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# Information Security

# Agenda

- Application Security
- Information Security
- Concepts review
- Security organizations
- Cryptography introduction

*Security is as strong as the weakest link*

# Introduction

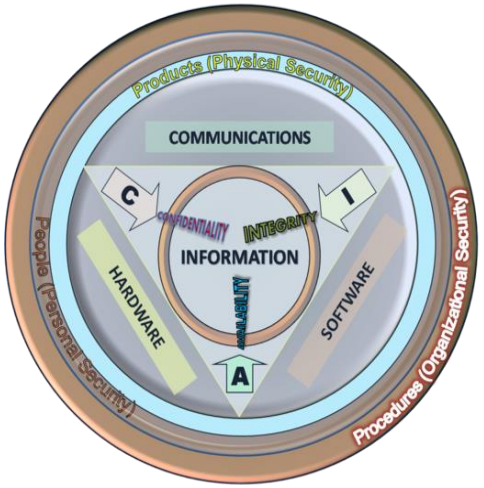
- Application Security
  - From Wikipedia
    **Application security** encompasses measures taken throughout the code's life-cycle to prevent gaps in the security policy of an application or the underlying system (vulnerabilities) through flaws in the design, development, deployment, upgrade, or maintenance of the application.
  - Common problem:
    - usually considered in the end of dev when it is too late

# Introduction

- Information security
  - From Wikipedia:
    ***Information security***, *sometimes shortened to InfoSec, is the practice of defending information from unauthorized access, use, disclosure, disruption, modification, perusal, inspection, recording or destruction. It is a general term that can be used regardless of the form the data may take (electronic, physical, etc…)*

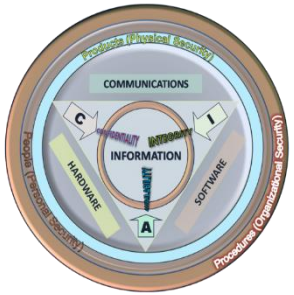
# Basic concepts

- Information security basic concepts
  - Confidentiality
  - Integrity
  - Availability



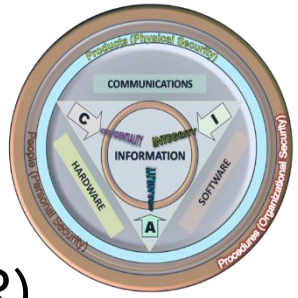
# Basic concepts

- Information security basic concepts
  - Confidentiality
    - Preventing discloure information
      - It's about reading
    - Classification of information
      - Different ways, e.g.
        - Top secret, Secret, Official (in UK)
        - Confidential, Restricted, Internal use, Public (quite common)
      - *Clearance*: rules controlling the level of permission required to view information and how it must be stored, transmitted, and destroyed
      - Term ***need-to-know***
      - Time perspective („how long" and „it may change")
      - NDA agreements



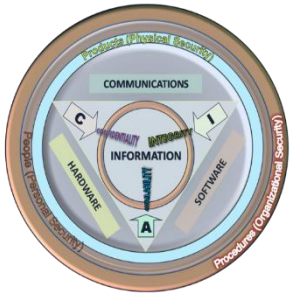
# Basic concepts

- Information security basic concepts
  - Privacy (often confused with secrecy)
    - The General Data Protection Regulation (GDPR)
      - https://en.wikipedia.org/wiki/General_Data_Protection_Regulation
    - Worth to watch
      - https://www.youtube.com/watch?v=NIf7YM71k5U (3 min)
        - Let's see this one
      - https://www.youtube.com/watch?v=pcSlowAhvUk (20 min)



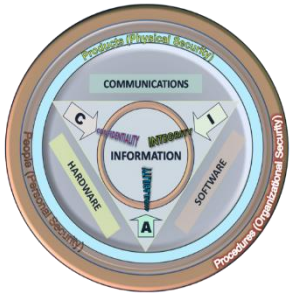
# Basic concepts

- Information security basic concepts
  - Integrity
    - Consistency of data over its entire life-cycle
    - It's about writing
    - Often missed classification, but good to have as well
    - When confidentiality is low, but integrity high?



