Intro to Cybersecurity

1.1.1 – Intro to Security Concepts

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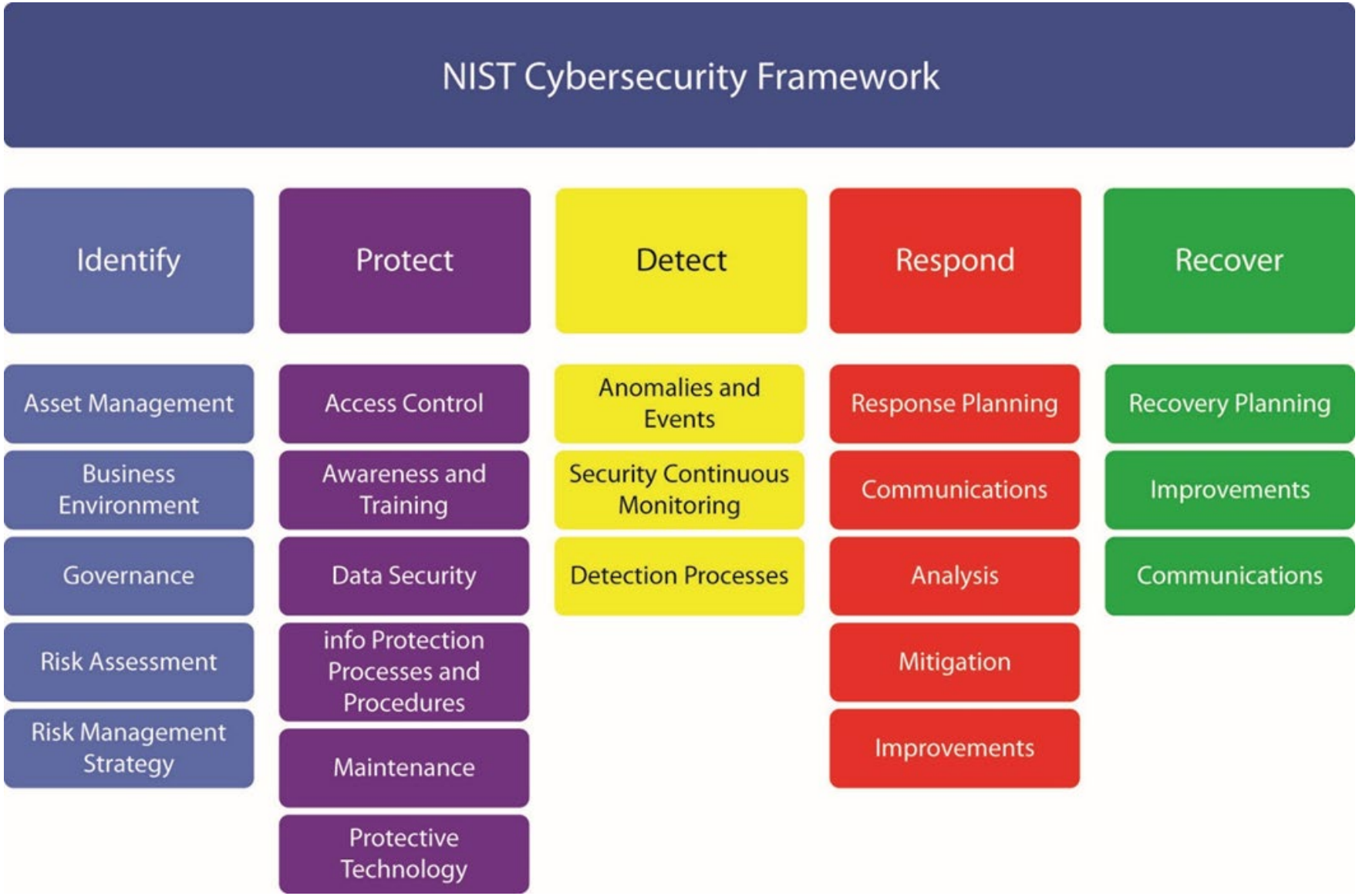
Model of Computer Security

Protection = Prevention + (Detection + Response)

