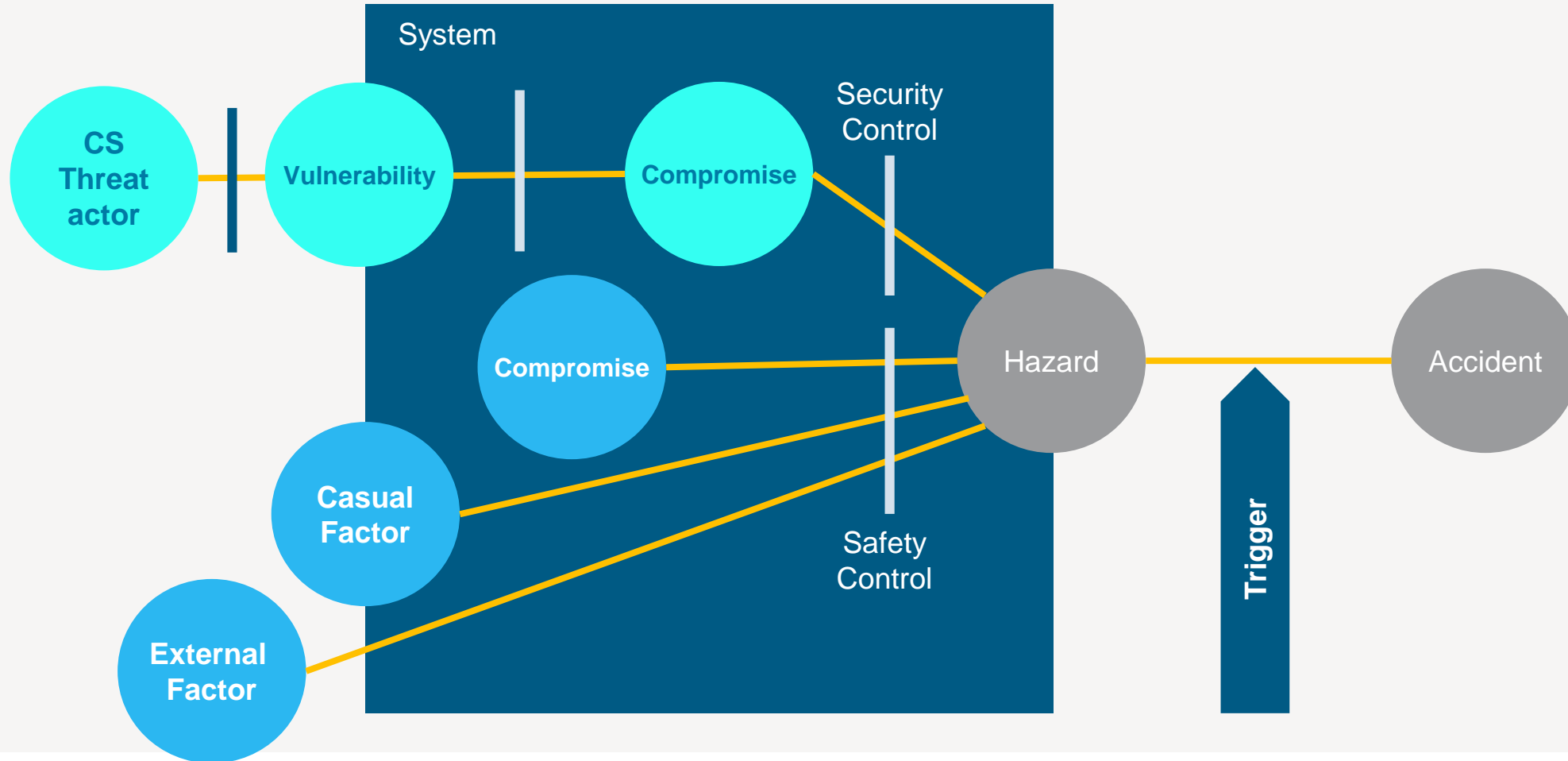


Safety and Security needs to be integrated at the same time as the two notions clearly relate to each other

Correlation between safety and security



Correlation between safety and security



**Be suspicious about emails
from people you do not know**

**Do not blindly trust
hyperlinks**

Do not ignore updates

**Stay away from social
media bullies**

**Even cute kitten
pictures may be harmful**

Cyber Safety Tips

**Do not ignore warnings
about pages and
websites**

**Keep sensitive
information to the
minimum on your
devices**

**Do not leave devices
unattended**

**Choose strong
passwords. Change
them regularly**

**Avoid free or public
Wi-Fi as much as
possible**





SNC • LAVALIN

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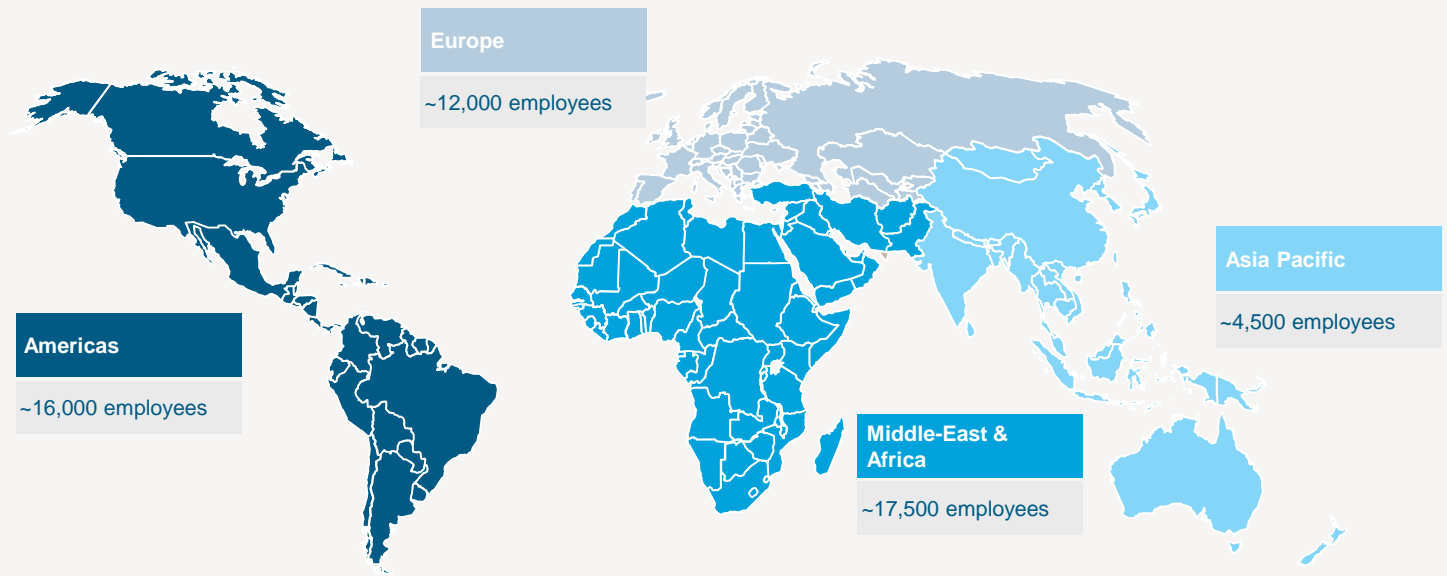


Global Rail & Transit



Increased geographic reach

- › An established and balanced footprint
- › Greater “at-scale” European and Middle Eastern presence