# Basic concepts

- Information security basic concepts
  - Availability
    - Information must be available when needed
    - Usually regulated by SLA
      - Be carefull to what SLA is related to? Solution or component?
    - Connected with Service Continuity (Plans)
    - Number of 9 matters:
      - 99% = **3d** 15h 39m 29.5s
      - 99,9% = **8h** 45m 57.0s
      - 99,99% = **52m** 35.7s
      - 99,999% = **5m** 15.6s
        - Nice calculator: https://uptime.is/



*Have we covered everything?*

# More concepts

- Information security basic concepts (more)
  - Authenticity
    - Ensure that the data, transactions or documents are genuine
  - Non-repudiation
    - Ensure involved party can't deny his or her participation in activity
  - Traceability
  - Anonymity

*Have we covered everything now?*

*No, not really.*

*There is still much more…*

# Basic terms

- Asset
- Threat
- Vulnerability
- Exploit
- Attack
- Controls (or countermeasures)
- Risk management
- Defence of depth
- Access control
- Principle of Least Privilege

# Security organizations

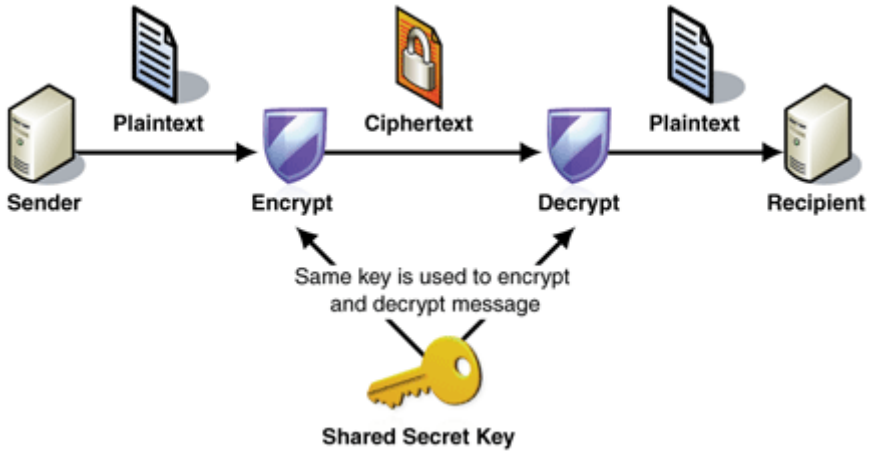
- Most important security organizations
  - OWASP: https://www.owasp.org/
    - OWASP Top 10
    - OpenSAMM
    - ASVS
  - WASC: http://www.webappsec.org/
    - Web Application Security Scanner Evaluation Criteria
    - Web Application Firewall Evaluation Criteria
    - Web Security Threat Classification
  - SANS Institute: http://www.sans.org/
    - GIAC certifications
    - Many trainings
    - A lot of articles
    - CWE/SANS Top 25 Most Dangerous Software Errors (joint with MITRE)

# Security organizations

- Most important security organizations
  - ISACA: https://www.isaca.org/
    - CISA, CISM, CRISC, CGEIT certifications
    - COBIT framework
    - Trainings, a lot of events
  - ISC2: https://www.isc2.org/
    - CISSP and many other certifications
    - Trainings, a lot of events
  - NIST: http://csrc.nist.gov/
    - FIPS standards
      - e.g. FIPS 197 (AES), FIPS 140-2 (crypto modules)