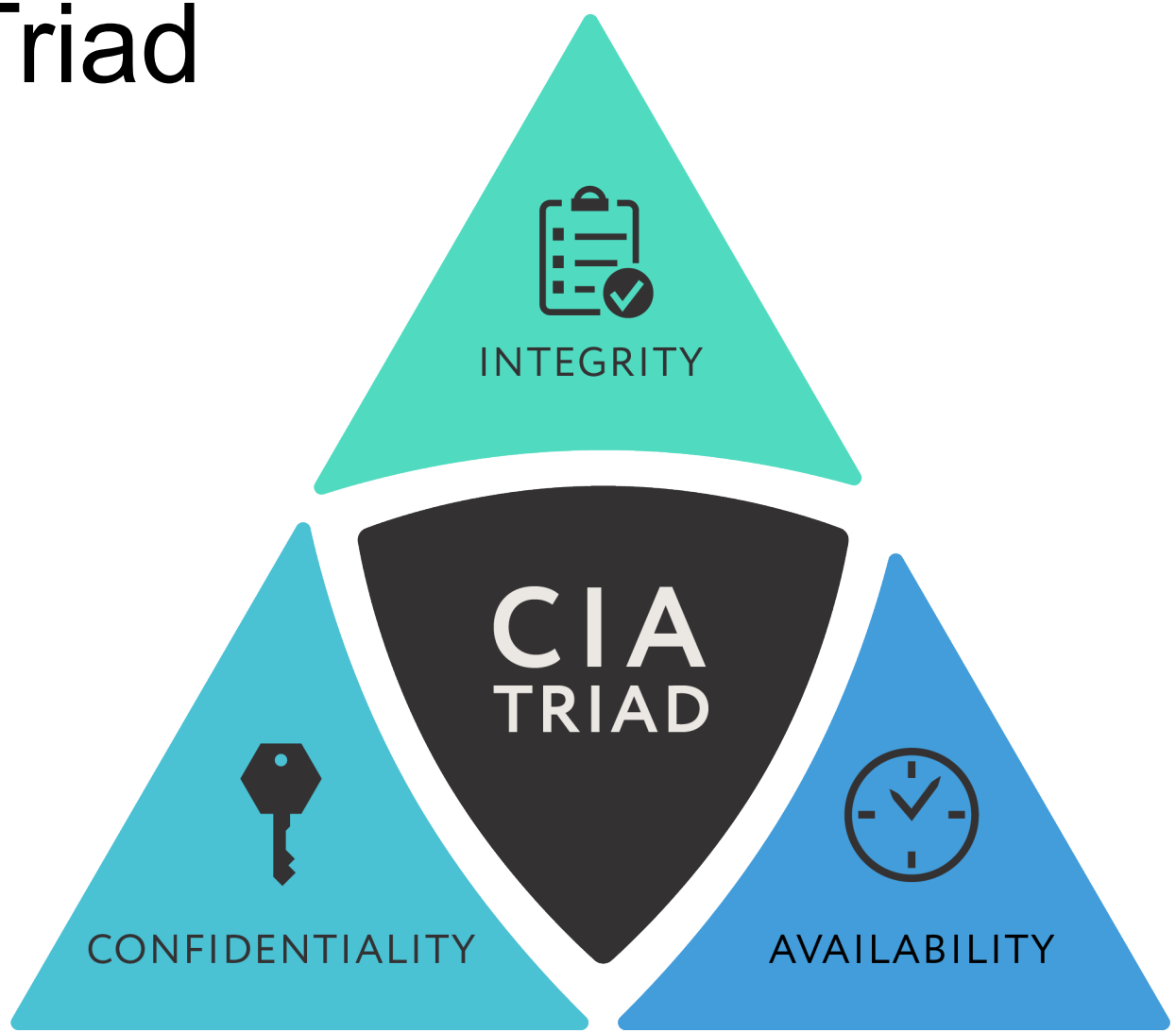
- **Protection** – What the goal is.
- **Prevention** – What you can do ahead of time.
- **Detection** – What you can do while the system is running to determine if something is wrong.
- **Response** – When something wrong is detected what you can do to fix the problem.