APPROXIMATELY
50,000
EMPLOYEES

SPEAKS
70
LANGUAGES

WORK FROM
OFFICES IN OVER
50
COUNTRIES

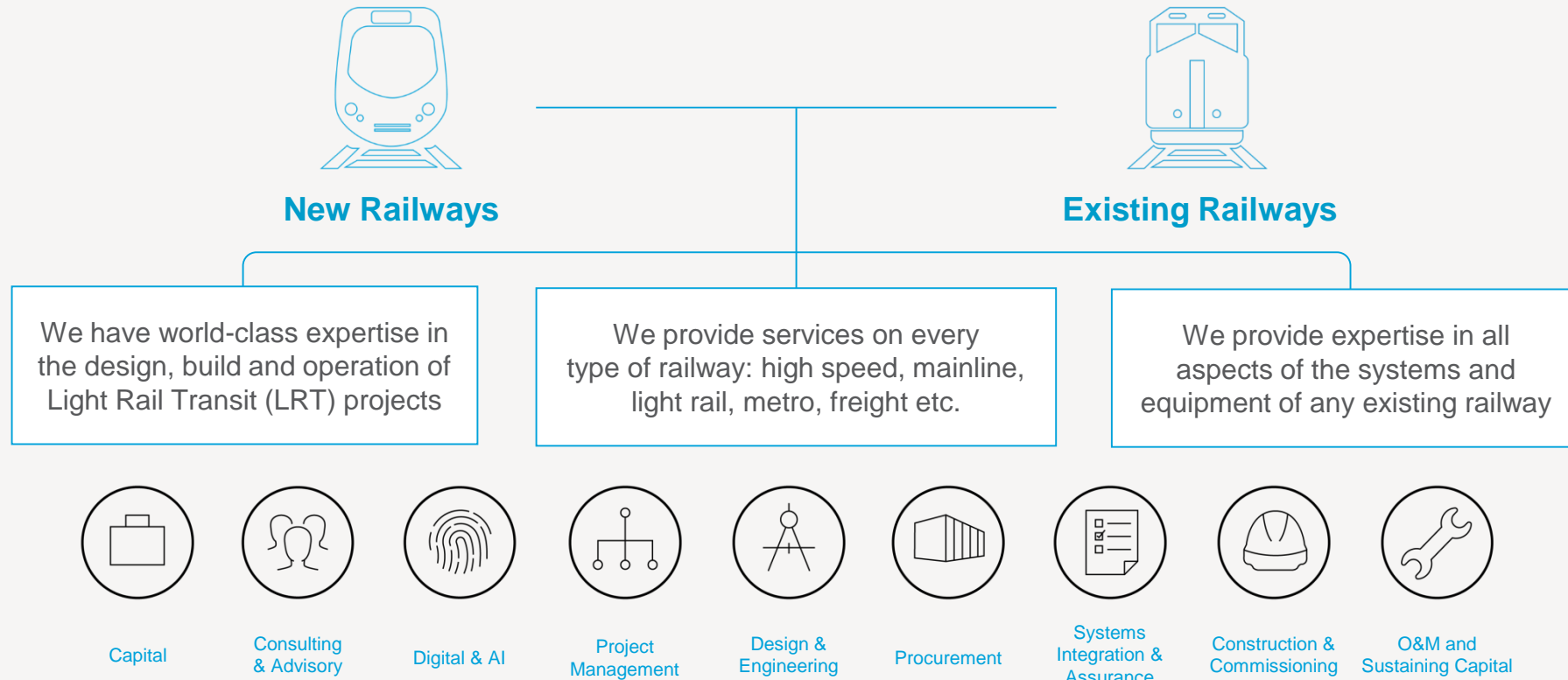
REPRESENTS
SOME
130
NATIONALITIES

- › Atkins Energy segment allocated 41% Europe, 46% North America, 9% Middle East & Africa and 4% Asia Pacific
- › Atkins segmentation based on fiscal year ended March 31, 2016 applied to twelve month period ended September 30, 2016
- › Pro forma financials based on SNC-Lavalin fiscal year ended December 31, 2016 and Atkins twelve month period ended September 30, 2016

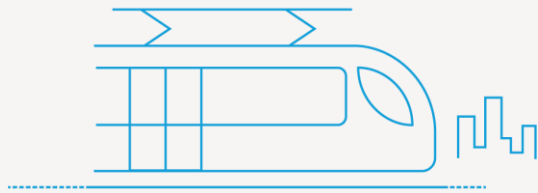


End-to-end Rail & Transit capabilities

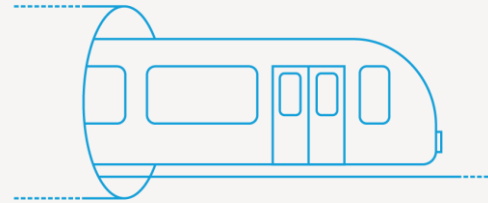
We provide services through the whole life cycle of existing or new railway projects.



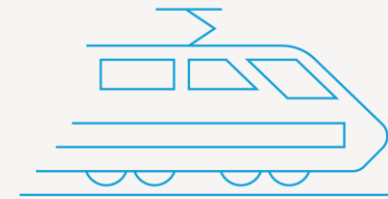
We support all types of railway systems



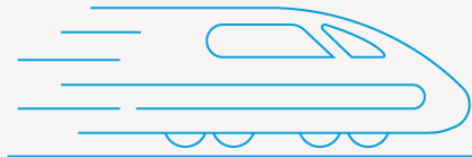
Light Rail



Metro



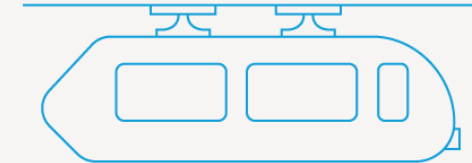
Mainline



High Speed



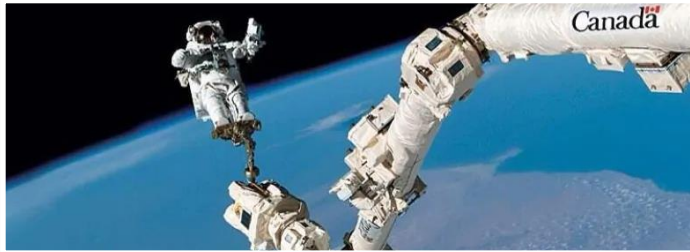
Freight



Other Modes



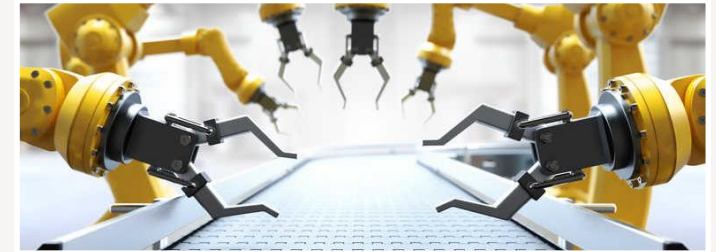
Pat Chartrand, Bsc. Aero. CISSP, CCNA, GIAC



