Integrity

Objectives

- Understand what Integrity is
- Discuss how integrity is achieved
- Discuss, through example, how it is applied

FIPS 199

- U.S. federal government special publication that outlines the standards for security categorization of Federal Information and Information Systems
- Breaks down categorization of information
- Based off FISMA compliance – Federal Information Security Modernization Act

Definition

- Definition according to Title 44 of the U.S. Code: “Guarding against improper information modification or destruction, and includes ensuring information non-repudiation and authenticity”
- In layman’s terms: keeping information:
  - Accurate, complete, and protected from modification

How it applies?

- How do we use this term?
- Each time we discuss any IT service or system and assess security, we must look at each of the 3 principles
- FIPS 199: “A loss of integrity is the unauthorized modification or destruction of information”

Example - 1

- Did you ever play the game called “telephone”
- It’s where one person said a word or a phrase and whispered it to another person.
- The message would go between person to person until the end and you would see if you kept the message correct
- Rarely was it correct.
- Think about the game if you gave a piece of paper instead. Could you passed the note along instead of whispering?
- Medium is important!

Example - 2

- Integrity allows us to verify data
- Luhn algorithm – used to protect against accidental errors
  - Credit card numbers
  - IMEI numbers
  - National Provider Identification numbers
  - Canadian Social Insurance numbers

Examples of how we use it everyday

- All packets traversing the network are checked for errors
- Digital signatures
- Hashes
- Cryptography

Why do we need this?

- If we can’t verify a message is correct, what good is the message?
- Think about any industry
  - Healthcare - Accuracy is key! Think about how you dose medicine?
  - Credit Card information – Think about how we use the data to make transactions?
  - Video on Youtube – If you have errors in the network and packets are garbled, do you have distorted video?

Major failures

- phpMyAdmin attack of 2012
- Checksum mismatches
- Phishing?