- Every security technique falls into at least one of the three elements of this equation



Source: https://www.nist.gov/cyberframework

The CIA Triad



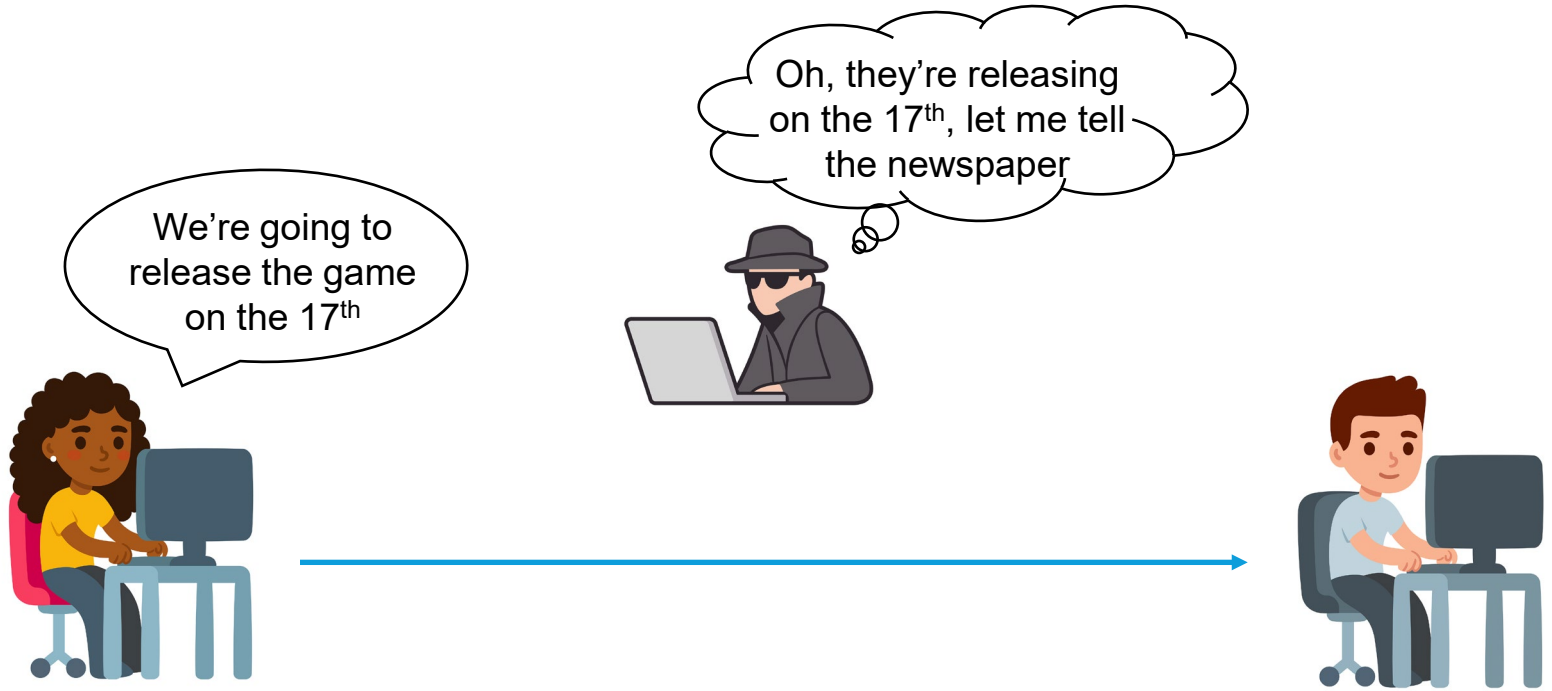
C I A = Goal of Network Security

Data (aka information) is an Asset. The goal of cybersecurity is to maintain…

Confidentiality	Data is not revealed
Integrity	Data is intact – not modified or corrupted
Availability	Data is accessible to allowed users