# Cryptography primitives

- Secret key cryptography

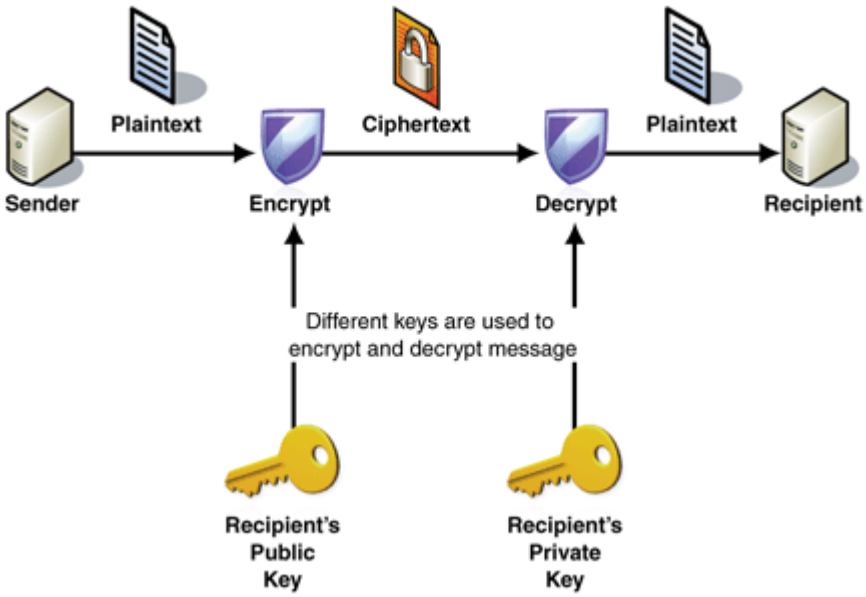



- Realization: AES, TripleDES
- The biggest challenge?

*http://redpinata-development.com/bitcoin-academy/index.php/reader/items/public-key-cryptography.html*

# Cryptography primitives

- Public key cryptography

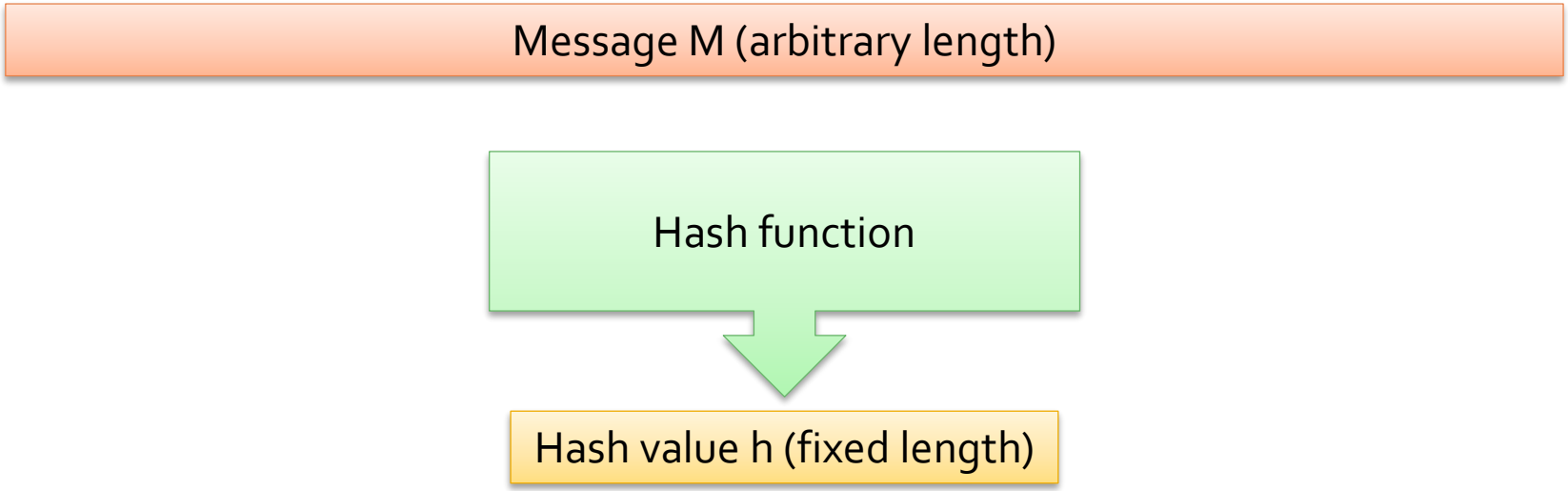



- Realization: RSA, DSA

*http://redpinata-development.com/bitcoin-academy/index.php/reader/items/public-key-cryptography.html*