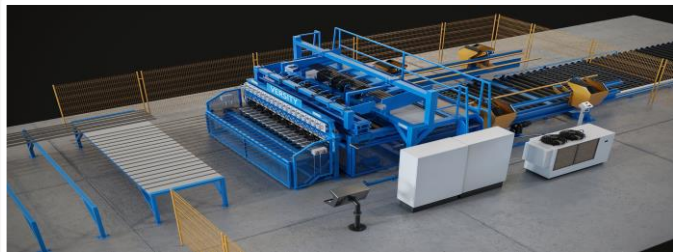
Project Management



Aerospace Engineering



Robotics Design



3D manufacturing



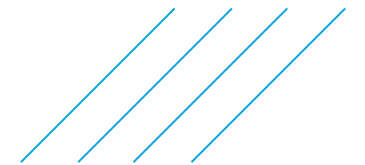
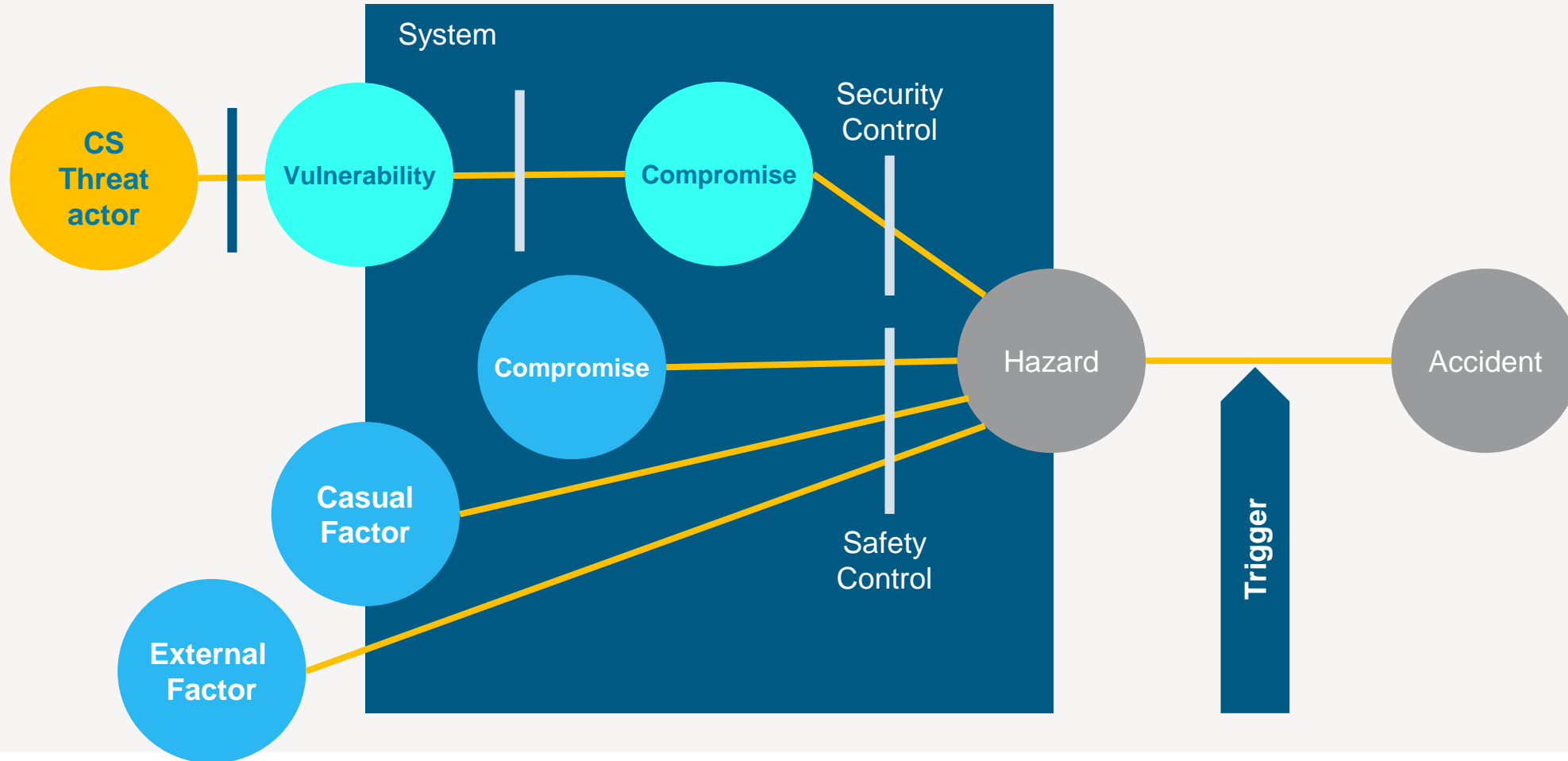
Programming since 1984