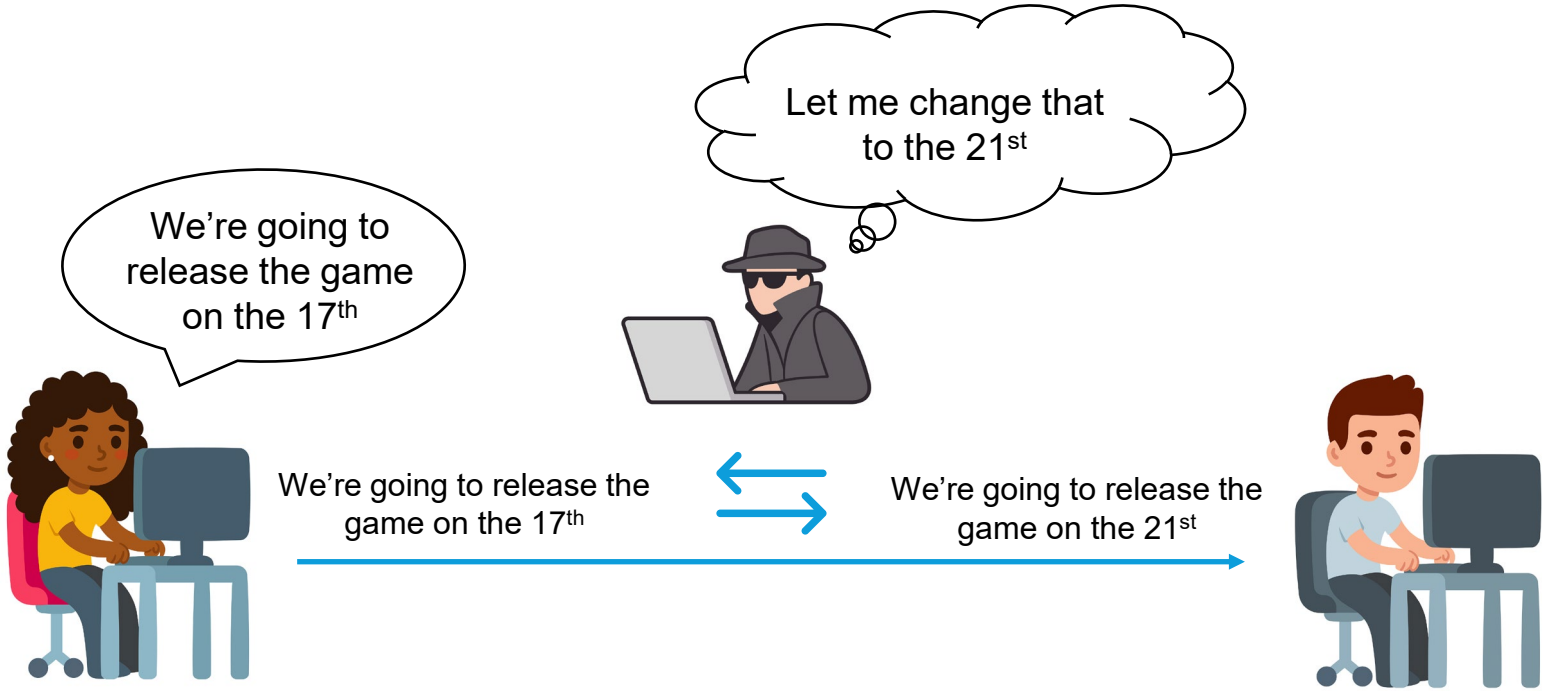
Confidentiality

Protection against unauthorized access



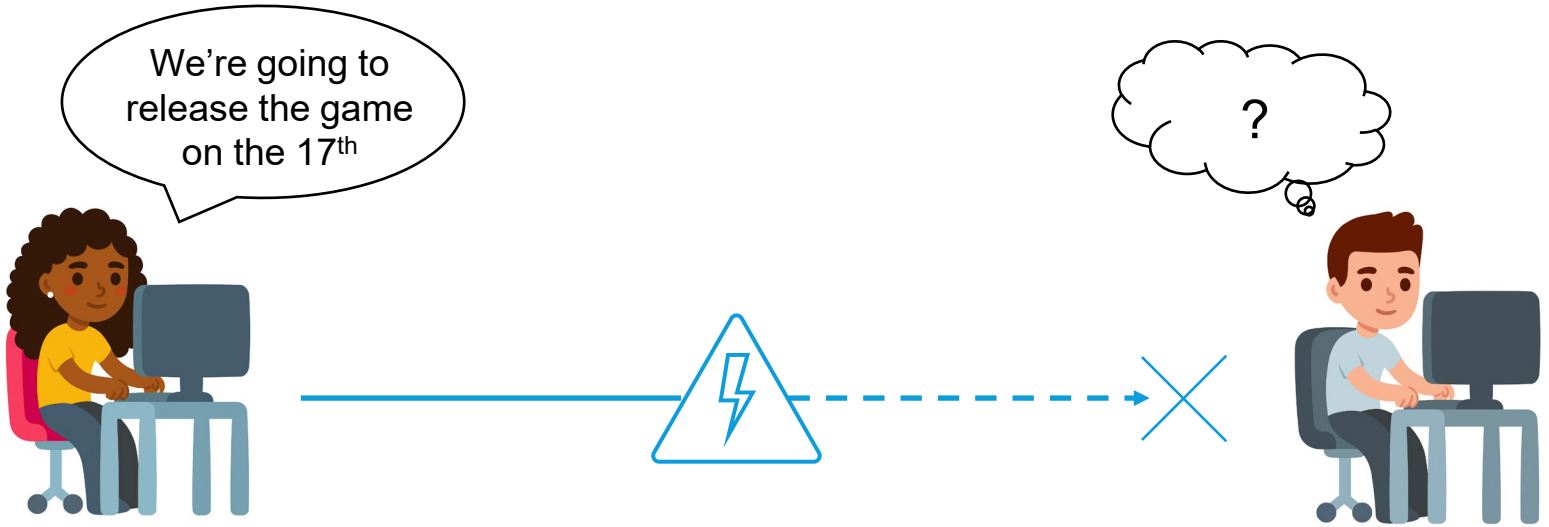
Integrity

Protection against unauthorized modification



Availability

Protection against denial of service



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Activity – Understanding the CIA Triad

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Data “states”

To protect the CIA of data, we need to know what *“state”* the data is in and then we can apply the right cybersecurity tool.

- **Data at Rest** = *storage* → information is at rest; usually files, databases, etc stored on hard drives, USB drives, memory, DVDs

- **Data in Transit** = *transmission* → being moved from one system to another or file sharing on a LAN or transfer on the Internet, etc.

- **Data in Use** = *processing* → file creation by user, data used in an application, being processed or placed in memory, etc.

Breach of CIA examples

Loss of Confidentiality
Stolen data that was made public

- NSA leaks of government data by Edward Snowden

NY Times 6/9/13 Credit:Glenn Greenwald/Laura Poitras/European Pressphoto Agency

Breach of CIA examples

Loss of Integrity → Data that was corrupted


Iran: Computer Malware Sabotaged Uranium Centrifuges

BY KIM ZETTER 11.29.10 4:18 PM

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https://www.wired.com/2010/11/stuxnet-sabotage-centrifuges/

STUXNET worm – changed the code on the centrifuge machines in an Iranian nuclear facility so that they ran at too high a speed.

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Breach of CIA examples

Loss of Availability → Data is inaccessible

A common reason is a DDoS attack = *Distributed Denial of Service*

Mirai Botnet takes down website of cybersecurity reporter Brian Krebs– mad about an article he wrote, hackers infected more than 145,000 internet-attached devices like cameras and ordered them to flood Krebs' website with traffic. It was like getting hit with a massive firehose and the site crashed for 4 days.


BIZ & IT —

Record-breaking DDoS reportedly delivered by >145k hacked cameras

Once unthinkable, 1 terabit attacks may soon be the new normal.

DAN GOODIN - 9/28/2016, 8:50 PM

https://arstechnica.com/information-technology/2016/09/botnet-of-145k-cameras-reportedly-deliver-internets-biggest-ddos-ever/

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Activity – CIA Triad Card Game

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