# Cryptography primitives

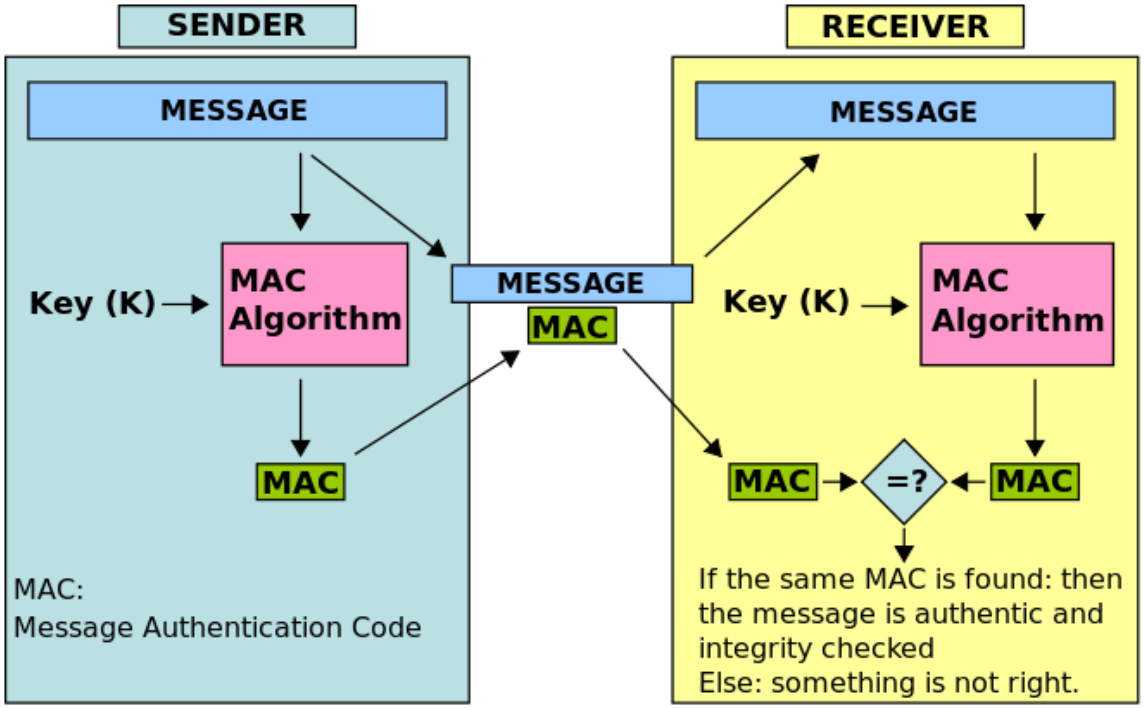
- Hash function




- Realization: SHA-2, SHA-3

# Cryptography primitives

- Message Authentication Code

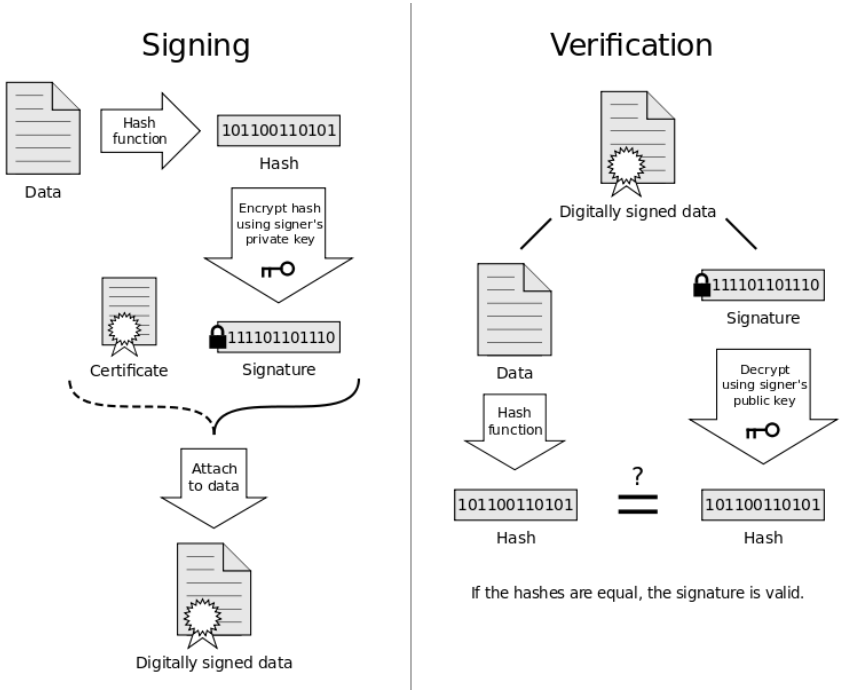



- Realization: HMAC-SHA512, CBC-MAC

*https://en.wikipedia.org/wiki/Message_authentication_code*

# Cryptography primitives

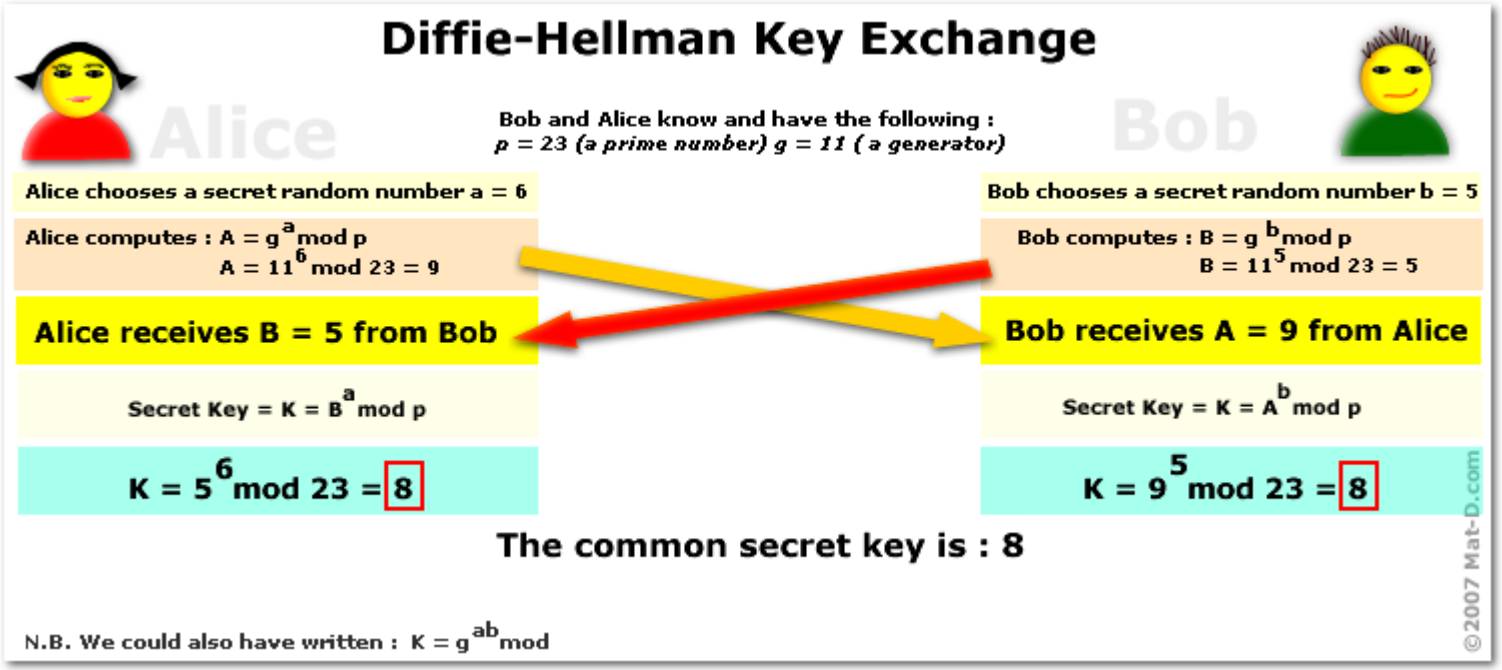
- Digital Signature




*https://en.wikipedia.org/wiki/Message_authentication_code*

# Cryptography primitives

- Key exchange




- Realization: Diffie-Hellman, RSA

*http://internetokracy.appspot.com/crypto1*

# References

- Application Security
  - http://en.wikipedia.org/wiki/Application_security
- Information Security
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