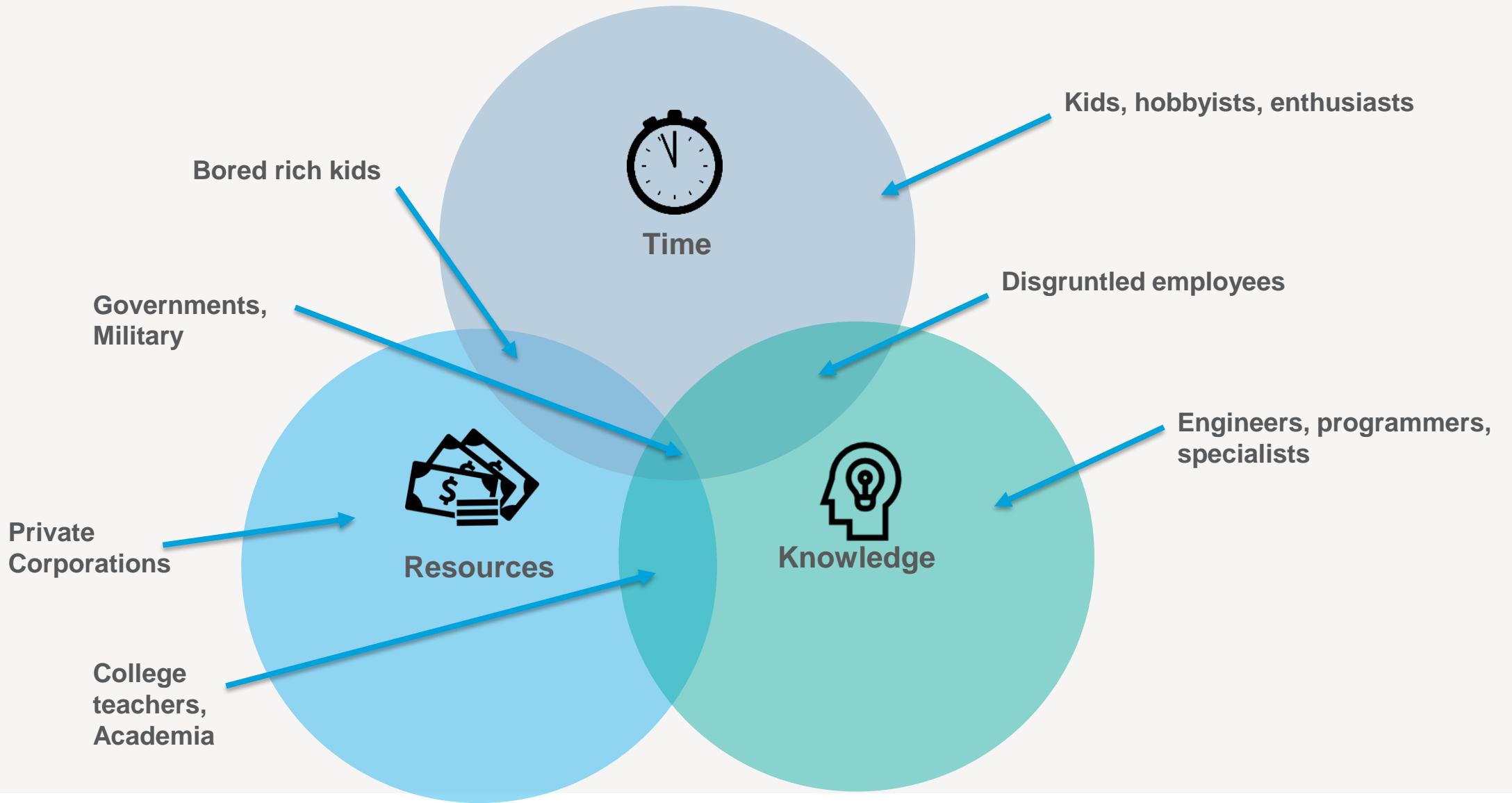


Serial Entrepreneur



Correlation between safety and security







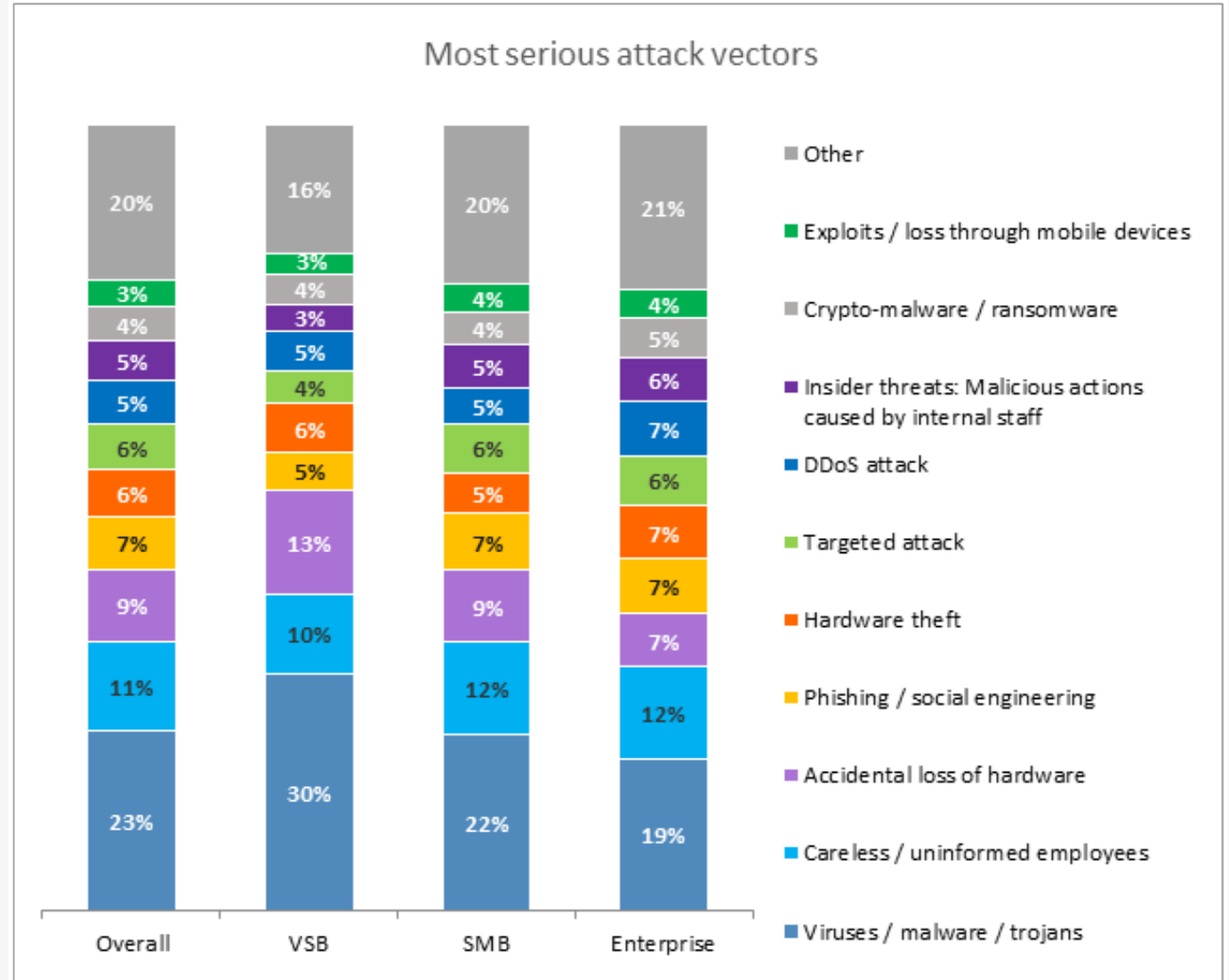
Unusual suspects



Human Factors

- Purple:** Insider Threats
- Orange:** Hardware Threats
- Yellow:** Social Engineering
- Lilac:** Accidental loss of hardware
- Light Blue:** Carelessness

Overall: 38% employee related attack vectors



Characterizing and Measuring Maliciousness for Cybersecurity Risk Assessment

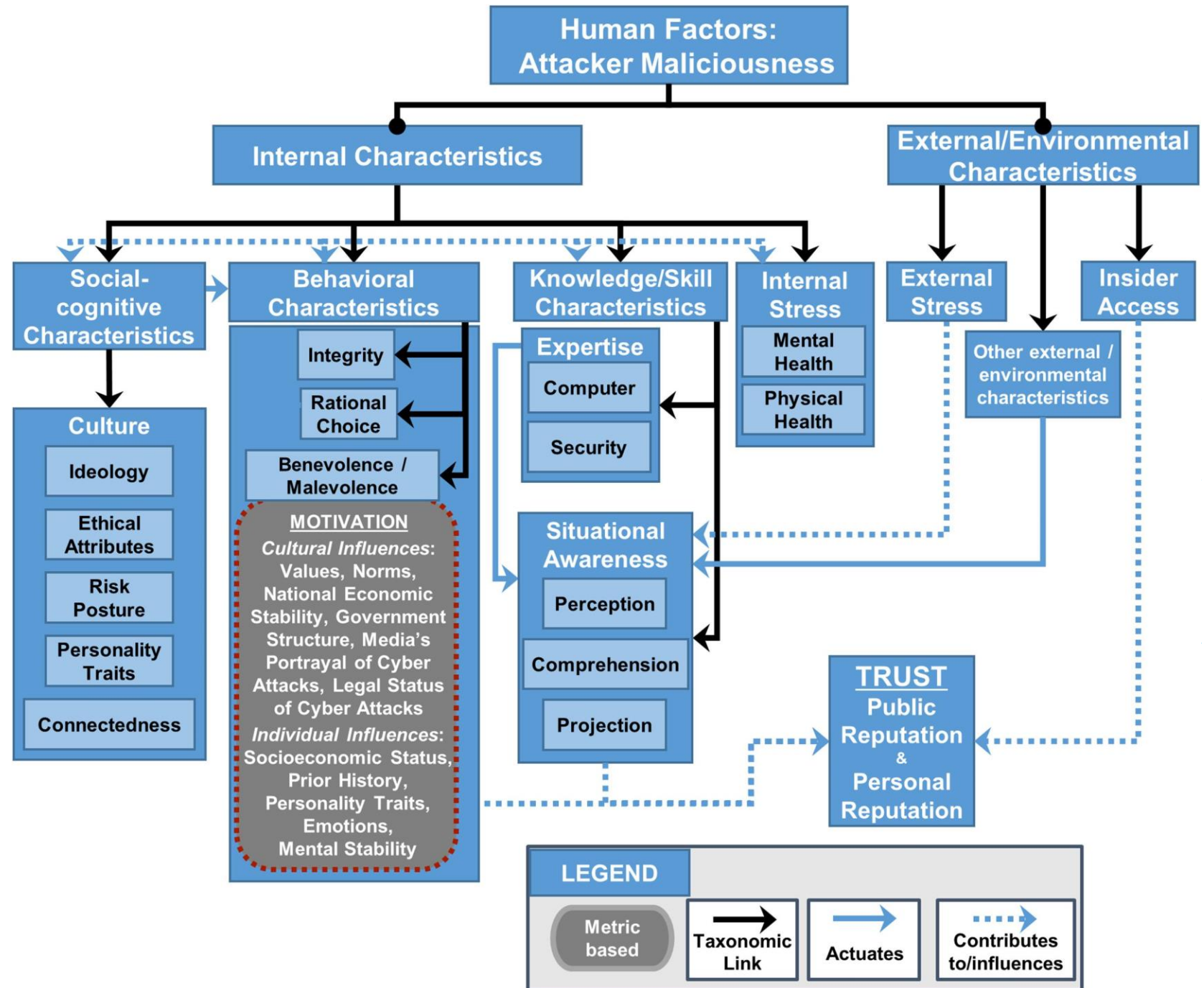
[Zoe M. King](#)

[Diane S. Henshel](#)

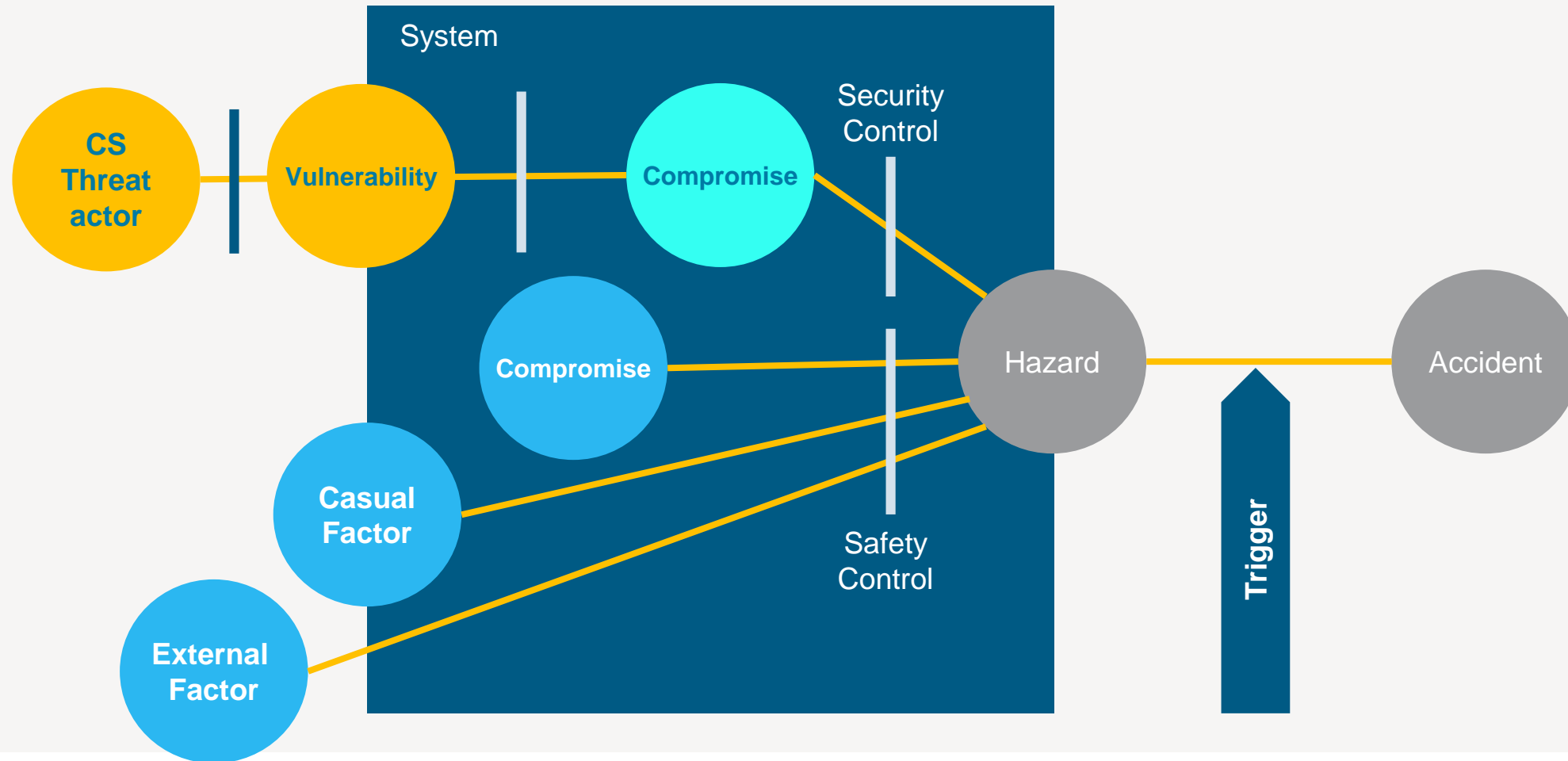
[Liberty Flora](#)

[Mariana G. Cain](#)

[Blaine Hoffman](#)

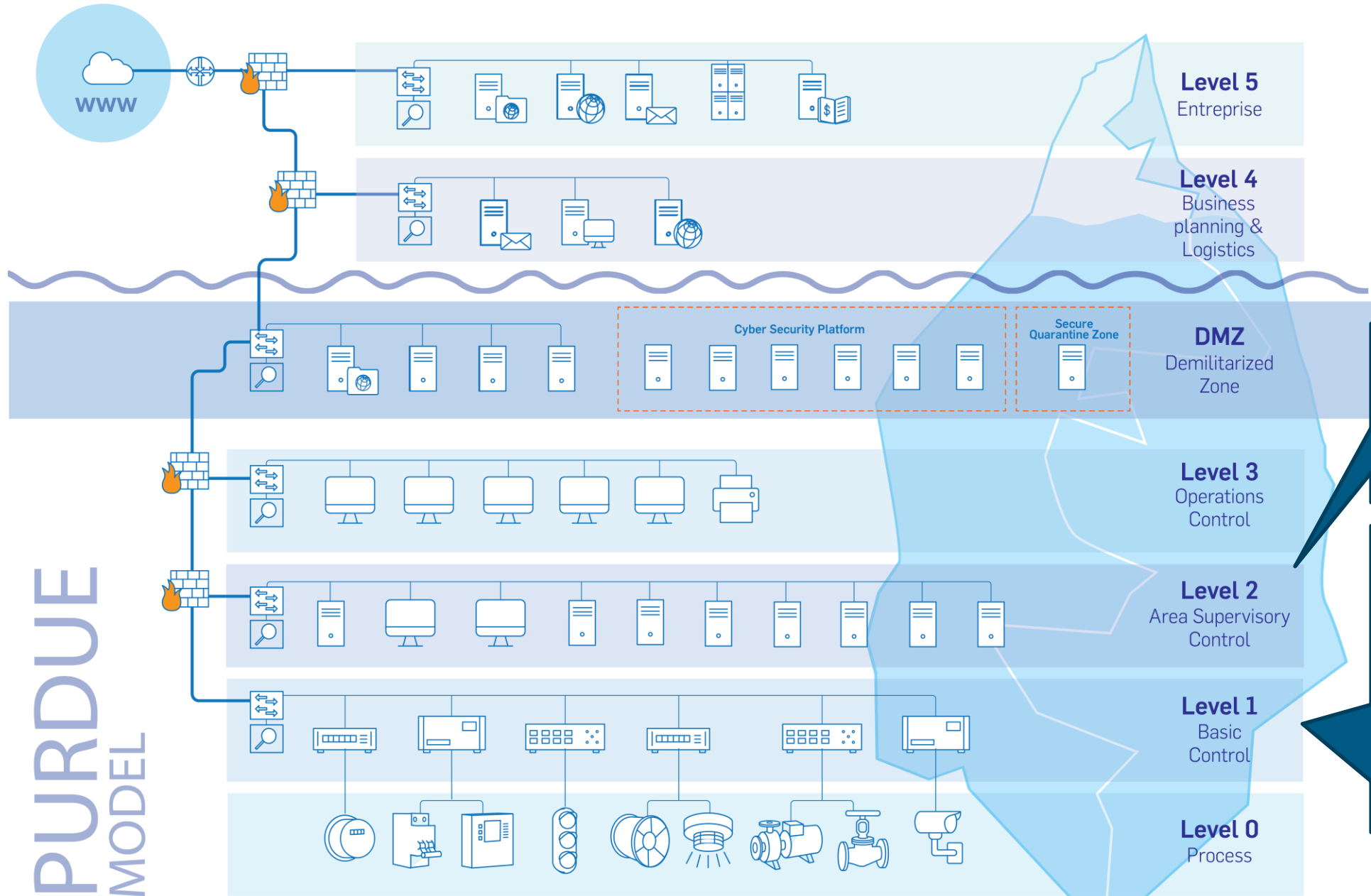


Correlation between safety and security



Train cyber security





Current scope of IEC62443 ends here !

All ICS Controllers, Logic Solvers and Field Devices are in Level 0/1

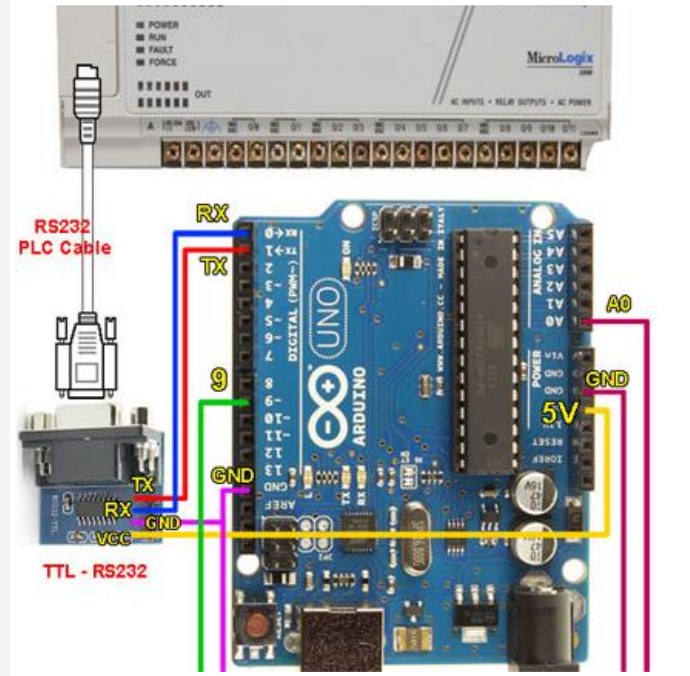
Safety related systems make up ~20% of level 0/1

PURDUE MODEL

Given Physical Access (by employee?)



Take a PLC and...



Simple Plug and Play Arduino Module including a...



Cellular Communication module for Arduino



Recently found in an enclosure

Most PLC have open USB ports

Default Passwords

Not monitored

An Arduino module:

sending Serial Commands

Ghost Typing

Changing Input – Outputs at terminal level

Acting as Man in the middle on the network

Reporting “all systems go” to operator.



Smart Sensors (IIoT)

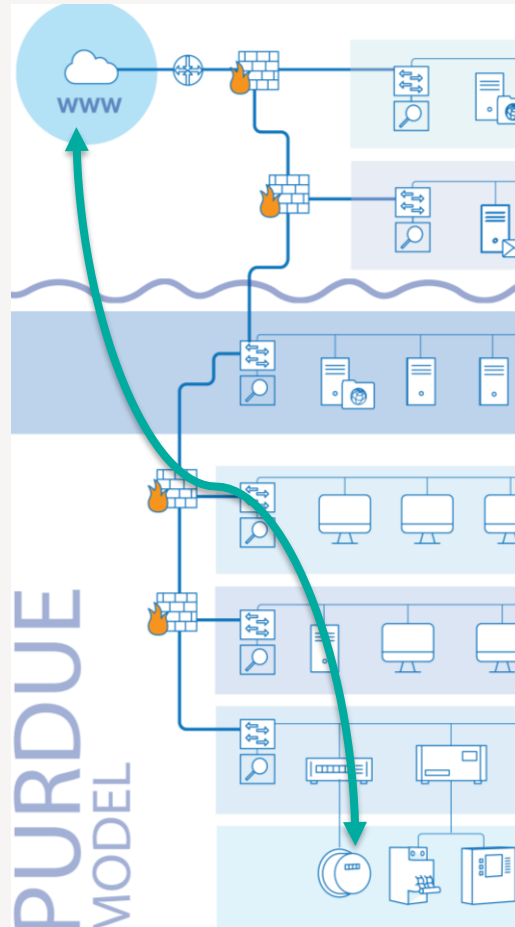
Notorious for opening ports on the internet.
Key selling point !

Use proprietary protocols

Not standard based (no Standards)

Many documented exploits.

Blurs the Purdue Model



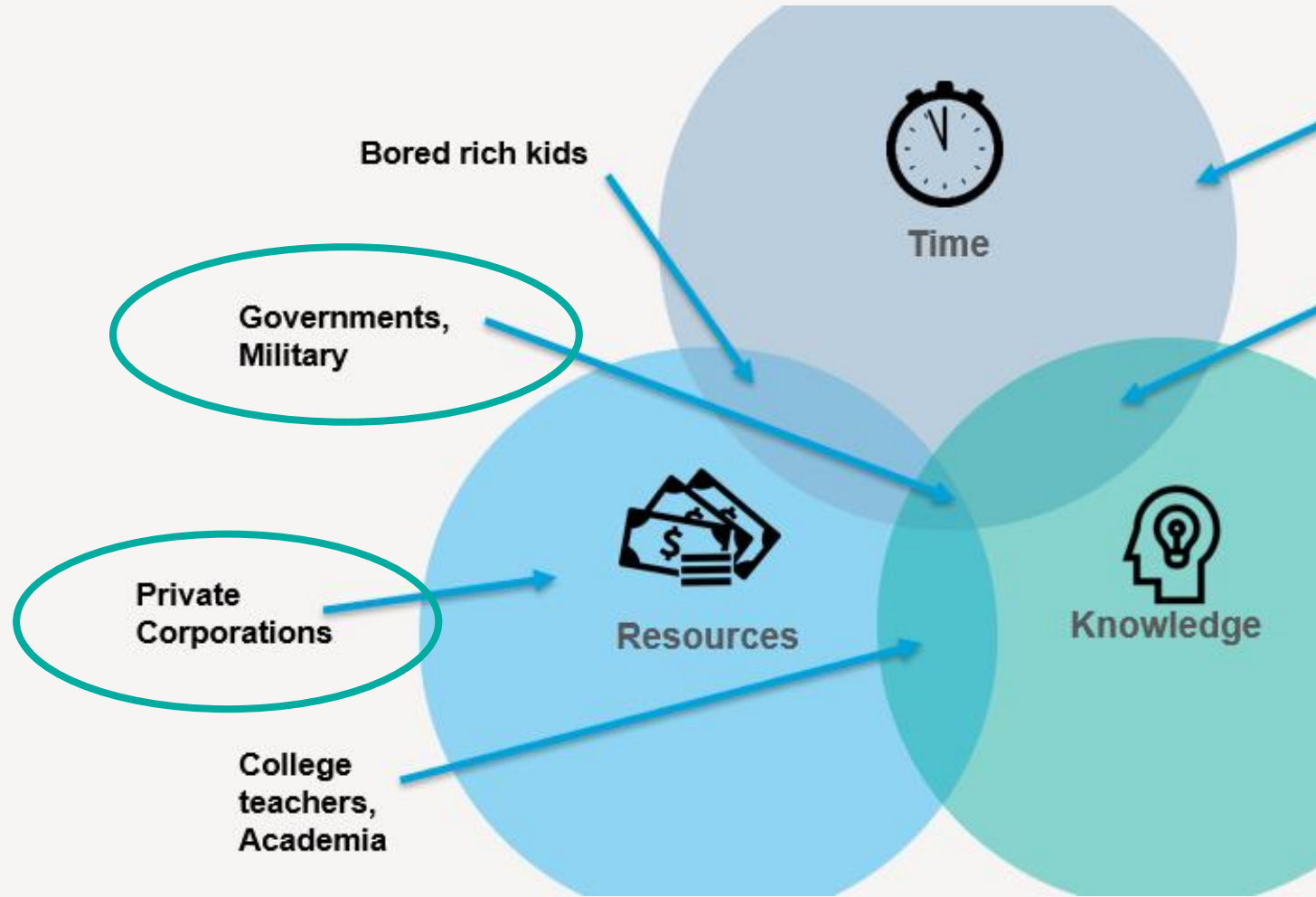
Foreign Sourcing

Going for cheap! Key selling point !

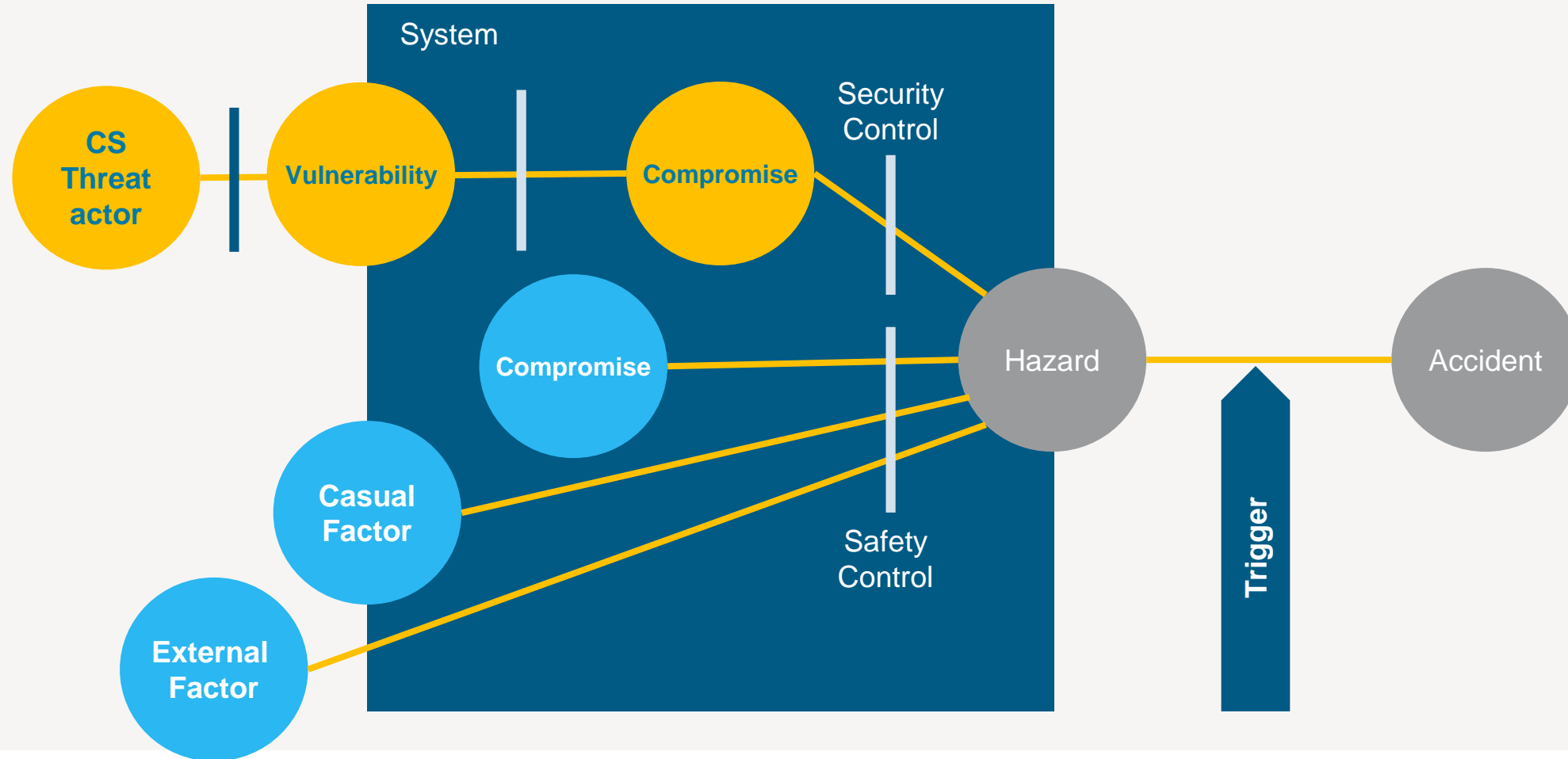
Different Standards (if any)

Never sure of Cyber Security features.

No control on the country's objectives.



Correlation between safety and security



Compromise example: Project Honey Train

"The goal is to provide an environment where we can study how people may try to attack public infrastructure projects where they could put public safety at risk,"

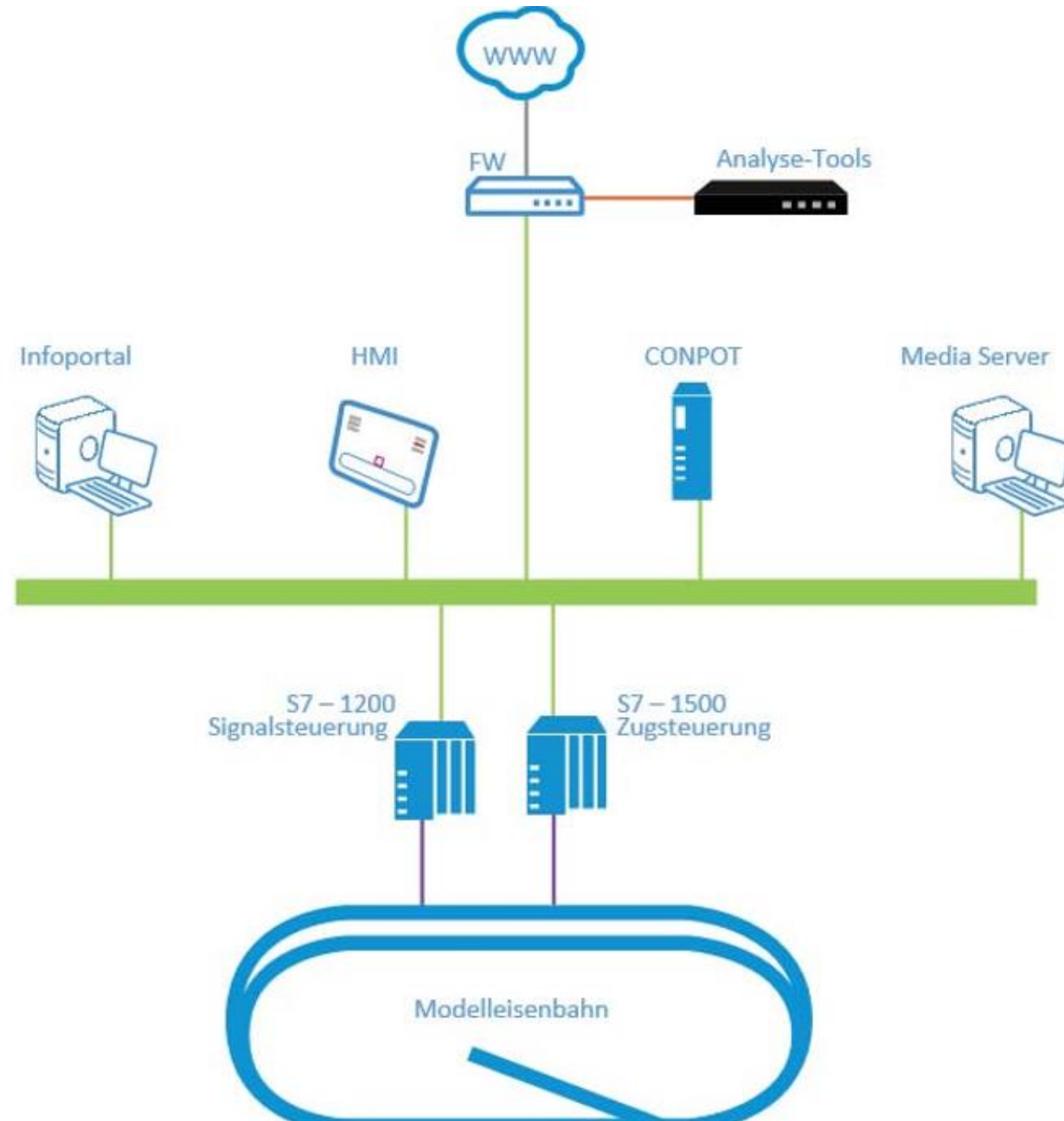
Train cyber security

6

weeks

2.7M
attacks

250K
Reached
signaling
modules



LIVE

breakyourfrownnews.com

BREAKING NEWS

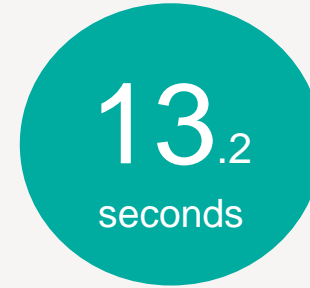
25 DEAD IN RAIL CYBER ATTACK

11:16

MINISTERS ASKING WHY CYBER SECURITY WAS NOT ADDRESSED | RAILWAY SHUTDOWN



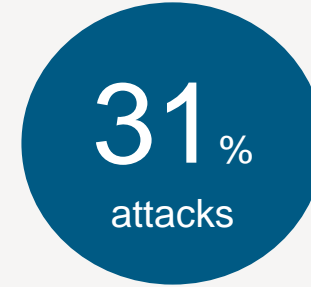
The annual cost of cybercrime damages is expected to hit \$5 trillion by 2020.
(Source: Cyber Defense Magazine)



A business falls victim to a ransomware attack every 13.275 seconds.
(Source: Cyber Defense Magazine)



95% of data breaches have cause attributed to human error
(Source: Cybit Solutions)



31% of organizations have experienced cyber attacks on operational infrastructure.
(Source: Cisco)



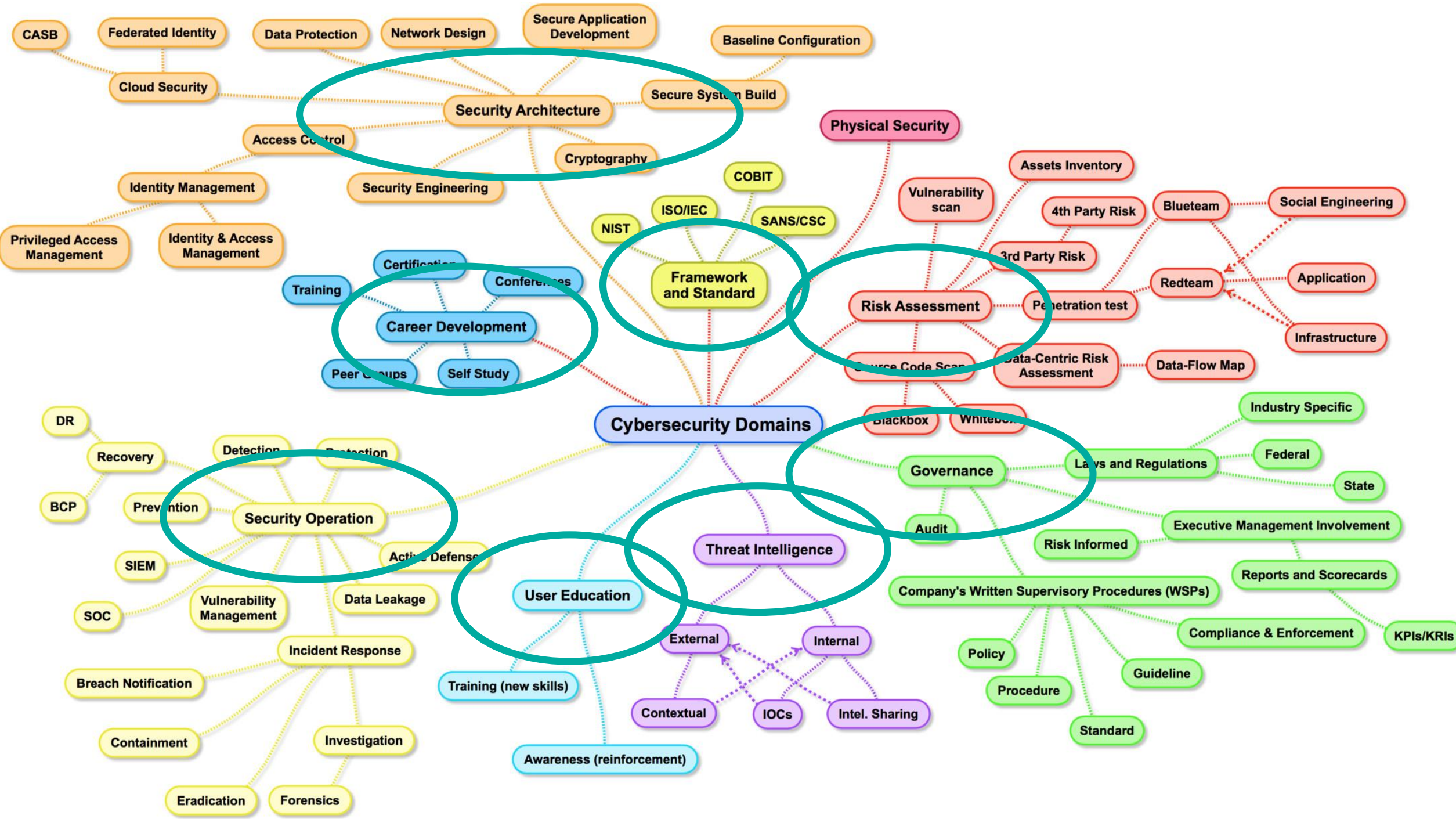
Cyber Security Is in High Demand

Security specialist is one of the most promising career choices in the IT sector.

There are over 300,000 unfilled cybersecurity jobs in the United States, with the demand rising each year.

(Source: Cybit Solutions)



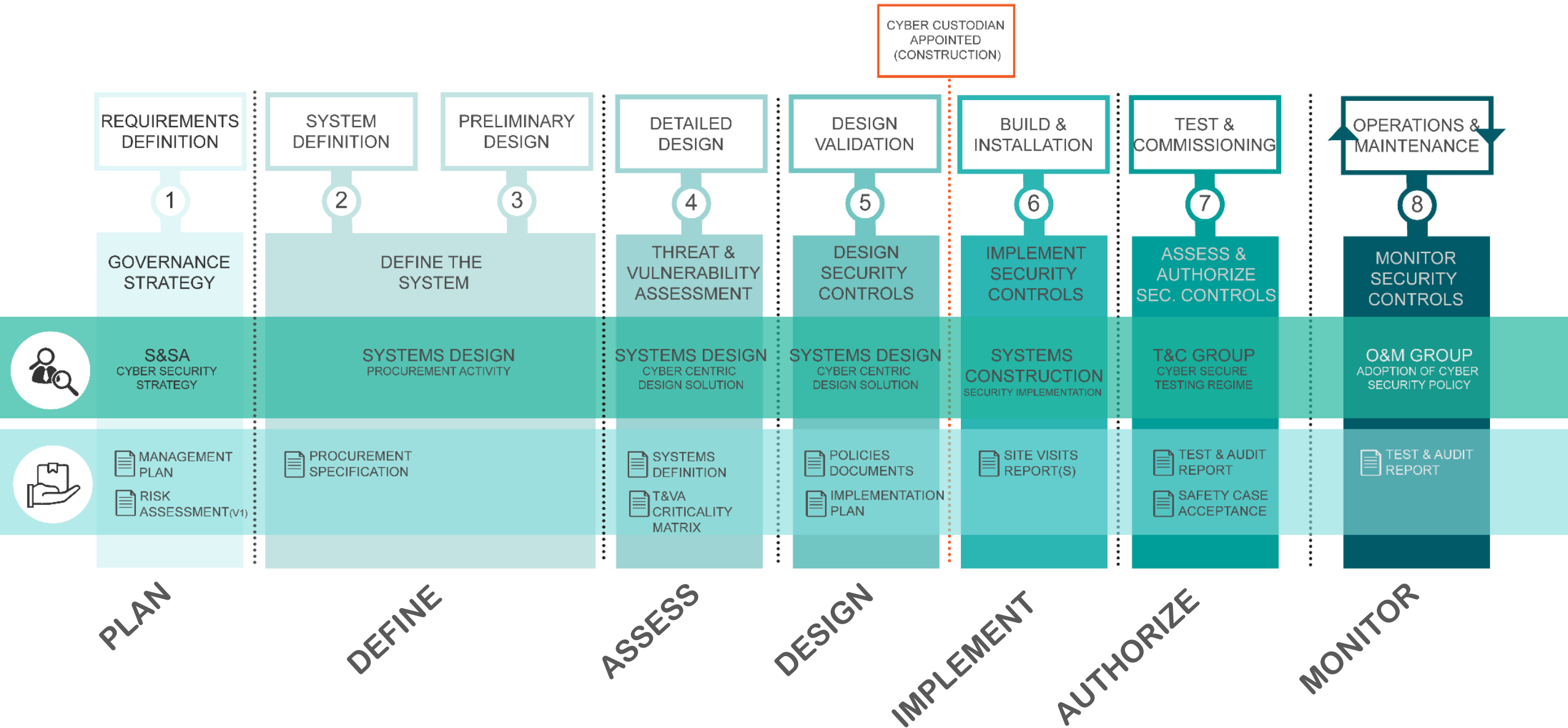


point of view:

For Safety considerations, Cyber Security needs to be planned for as early as possible in a development project.

A holistic approach to Cyber Security in the context of a train project







Fact:
This Cyber Security holistic view can be applied to any type of industrial project.



Thank you

Q&A period

References available upon request at:
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